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Murata Power Solutions

MGJ2B Series

5.4kVDC Isolated 2W Gate Drive DC-DC Converters



FEATURES

- Optimised bipolar output voltages for IGBT/SiC & Mosfet gate drives
- Reinforced insulation to UL62368-1 recognised
- ANSI/AAMI ES60601-1, 1 MOPP/2 MOOP's recognition pending
- 5.4kVDC isolation test voltage 'Hi Pot Test'
- Ultra low isolation capacitance
- SIP package style
- 5V, 12V, 15V & 24V inputs
- +15V/-3V, +15V/-5V, +15V/-8.7V, +15V/-15V, +17V/-9V, +18V/-2.5V, +18V/-5V[3], +20V/-3.5V & +20V/-5V outputs
- Operation to 105°C
- Characterised CMTI >200kV/µS
- Continuous barrier withstand voltage 2.4kVDC
- Characterised partial discharge performance

PRODUCT OVERVIEW

The MGJ2B series of DC-DC converters is ideal for powering 'high side' and 'low side' gate drive circuits for IGBT/SiC and Mosfet gate drives in bridge circuits.

A choice of asymmetric output voltages allows optimum drive levels for best system efficiency and EMI. The MGJ2B series is characterised for high isolation and dv/dt requirements commonly seen in bridge circuits used in motor drives and inverters, while the MGJ2B extended temperature range and construction gives long service life and reliability.

SELECTION GUIDE

Order Code	Nominal Input Voltage	Output Voltage 1	Output Voltage 2	Output Current 1	Output Current 2	Input Current at Rated Load	Load Regulation (Typ)	Load Regulation (Max)	Ripple & Noise (Typ)[2]	Ripple & Noise (Max)[2]	Efficiency (Min)	Efficiency (Typ)	Isolation Capacitance	MTTF[1]	
														MIL.	Tel.
	V	V	V	mA			%		mVp-p		%		pF	kHrs	
MGJ2D051505BSC	5	15	-5	80	40	360	5.7	7	30	50	71	76	3	3136	95134
MGJ2D051509BSC	5	15	-8.7	80	40	390	6	7	30	50	73	77.5	3	2947	86077
MGJ2D051515BSC	5	15	-15	67	67	492	7	8.5	20	35	74	78	3	2164	84961
MGJ2D051802BSC	5	18	-2.5	80	80	410	9	12	20	50	70	75	3	2502	84300
MGJ2D052003BSC	5	20	-3.5	80	80	470	8	11	20	50	72	77	3	2500	86317
MGJ2D052005BSC	5	20	-5	80	40	440	6.2	8	30	50	74	78.5	3	2502	83736
MGJ2D121503BSC	12	15	-3	95	95	170	8	10	25	50	76	80	3	2933	96712
MGJ2D121505BSC	12	15	-5	80	40	150	4.7	6	30	50	75	80	3	3093	105983
MGJ2D121509BSC	12	15	-8.7	80	40	155	5.3	7.5	30	50	76	80	3	2760	95198
MGJ2D121515BSC	12	15	-15	67	67	203	6.0	8	24	40	78	82	3	2194	96436
MGJ2D121802BSC	12	18	-2.5	80	80	170	8	11	20	50	74	80	3	2175	85409
MGJ2D121805BSC[3]	12	18	-5	80	40	170	5.2	8	20	50	74	81	3		
MGJ2D122003BSC	12	20	-3.5	80	80	190	7	10	20	50	77	82	3	2373	89831
MGJ2D122005BSC	12	20	-5	80	40	195	5.5	8	30	45	78	82	3	2417	93548
MGJ2D151505BSC	15	15	-5	80	40	120	5	7	30	50	75	80	3	2735	90911
MGJ2D151509BSC	15	15	-8.7	80	40	130	5	7	30	50	76	80	3	2769	81620
MGJ2D151515BSC	15	15	-15	67	67	167	5.5	8	23	35	75	79	3	2459	91193
MGJ2D151802BSC	15	18	-2.5	80	80	130	8	11	20	50	73	79	3	2217	77469
MGJ2D152003BSC	15	20	-3.5	80	80	150	7	10	20	50	76	81	3	2379	84696
MGJ2D152005BSC	15	20	-5	80	40	145	6	8	30	50	78	81	3	2052	75638
MGJ2D241503BSC	24	15	-3	95	95	90	8	10	25	50	76	80	4	2629	73130
MGJ2D241505BSC	24	15	-5	80	40	75	4.6	7	30	50	74	80.5	4	2730	64179
MGJ2D241509BSC	24	15	-8.7	80	40	80	4.8	7	30	50	77	82	4	2896	77980
MGJ2D241709BSC	24	17	-9	80	80	105	6	8	30	50	78	83	4	2580	62586
MGJ2D241802BSC	24	18	-2.5	80	80	90	8	11	20	50	74	80	4	2674	75178
MGJ2D242003BSC	24	20	-3.5	80	80	90	7	10	20	50	76	82	4	2256	67350
MGJ2D242005BSC	24	20	-5	80	40	90	6	8	30	50	78	82	4	2227	68908

INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	Continuous operation, 5V input types	4.5	5	5.5	V
	Continuous operation, 12V input types	10.8	12	13.2	
	Continuous operation, 15V input types	13.5	15	16.5	
	Continuous operation, 24V input types	21.6	24	26.4	
Input reflected ripple	051505, 051509, 051515, 052003 & 052005 types		40		mA
	121503, 121505, 121509, 121515, 122005, 151505, 151509, 151515 & 152005 types		20		
	051802, 241505, 241509, 241709 & 242005 types		15		
	122003, 121802, 121805, 151802, 152003, 241503, 241802 & 242003 types		10		

RoHS COMPLIANT

For full details go to www.murata.com/en-global/products/power/rohs

cULus

1. Calculated using MIL-HDBK-217 and Telecordia SR-332 calculation model with nominal input voltage at full load.
2. See ripple & noise test method.
3. MGJ2D121805BSC variant is in preliminary stages.

All specifications typical at T_A=25°C, nominal input voltage and rated output current unless otherwise specified.

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OUTPUT CHARACTERISTICS					
Parameter	Conditions	Min.	Typ.	Max.	Units
Rated Power	T_A=-40ºC to 105ºC			2	W
Voltage Set Point Accuracy	See tolerance envelopes				
Line regulation	High V_{IN} to low V_{IN}		1.0	1.2	%/%

ISOLATION CHARACTERISTICS						
Parameter		Conditions	Min.	Typ.	Max.	Units
Isolation test voltage		Production tested for 1 second	5400			VDC
		Qualification tested for 1 minute	5400			
Resistance		Viso = 500VDC	1			GΩ
Continuous barrier withstand voltage		Non-safety barrier application			2400	VDC
Safety standard	UL62368-1	Reinforced			300	Vrms
		Basic/supplementary			600	
	ANSI/AAMI ES60601-1[1]	1 MOOP			300	
		2 MOOP/1 MOPP			200	

GENERAL CHARACTERISTICS					
Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency			45		kHz

TEMPERATURE CHARACTERISTICS					
Parameter	Conditions	Min.	Typ.	Max.	Units
Specification	All output types (see safety approval section for limitations)	-40		105	°C
Storage		-55		125	
Case Temperature above ambient	5V input types		24		
	All other input types		20		
Cooling	Free air convection				

ABSOLUTE MAXIMUM RATINGS	
Input voltage V_{IN}, MGJ2D05xxxxBSC	5.5V
Input voltage V_{IN}, MGJ2D12xxxxBSC	13.2V
Input voltage V_{IN}, MGJ2D15xxxxBSC	16.5V
Input voltage V_{IN}, MGJ2D24xxxxBSC	26.4V
Short-circuit protection	Continuous
Lead temperature 1mm from case for 10 seconds	260°C
Wave Solder	Wave Solder profile not to exceed the profile recommended in IEC 61760-1 Section 6.1.3. Please refer to application notes for further information.

1. ANSI/AAMI ES60601-1 recognition is currently pending for the MGJ2DxxxxxBSC variants.

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TECHNICAL NOTES

ISOLATION VOLTAGE

'Hi Pot Test', 'Flash Tested', 'Withstand Voltage', 'Proof Voltage', 'Dielectric Withstand Voltage' & 'Isolation Test Voltage' are all terms that relate to the same thing, a test voltage, applied for a specified time, across a component designed to provide electrical isolation, to verify the integrity of that isolation.

Murata Power Solutions MGJ2B series of DC-DC converters are all 100% production tested at 5.4kVDC for 1 seconds and have been qualification tested at 5.4kVDC for 1 minute.

The MGJ2B series is recognised by Underwriters Laboratory, please see safety approval section for more information. When the insulation in the MGJ2B series is not used as a safety barrier, i.e. provides functional isolation only, continuous or switched voltages across the barrier up to 2.4kV are sustainable. This is established by measuring the partial discharge inception voltage in accordance with IEC 60270. Please contact Murata for further information.

REPEATED HIGH-VOLTAGE ISOLATION TESTING

It is well known that repeated high-voltage isolation testing of a barrier component can actually degrade isolation capability, to a lesser or greater degree depending on materials, construction and environment. We therefore strongly advise against repeated high voltage isolation testing, but if it is absolutely required, that the voltage be reduced by 20% from specified test voltage.

SAFETY APPROVAL

ANSI/AAMI ES60601-1

The MGJ2B series is pending recognition by Underwriters Laboratory (UL) to ANSI/AAMI ES60601-1 for 1 MOOP (Means Of Operator Protection) based on a working voltage of 300Vrms or 2 MOOP based upon a working voltage of 200Vrms, and 1 MOPP (Mean Of Patient Protection) based on a working voltage of 200Vrms, between Primary and Secondary.

File number E202895 applies.

UL62368-1

The MGJ2B series is recognised by Underwriters Laboratory (UL) to UL62368-1 for reinforced insulation to a working voltage of 300Vrms and for basic/supplementary insulation to a working voltage of 600Vrms.

File number E151252 applies.

Creepage and clearance 6mm
Working altitude 5000m

Fusing

The MGJ2B Series of converters are not internally fused so to meet the requirements of UL an anti-surge input line fuse should always be used with ratings as defined below.
MGJ2D05xxxxBSC: 1.25A
MGJ2D12xxxxBSC: 750mA
MGJ2D15xxxxBSC: 750mA
MGJ2D24xxxxBSC: 750mA
All fuses should be UL recognised and rated to 125VDC.

RoHS COMPLIANCE INFORMATION

RoHS COMPLIANT

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 260ºC for 10 seconds. Please refer to application notes for further information. The pin termination finish on this product series is Tin Plate, Hot Dipped over Matte Tin with Nickel Preplate. The series is backward compatible with Sn/Pb soldering systems. For further information, please visit www.murata.com/en-global/products/power/rohs

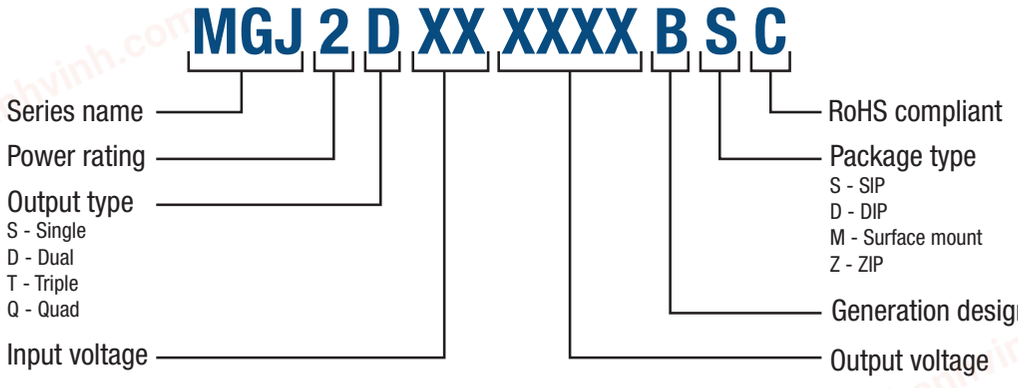
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ENVIRONMENTAL VALIDATION TESTING

The following tests have been conducted on this product series, as part of our design verification process. The datasheet characteristics specify user operating conditions for this series, please contact Murata if further information about the tests is required.

Test	Standard	Condition
Temperature cycling	JEDEC JESD22-A104	400 cycles in a dual zone chamber from -40 (+5/-10)°C to 105 (+10/-5)°C. 15 mins dwell at each (inclusive of ramps). 2 cycles per hour.
Humidity bias	JEDEC JESD22-A101	85°C ±2°C, 85% ±5% R.H. for >1000 hours.
High temperature storage life	JEDEC JESD22-A103, Condition A	125°C +10/-0°C for ≥1000 hours.
Vibration	MIL-STD-883 Method 2007, Condition A	1.5mm pk-pk / 20g pk min, 20-2000-20Hz, 4 sweeps in each of 3 mutually perpendicular axes at 3 oct/min.
Shock	MIL-STD-883 Method 2002, Condition A	500g 1.0ms half sine, 5 shocks in each direction of 3 mutually perpendicular axis.
ESD	JEDEC JESD22-A114	HBM 8.0kV.
Bump	IEC Class 4M5 of ETS 300 019-2-4	Shock Spectrum Type II, 6mS duration, 250m/s^2 500 bumps in 6 directions.
Solderability	EIA/IPC/JEDEC J-STD-002, Test A and A1	SnPb (Test A) For leaded solderability the parts are conditioned in a steam ager for 8 hours ±15 min. at a temperature of 93°C ±3°C. Dipped in solder at 245°C ±5°C for 5 (+0/-0.5) seconds. Pb-free (Test A1) For lead free solderability the parts are conditioned in a steam ager for 8 hours ±15 min. at a temperature of 93°C ±3°C. Dipped in solder at 255°C ±5°C for 5 (+0/-0.5) seconds.
Solder heat	JEDEC JESD22-B106	The test sample is subjected to a molten solder bath at 270°C ±5°C for 7 (+2/-0) seconds.
Solder heat (hand)	MIL-STD-202 Method 210, Condition A	The soldering iron is heated to 350°C ±10°C and applied to the terminations for a duration of 4 to 5 seconds.
Solvent cleaning	Resistance to cleaning agents.	Solvent – Novec 71IPA & Topklean EL-20A. Pulsed ultrasonic immersion 45°C - 62°C.
Solvent Resistance	MIL-STD-883 Method 2015	Separate samples subjected to solvent A, solvent B and solvent D.
Lead Integrity (Adhesion)	MIL-STD-883 Method 2025	Leads are bent through 90º until a fracture occurs.
Lead Integrity (Fatigue)	MIL-STD-883 Method 2004, condition B_2	The leads are bent to an angle of 15º. Each lead is subjected to 3 cycles.
Lead Integrity (Tension/Pull)	MIL-STD-883 Method 2004, Condition A_1	Pull of 0.227kg applied for 30 seconds. The force is then increased until the pins snap.
Aqueous wash	Resistance to wash process	Parts washed in an aqueous/ultrasonic process, in a suitable chemical for 30 mins at a controlled temperature. Followed by a towns water wash at low pressure and a demineralised water wash at low pressure. Dried in a vacuum oven.

PART NUMBER STRUCTURE



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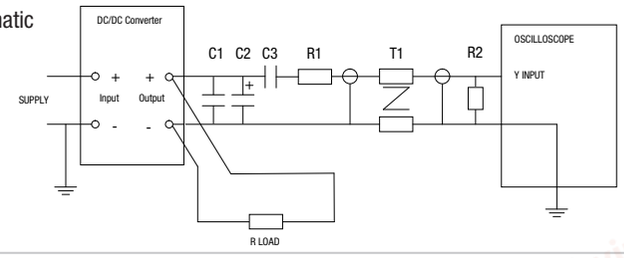
CHARACTERISATION TEST METHODS

Ripple & Noise Characterisation Method

Ripple and noise measurements are performed with the following test configuration.

C1	1µF X7R multilayer ceramic capacitor, voltage rating to be a minimum of 3 times the output voltage of the DC-DC converter
C2	10µF tantalum capacitor, voltage rating to be a minimum of 1.5 times the output voltage of the DC-DC converter with an ESR of less than 100mΩ at 100kHz
C3	100nF multilayer ceramic capacitor, general purpose
R1	450Ω resistor, carbon film, ±1% tolerance
R2	50Ω BNC termination
T1	3T of the coax cable through a ferrite toroid
RLOAD	Resistive load to the maximum power rating of the DC-DC converter. Connections should be made via twisted wires
Measured values are multiplied by 10 to obtain the specified values.	

Differential Mode Noise Test Schematic



APPLICATION NOTES

Minimum load

The minimum load to meet datasheet specification is 10% of the full rated load across the specified input voltage range. Lower than 10% minimum loading will result in an increase in output voltage, which may rise to typically 1.25 times the specified output voltage if the output load falls to less than 5%.

Gate Drive Applications Advisory Note

For general guidance for product usage in gate drive applications please refer to "gate drive application notes".

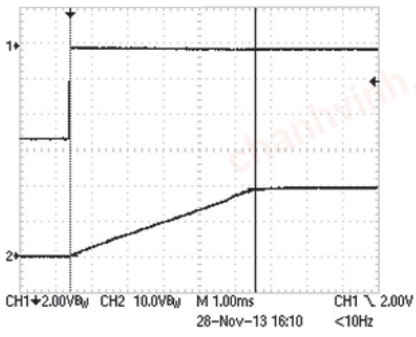
Capacitive loading and start up

Typical start up times for this series, with a typical input voltage rise time of 2.2µs and output capacitance of 10µF, are shown in the table below. The product series will start into capacitance ranging from 47µF up to 220µF with increased start times.

	Start-up time ms
MGJ2D051505BSC	3
MGJ2D051509BSC	4.5
MGJ2D051515BSC	21
MGJ2D051802BSC	4
MGJ2D052003BSC	5
MGJ2D052005BSC	5
MGJ2D121503BSC	3
MGJ2D121505BSC	3
MGJ2D121509BSC	4
MGJ2D121515BSC	14.5
MGJ2D121802BSC	5
MGJ2D121805BSC	4
MGJ2D122003BSC	5
MGJ2D122005BSC	5.5

	Start-up time ms
MGJ2D151505BSC	2.5
MGJ2D151509BSC	3
MGJ2D151515BSC	10.5
MGJ2D151802BSC	3
MGJ2D152003BSC	5
MGJ2D152005BSC	4.5
MGJ2D241503BSC	3
MGJ2D241505BSC	3
MGJ2D241509BSC	3
MGJ2D241709BSC	4
MGJ2D241802BSC	3
MGJ2D242003BSC	4
MGJ2D242005BSC	4

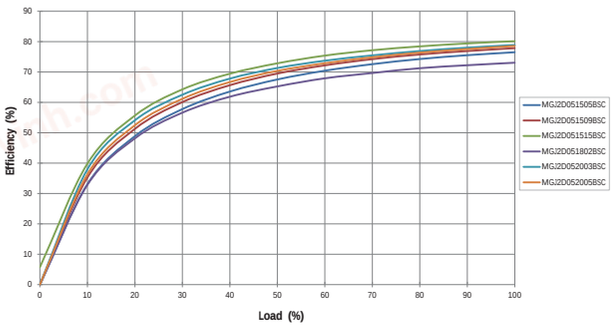
Typical Start-Up Wave Form



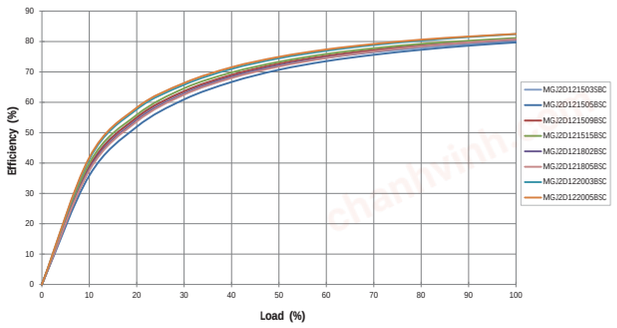
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EFFICIENCY VS LOAD

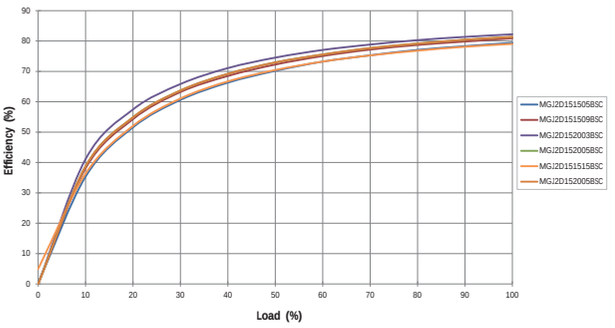
5V INPUT



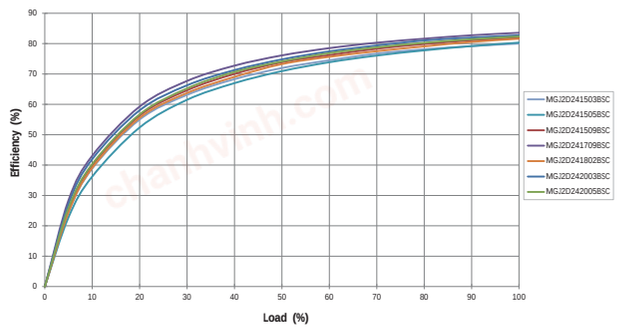
12V INPUT



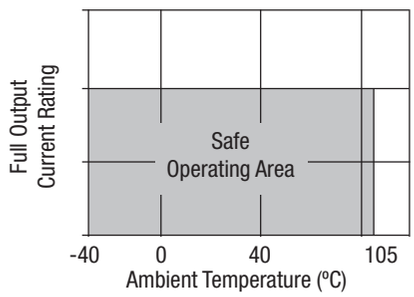
15V INPUT



24V INPUT



TEMPERATURE DERATING GRAPH

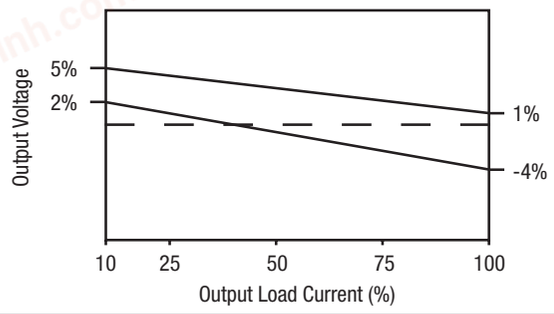


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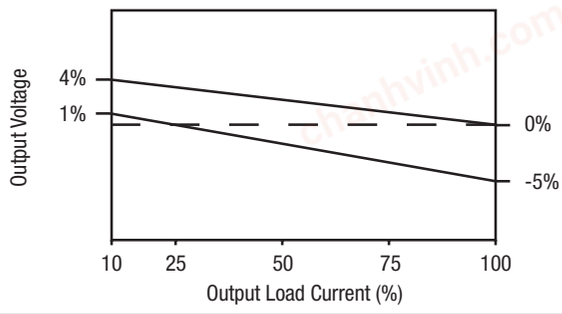
POSITIVE OUTPUT VOLTAGE TOLERANCE ENVELOPES

The voltage tolerance envelopes show typical load regulation characteristics for this product series. The tolerance envelope is the maximum output voltage variation due to changes in output loading and set point accuracy.

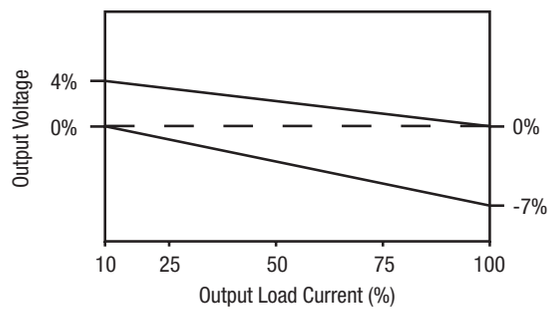
051509 & 151509



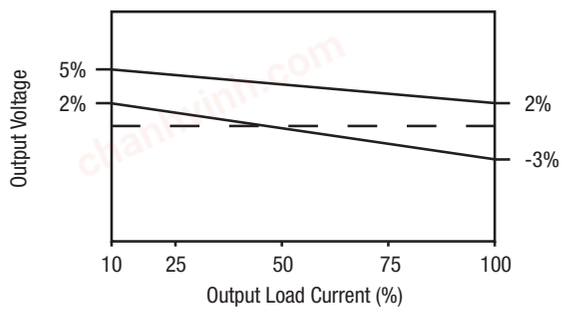
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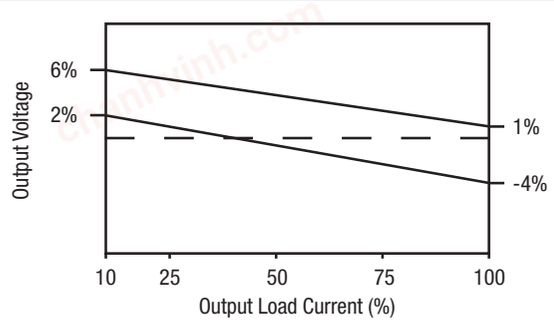
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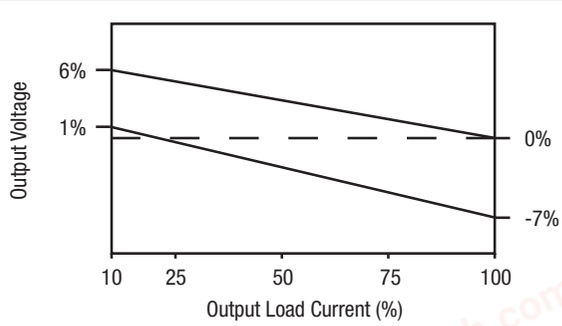
121505 & 241505



151515



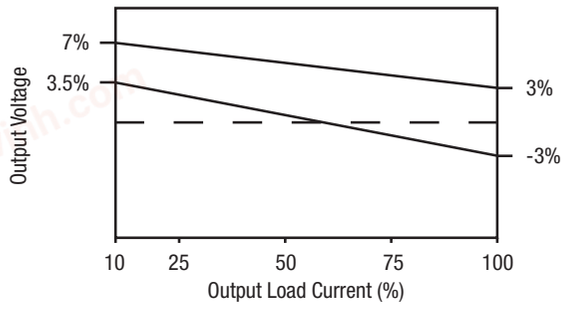
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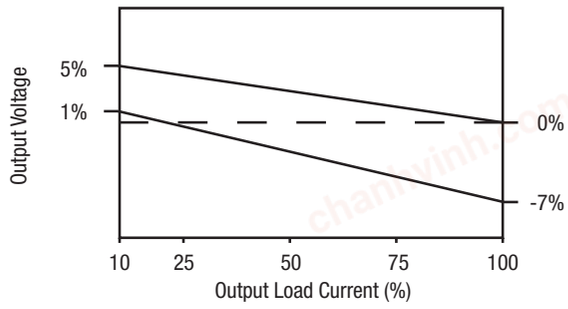
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POSITIVE OUTPUT VOLTAGE TOLERANCE ENVELOPES (Continued)

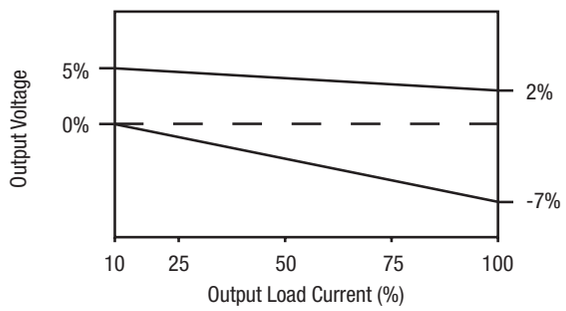
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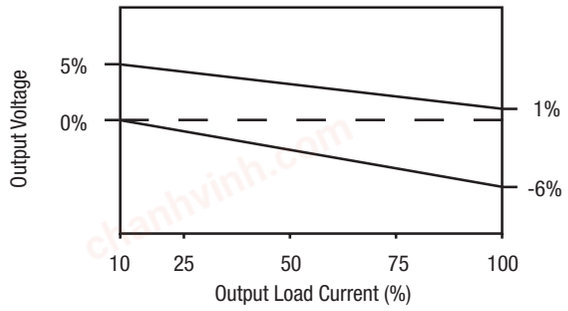
052003 & 052005



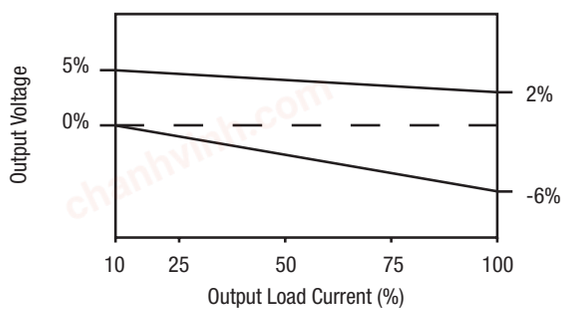
122003, 152003 & 242003



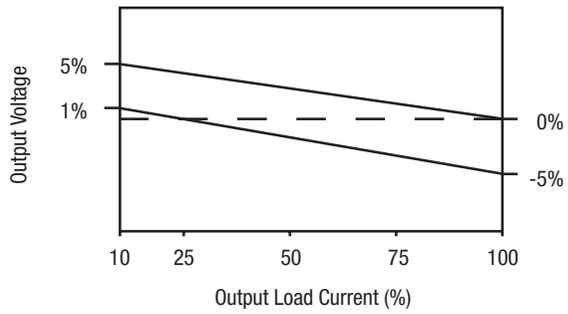
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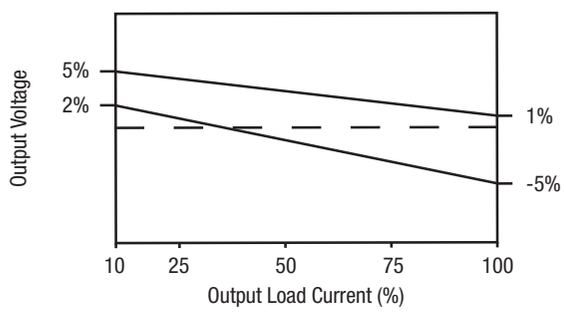
121802, 151802 & 241802



121503



241503

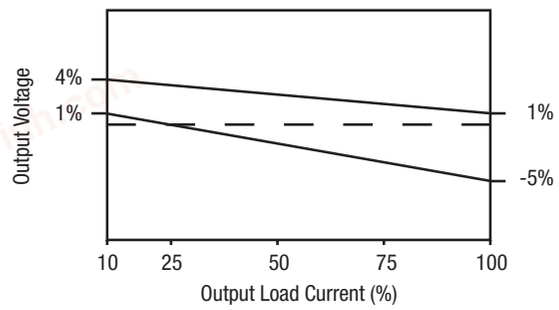


121805

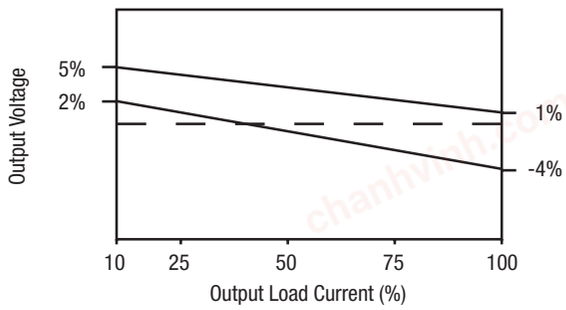
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POSITIVE OUTPUT VOLTAGE TOLERANCE ENVELOPES (Continued)

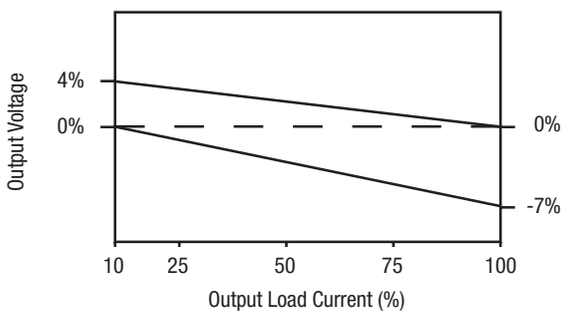
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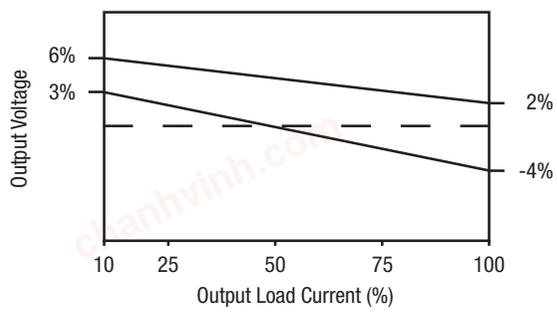
051505 & 151505



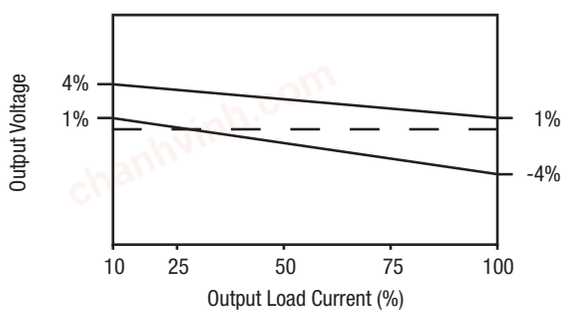
121509



121515



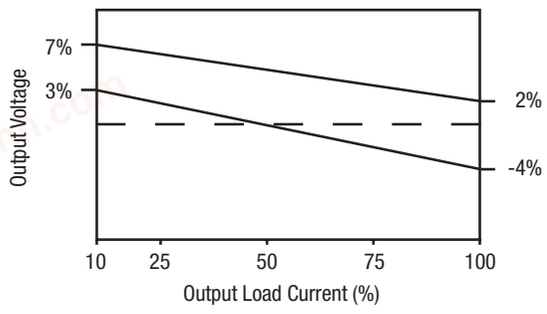
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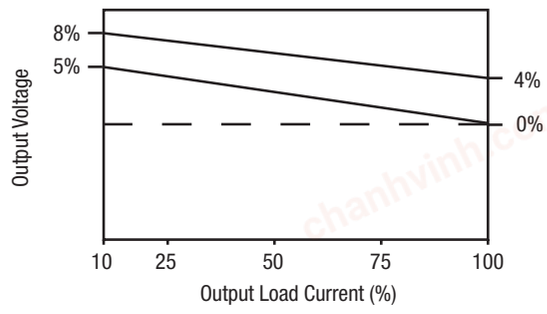
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NEGATIVE OUTPUT VOLTAGE TOLERANCE ENVELOPES

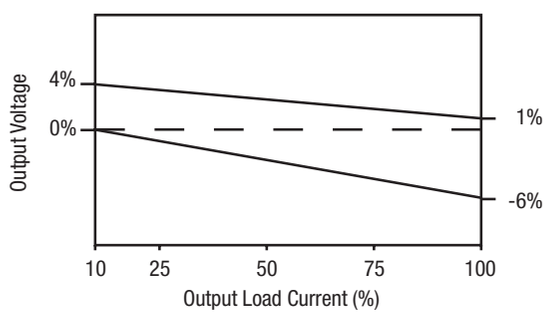
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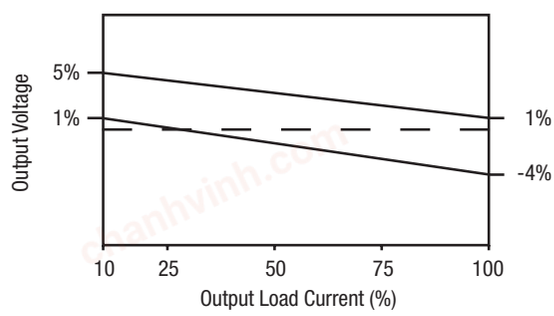
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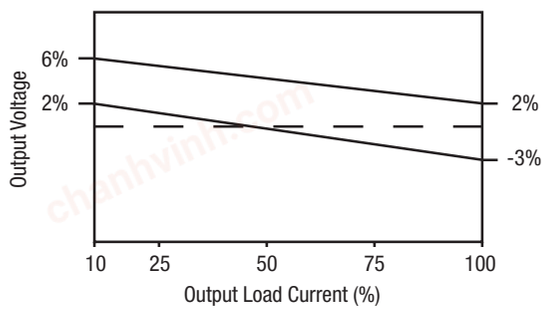
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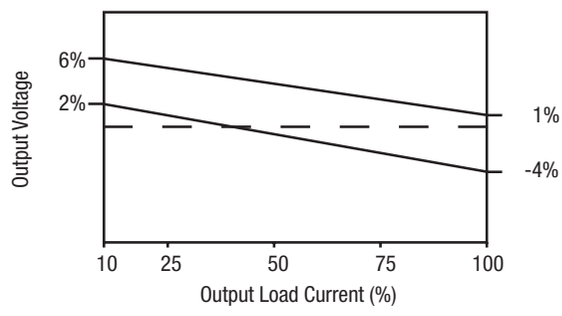
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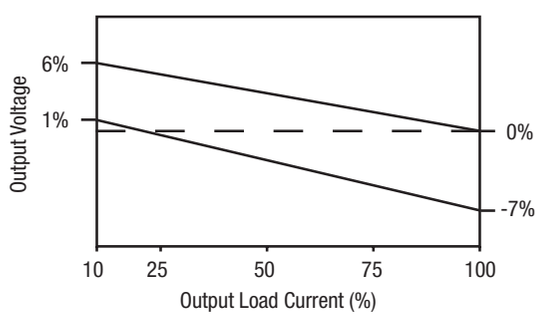
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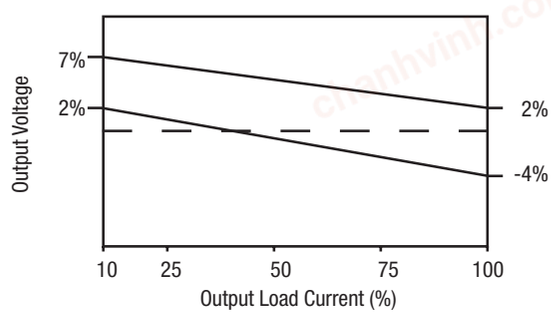
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051515



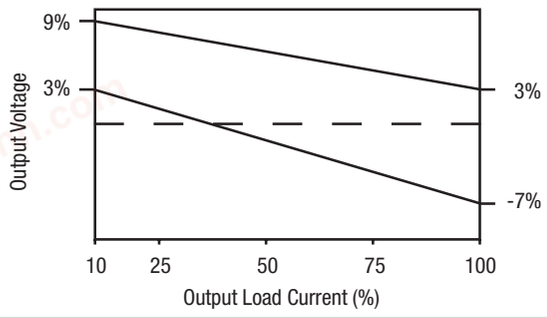
121505, 122005, 152005, 242005 & 241709



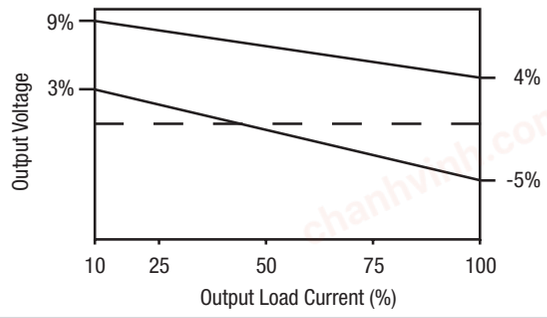
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NEGATIVE OUTPUT VOLTAGE TOLERANCE ENVELOPES (Continued)

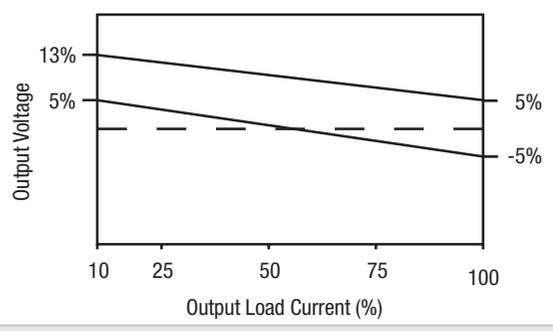
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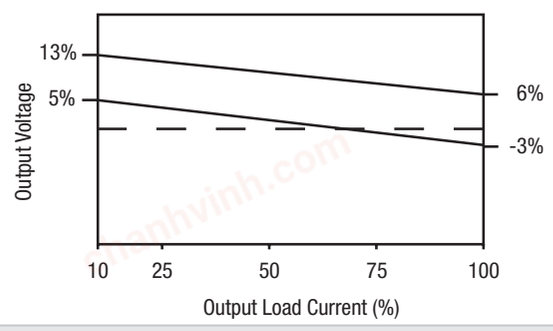
122003, 152003 & 242003



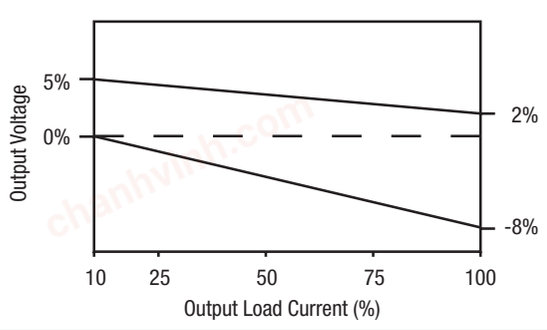
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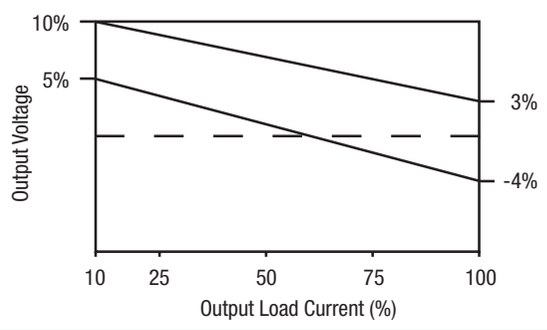
121802, 151802 & 241802



121503

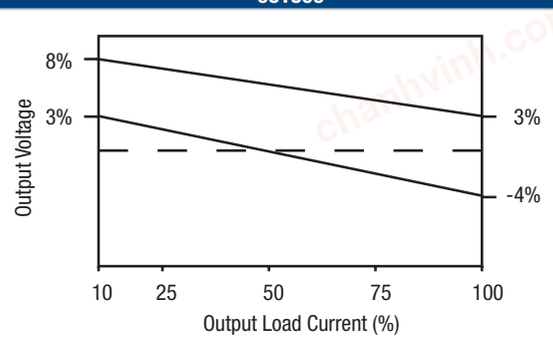


241503



121805

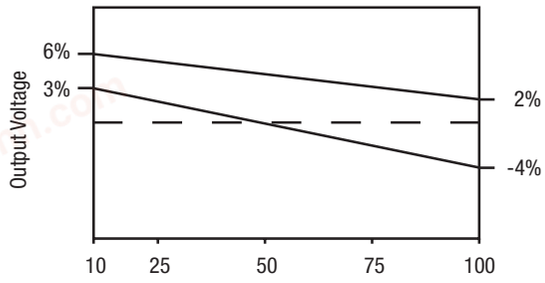
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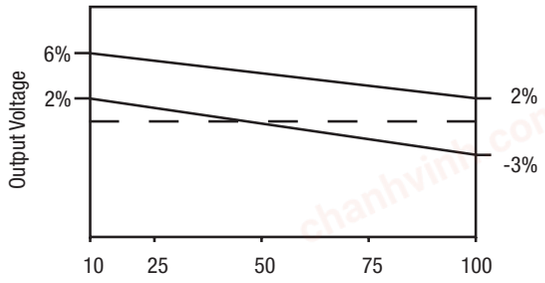
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NEGATIVE OUTPUT VOLTAGE TOLERANCE ENVELOPES (Continued)

121515



151509

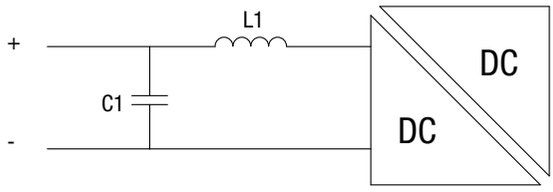


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EMC FILTERING AND SPECTRA

FILTERING

The following filter circuit and filter table shows the input filters typically required to meet EN55022 Quasi-PeakCurve B.

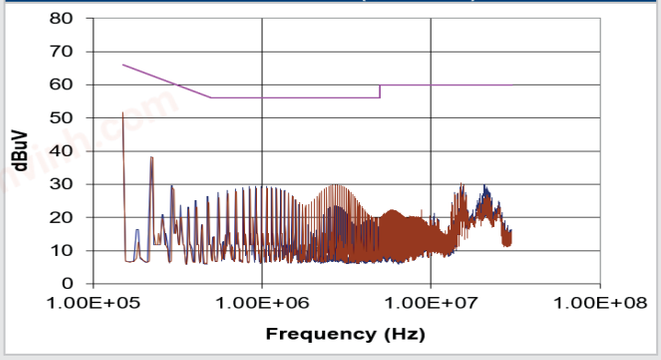


	Inductor			Capacitor		
	L1, µH	SMD	Through Hole	C1, µF	SMD	Through Hole
MGJ2D051505BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D051509BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D051515BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D051802BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D052003BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D052005BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D121503BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D121505BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D121509BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D121515BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D121802BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D121805BSC						
MGJ2D122003BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D122005BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D151505BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D151509BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D151515BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D151802BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D152003BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D152005BSC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ2D241503BSC	10	84103C	13R103C	4.7//4.7	GRM21BC71H475KE11L	RCER71H475K3K1H03B
MGJ2D241505BSC	10	84103C	13R103C	4.7//4.7	GRM21BC71H475KE11L	RCER71H475K3K1H03B
MGJ2D241509BSC	10	84103C	13R103C	4.7//4.7	GRM21BC71H475KE11L	RCER71H475K3K1H03B
MGJ2D241709BSC	10	84103C	13R103C	4.7//4.7	GRM21BC71H475KE11L	RCER71H475K3K1H03B
MGJ2D241802BSC	10	84103C	13R103C	4.7//4.7	GRM21BC71H475KE11L	RCER71H475K3K1H03B
MGJ2D242003BSC	10	84103C	13R103C	4.7//4.7	GRM21BC71H475KE11L	RCER71H475K3K1H03B
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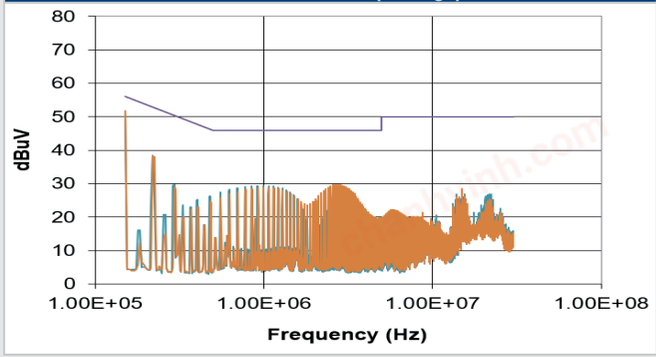
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EMC FILTERING AND SPECTRA (Continued)

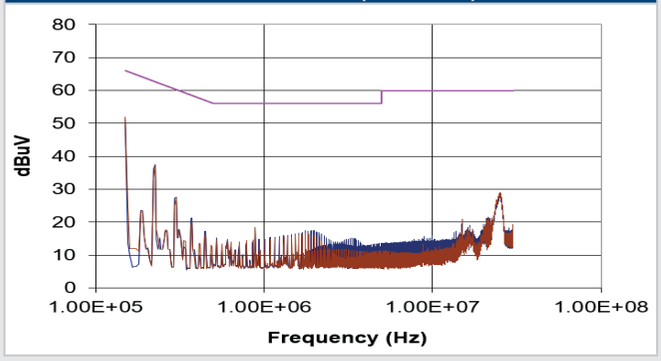
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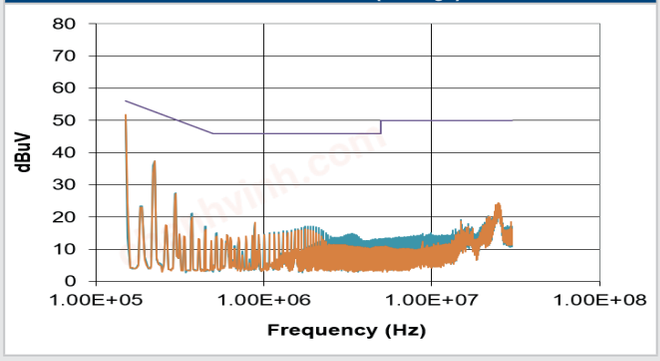
MGJ2D051505BSC (Average)



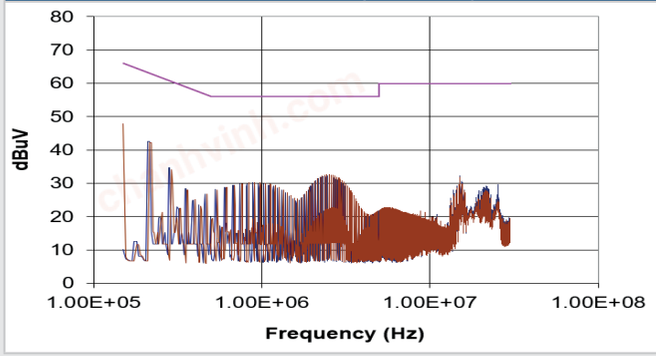
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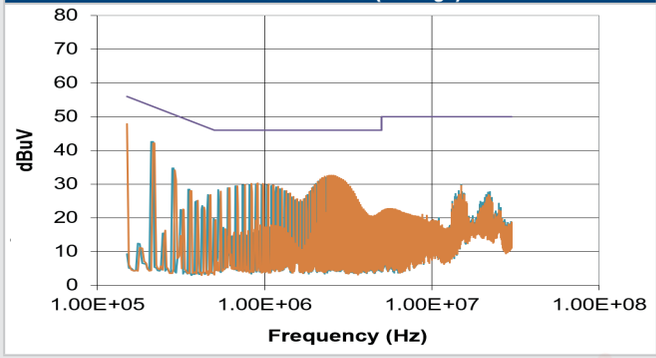
MGJ2D051509BSC (Average)



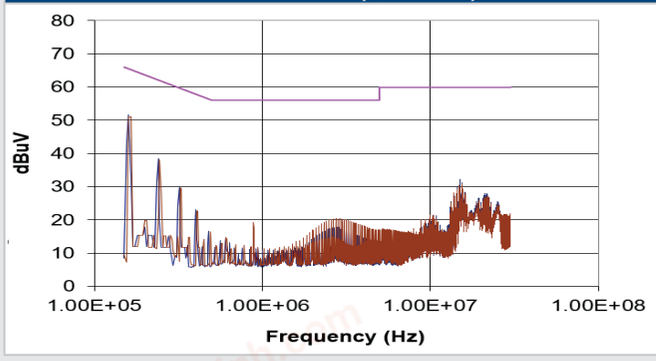
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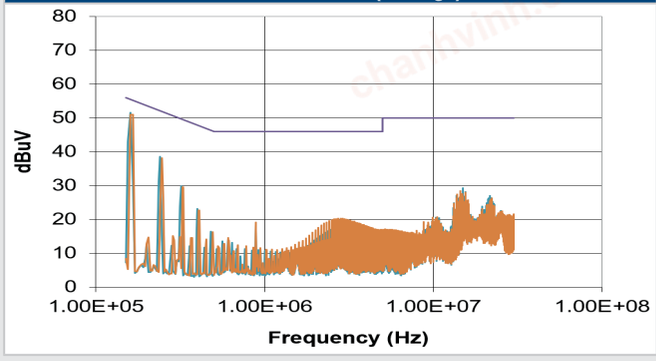
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MGJ2D051802BSC (Quasi-Peak)



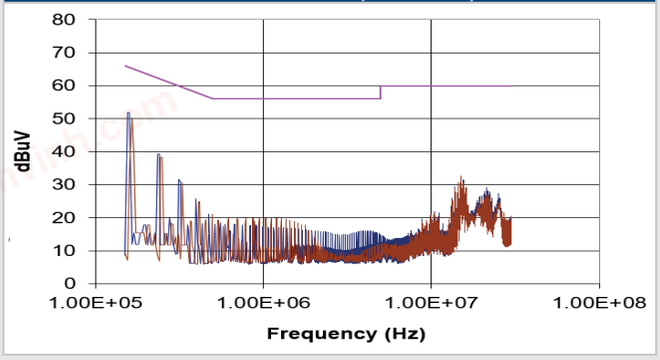
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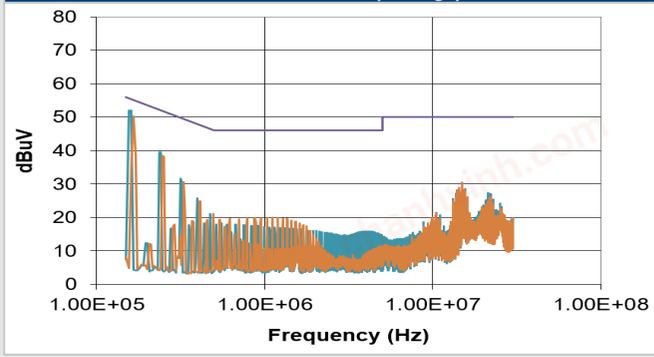
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EMC FILTERING AND SPECTRA (Continued)

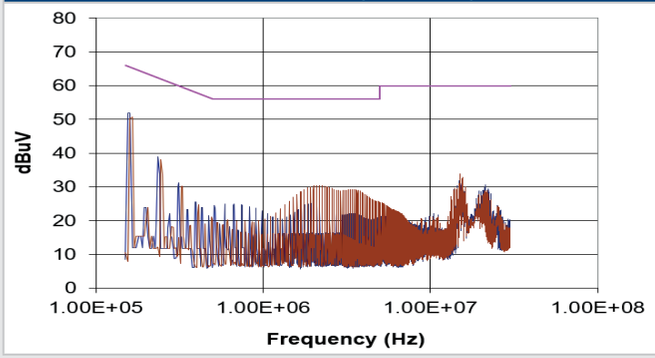
MGJ2D052003BSC (Quasi-Peak)



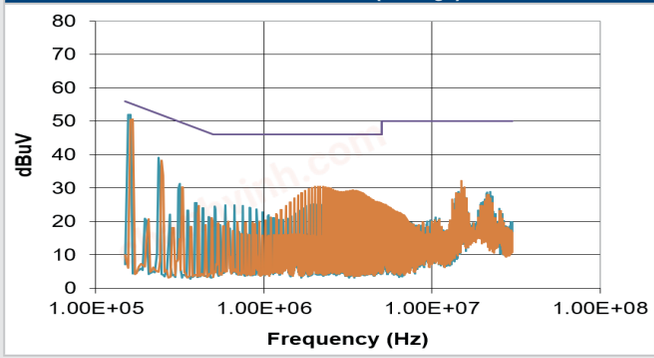
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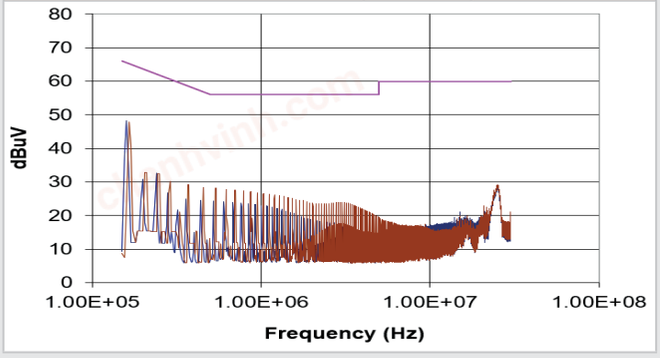
MGJ2D052005BSC (Quasi-Peak)



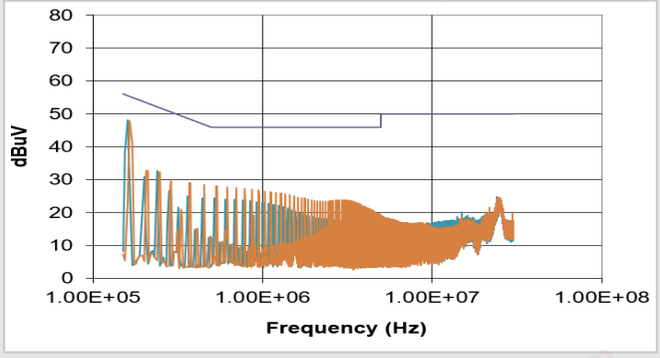
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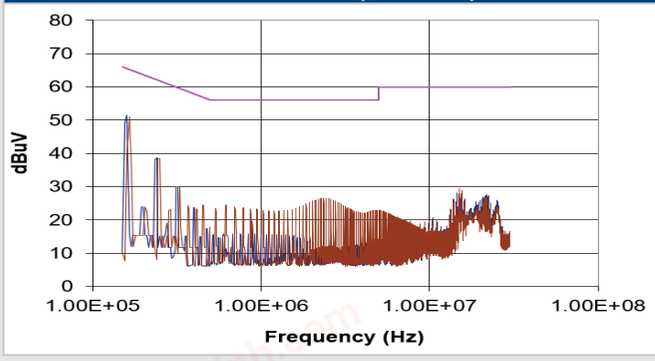
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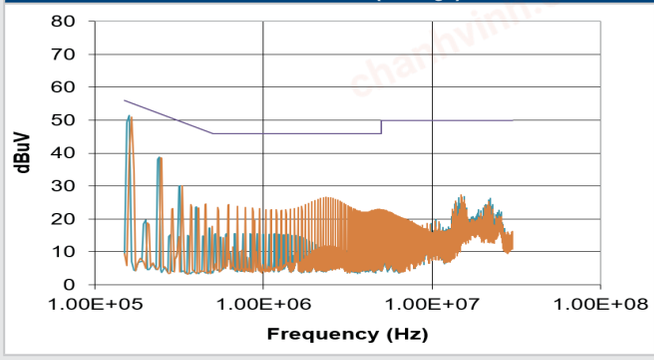
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MGJ2D121505BSC (Quasi-Peak)



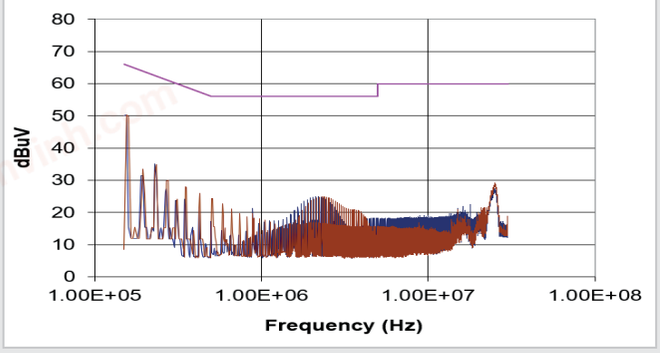
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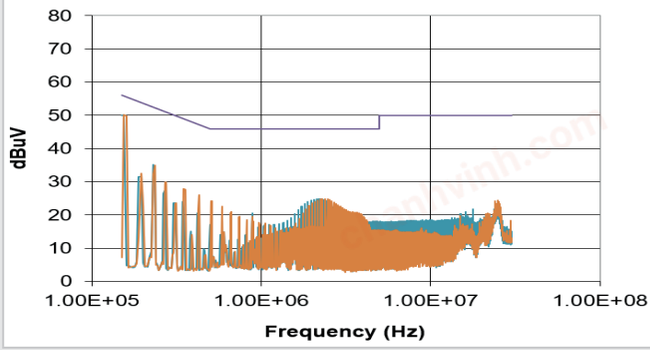
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EMC FILTERING AND SPECTRA (Continued)

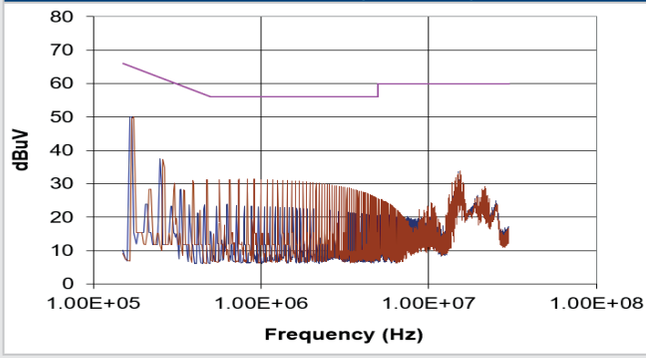
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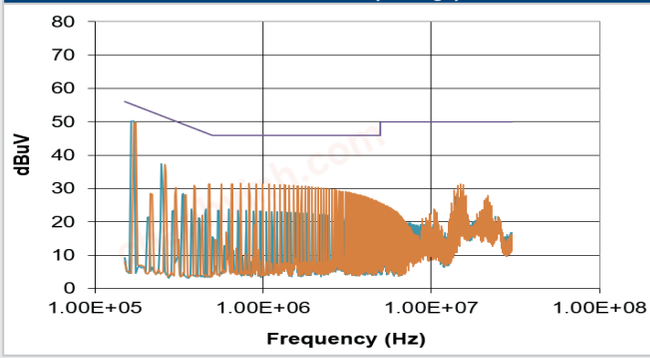
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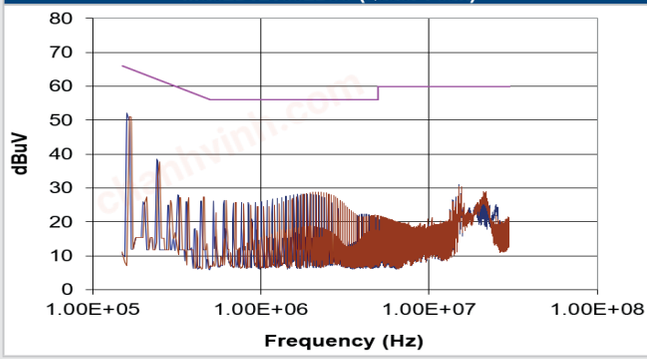
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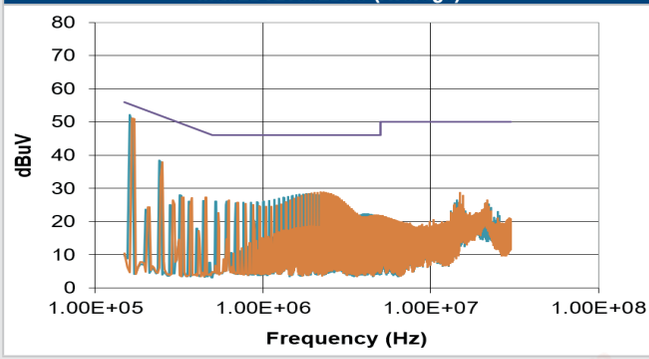
MGJ2D121515BSC (Average)



MGJ2D121802BSC (Quasi-Peak)



MGJ2D121802BSC (Average)



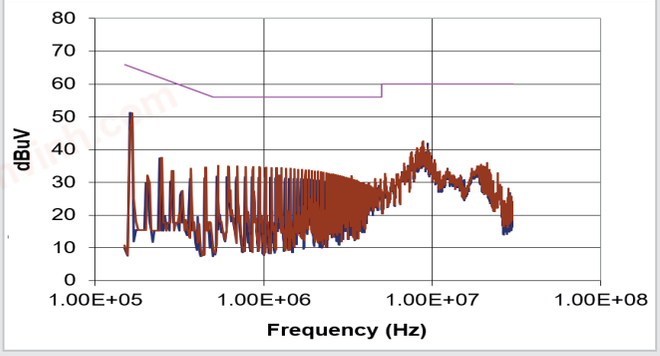
MGJ2D121805BSC (Quasi-Peak)

MGJ2D121805BSC (Average)

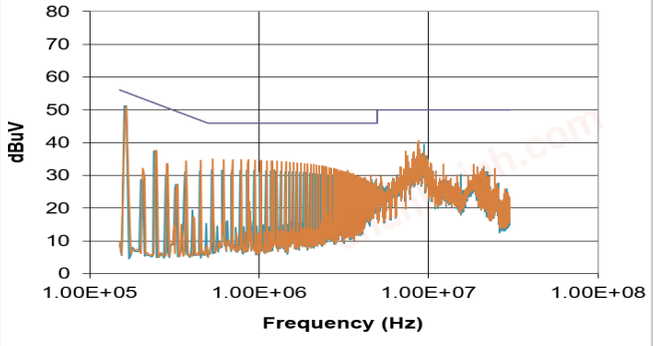
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EMC FILTERING AND SPECTRA (Continued)

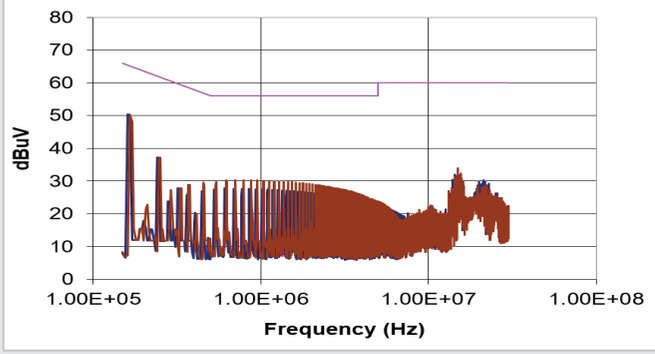
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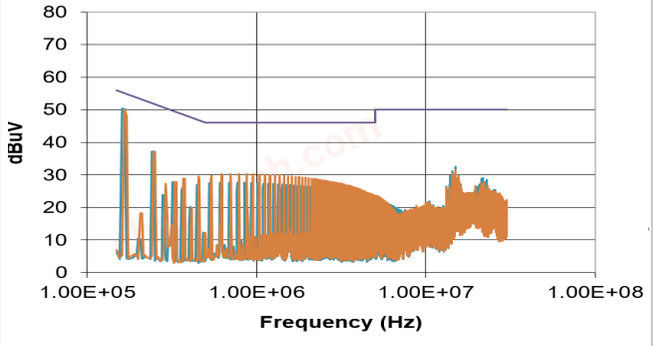
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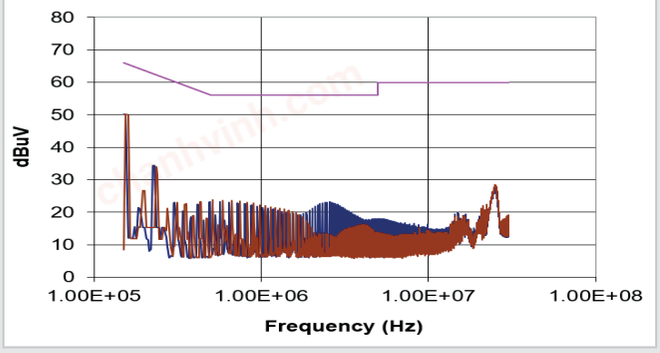
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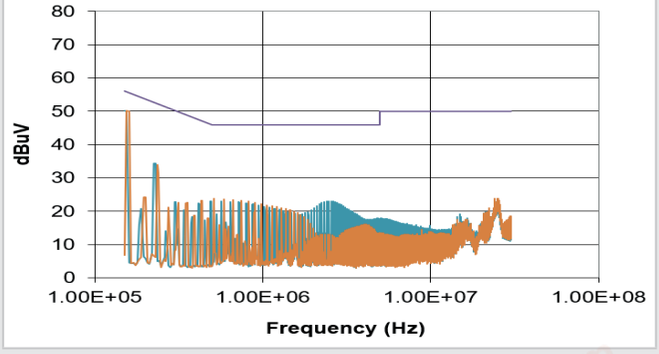
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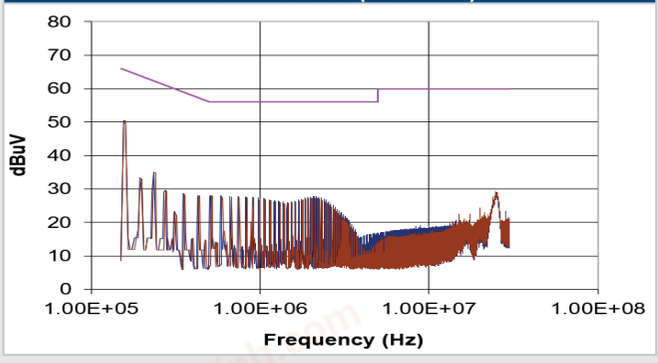
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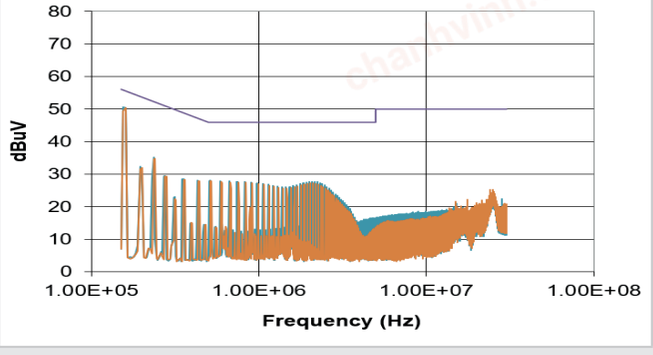
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MGJ2D151509BSC (Quasi-Peak)



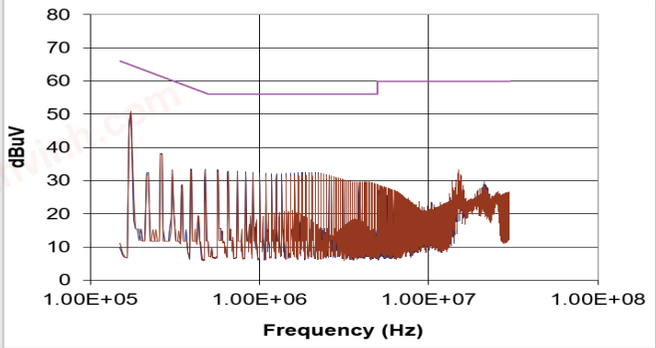
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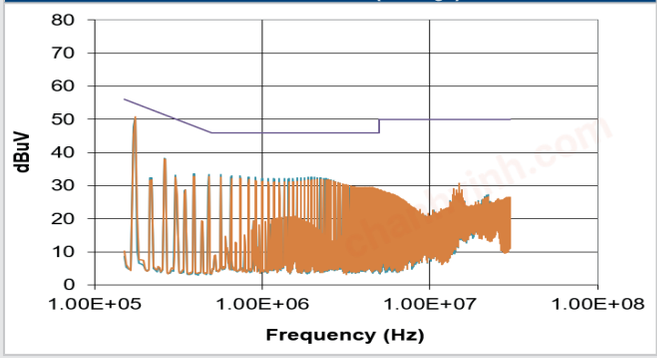
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EMC FILTERING AND SPECTRA (Continued)

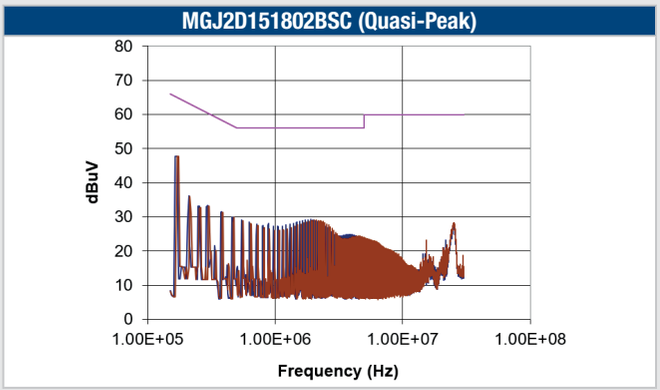
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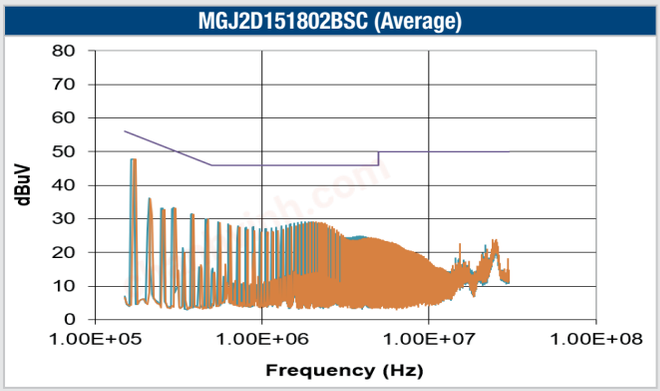
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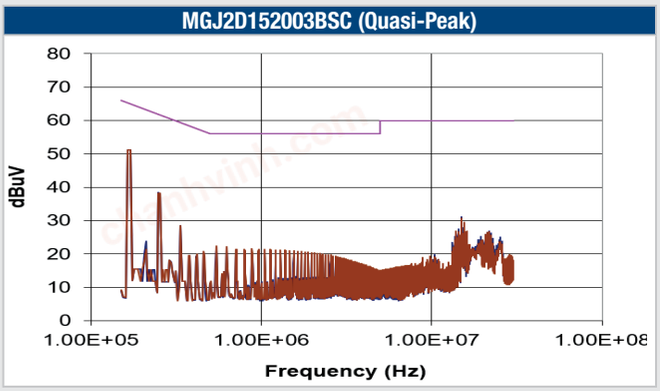
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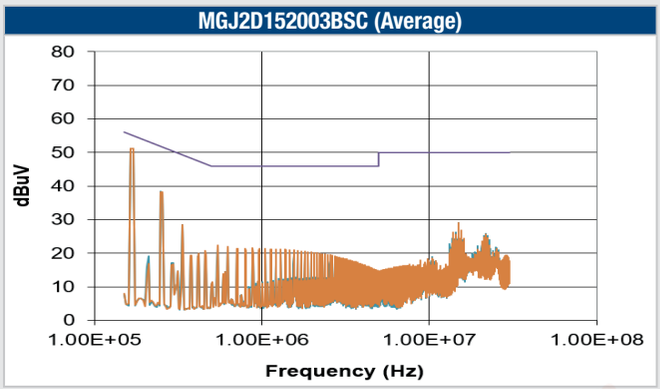
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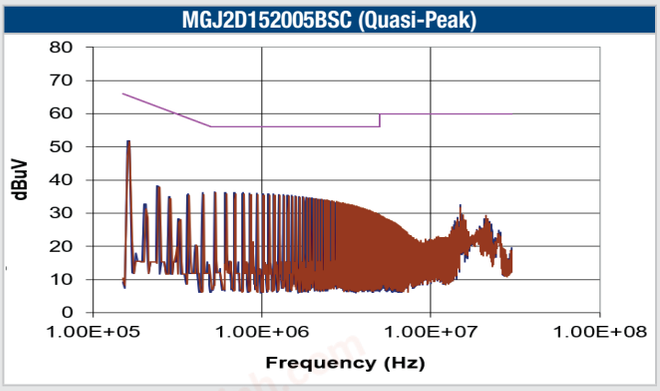
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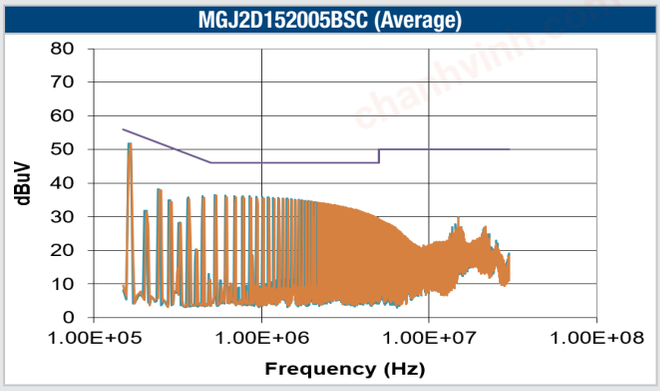
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MGJ2D152005BSC (Quasi-Peak)



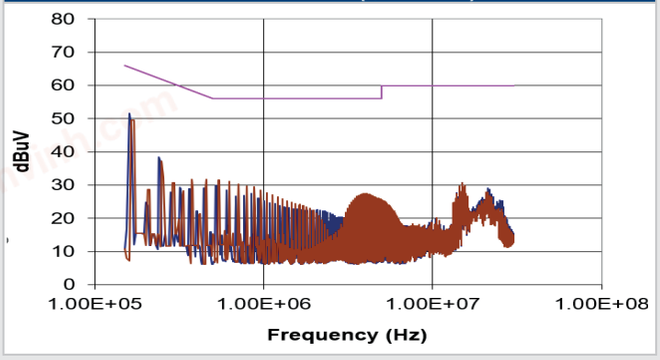
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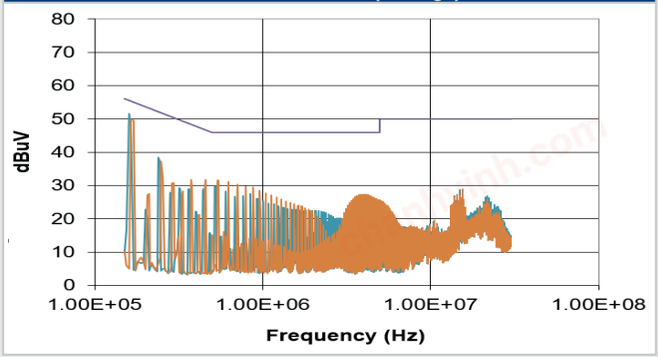
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EMC FILTERING AND SPECTRA (Continued)

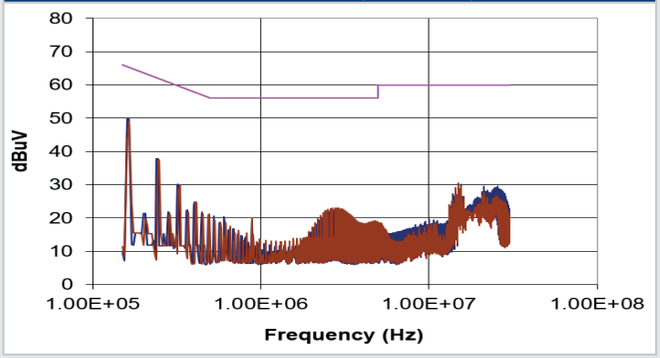
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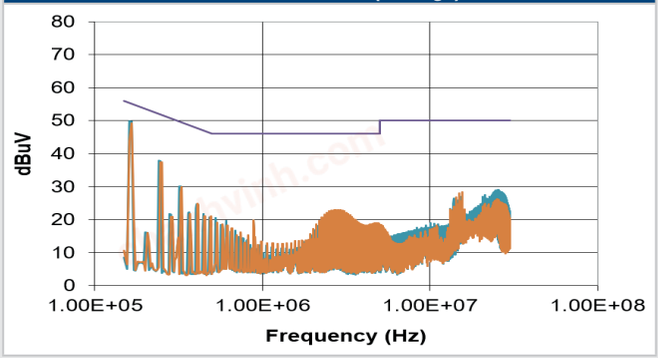
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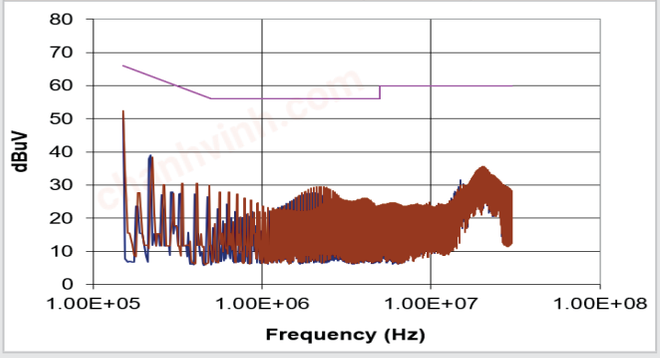
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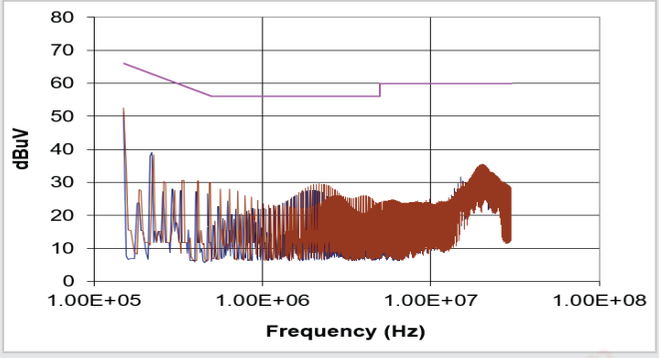
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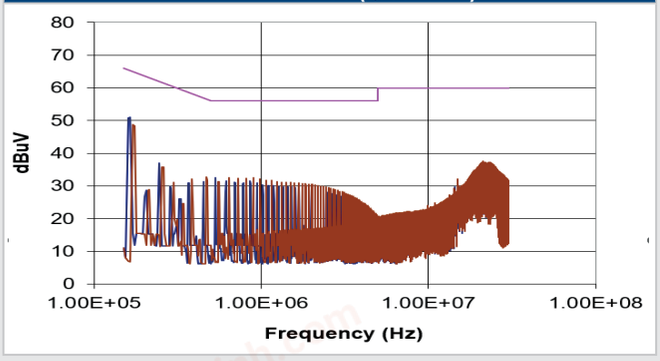
MGJ2D241509BSC (Quasi-Peak)



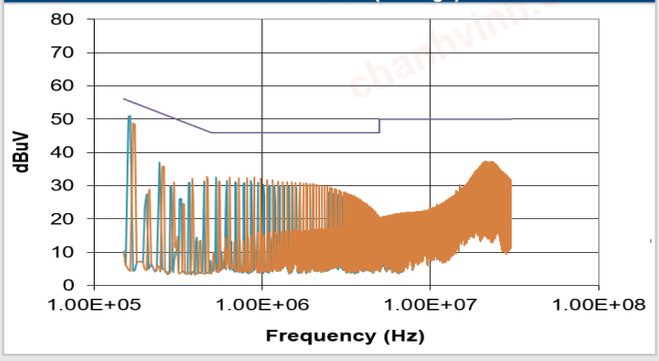
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MGJ2D241709BSC (Quasi-Peak)



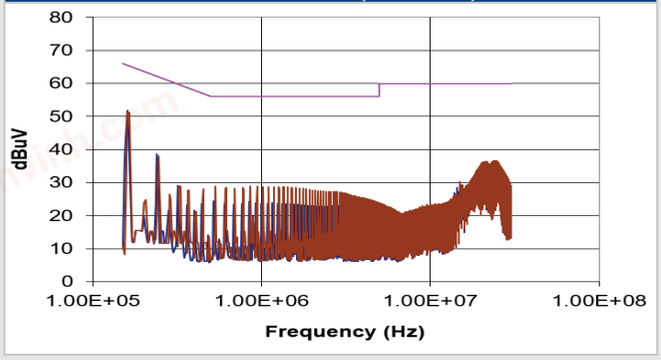
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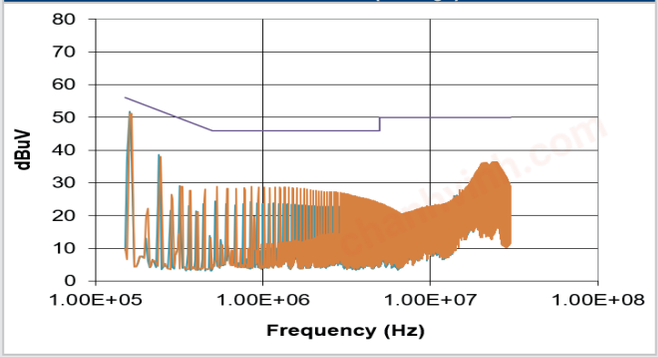
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EMC FILTERING AND SPECTRA (Continued)

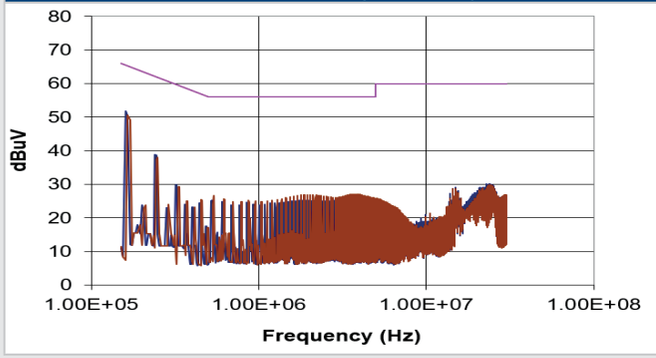
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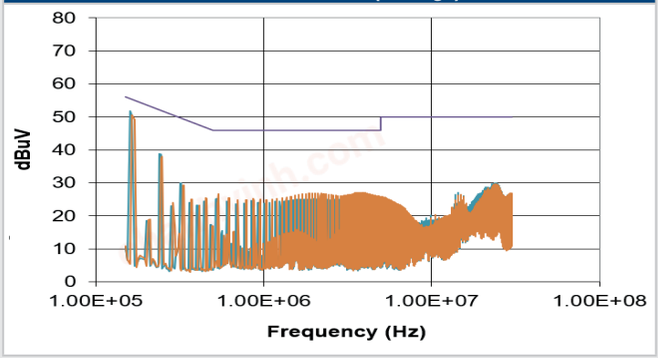
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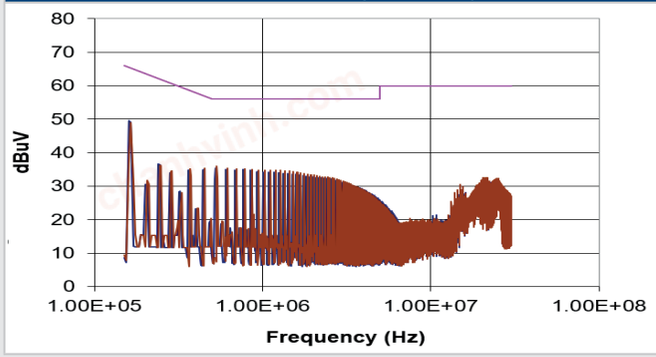
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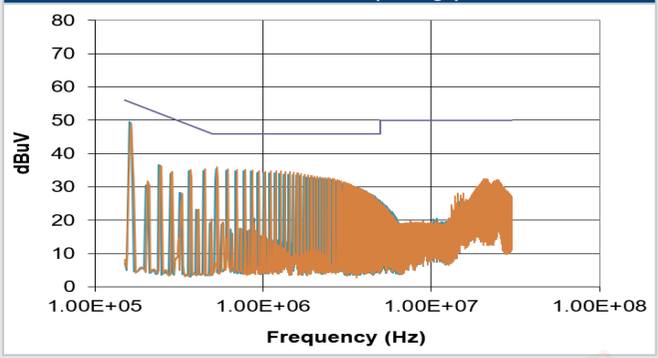
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MGJ2D242005BSC (Quasi-Peak)



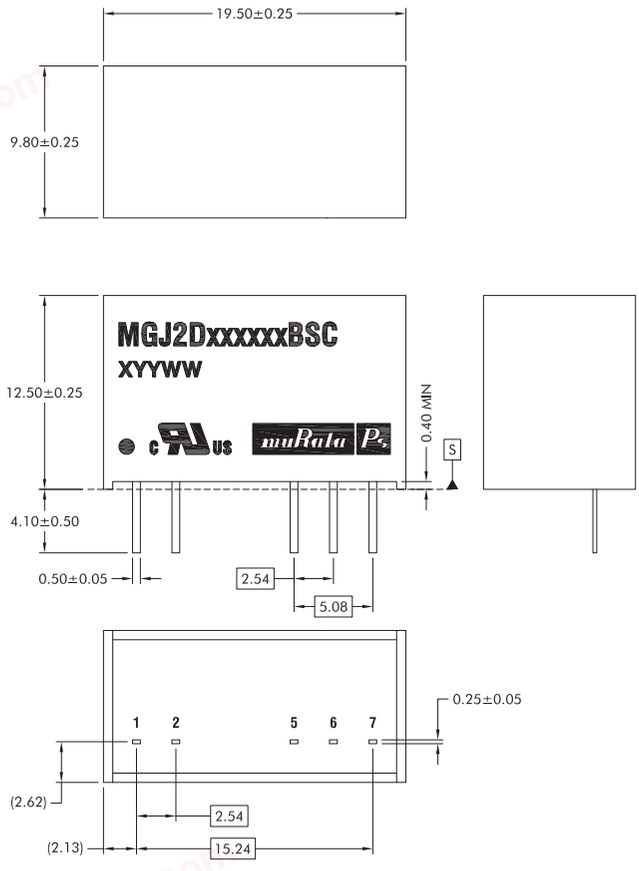
MGJ2D242005BSC (Average)



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PACKAGE SPECIFICATIONS

MECHANICAL DIMENSIONS



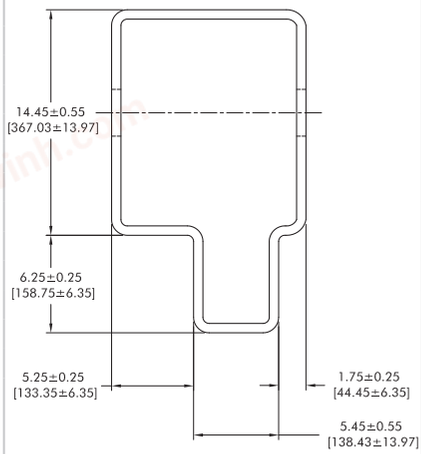
All dimensions in mm ±0.25mm. All pins on a 2.54 pitch and within ±0.1 of true position from pin 1 at seating plane 'S'.

Weight: 4.3g

PIN CONNECTIONS

Pin	Function
1	$+V_{IN}$
2	$-V_{IN}$
5	$-V_{OUT}$
6	0V
7	$+V_{OUT}$

Tube outline dimensions

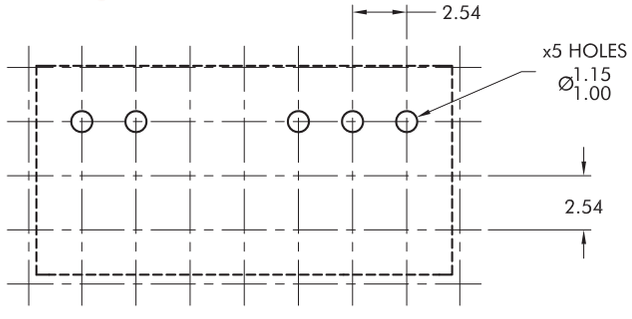


Unless otherwise stated all dimensions in mm (inches).

Tube length: 525mm [20.669] ±2.0 [0.079]

Tube Quantity : 25

RECOMMENDED FOOTPRINT DETAILS



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- Data Processing equipment

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