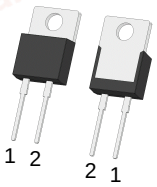
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DATA SHEET
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Silicon Carbide (SiC) Diode – EliteSiC, TO220-2, 12 A, 650 V SiC Merged PiN-Schottky (MPS) Diode

UJ3D06512TS



TO220-2
CASE 340AZ

Description

onsemi offers the 3rd generation of high performance SiC Merged-PiN-Schottky (MPS) diodes. With zero reverse recovery charge and 175 °C maximum junction temperature, these diodes are ideally suited for high frequency and high efficiency power systems with minimum cooling requirements.

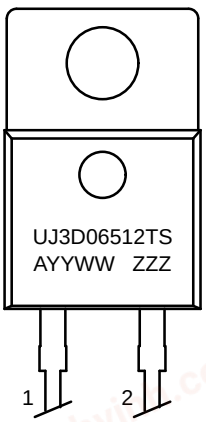
Features

- Maximum Operating Temperature of 175 °C
- Easy Paralleling
- Extremely Fast Switching not Dependent on Temperature
- No Reverse or Forward Recovery
- Enhanced Surge Current Capability, MPS Structure
- Excellent Thermal Performance, Ag Sintered
- 100% UIS Tested
- This Device is Pb-Free, Halogen Free and is ROHS Compliant

Typical Applications

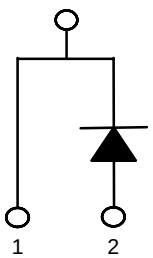
- Power Converters
- Industrial Motor Drives
- Switch Mode Power Supplies
- Power Factor Correction Modules

MARKING DIAGRAM



UJ3D06512TS	= Specific Device Code
A	= Assembly Location
YY	= Year
WW	= Work Week
ZZZ	= Lot ID

PIN CONNECTIONS



ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

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UJ3D06512TS

MAXIMUM RATINGS

Parameter	Symbol	Test Conditions	Value	Unit
DC Blocking Voltage	V_R		650	V
Repetitive Peak Reverse Voltage, T_J = 25 °C	V_{RRM}		650	V
Surge Peak Reverse Voltage	V_{RSM}		650	V
Maximum DC Forward Current	I_F	T_C = 153 °C	12	A
Non-repetitive Forward Surge Current Sine Halfwave	I_{FSM}	T_C = 25 °C, t_p = 10 ms	81	A
		T_C = 110 °C, t_p = 10 ms	70	
Repetitive Forward Surge Current Sine Halfwave, D = 0.1	I_{FRM}	T_C = 25 °C, t_p = 10 ms	53	A
		T_C = 110 °C, t_p = 10 ms	32.5	
Non-repetitive Peak Forward Current	$I_{F,max}$	T_C = 25 °C, t_p = 10 μs	480	A
		T_C = 110 °C, t_p = 10 μs	480	
i^2t Value	$\int i^2dt$	T_C = 25 °C, t_p = 10 ms	32.8	A^2s
		T_C = 110 °C, t_p = 10 ms	24.5	
Power Dissipation	P_{Tot}	T_C = 25 °C	187.5	W
		T_C = 153 °C	27.5	
Maximum Junction Temperature	$T_{J,max}$		175	°C
Operating and Storage Temperature	T_J, T_{STG}		−55 to 175	°C
Soldering Temperatures, Wavesoldering only Allowed at Leads	T_{sold}	1.6 mm from case for 10 s	260	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Thermal Resistance, Junction-Case	$R_{\theta JC}$		–	0.6	0.8	°C/W

ELECTRICAL CHARACTERISTICS (T_J = +25 °C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Voltage	V_F	I_F = 12 A, T_J = 25 °C	–	1.5	1.7	V
		I_F = 12 A, T_J = 150 °C	–	1.8	2.1	
		I_F = 12 A, T_J = 175 °C	–	1.9	2.25	
Reverse Current	I_R	V_R = 650 V, T_J = 25 °C	–	1.4	80	μA
		V_R = 650 V, T_J = 175 °C	–	12	–	
Total Capacitive Charge (Note 1)	Q_C	V_R = 400 V	–	29	–	nC
Total Capacitance	C	V_R = 1 V, f = 1 MHz	–	392	–	pF
		V_R = 300 V, f = 1 MHz	–	48	–	
		V_R = 600 V, f = 1 MHz	–	42	–	
Capacitance Stored Energy	E_C	V_R = 400 V	–	4.4	–	μJ

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Q_C is independent on T_J, di_F/dt, and I_F as shown in the application note AND90316/D

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TYPICAL PERFORMANCE DIAGRAMS

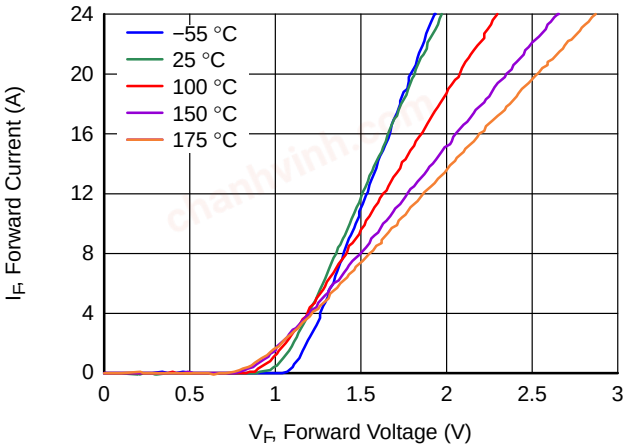


Figure 1. Typical Forward Characteristics

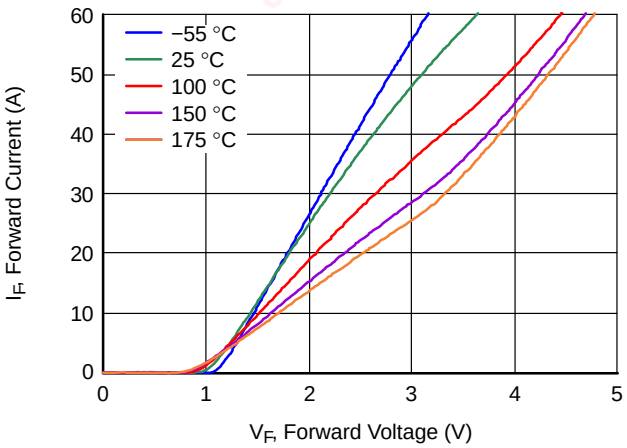


Figure 2. Typical Forward Characteristics in Surge Current

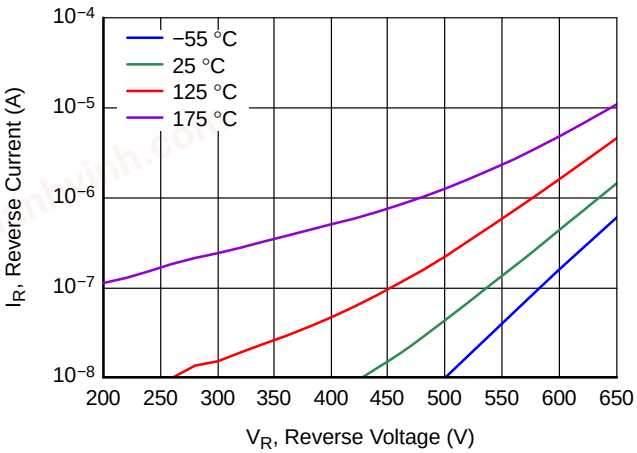


Figure 3. Typical Reverse Characteristics

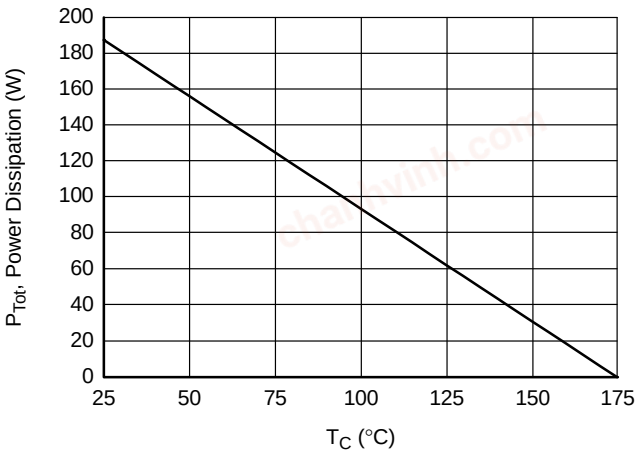


Figure 4. Power Dissipation

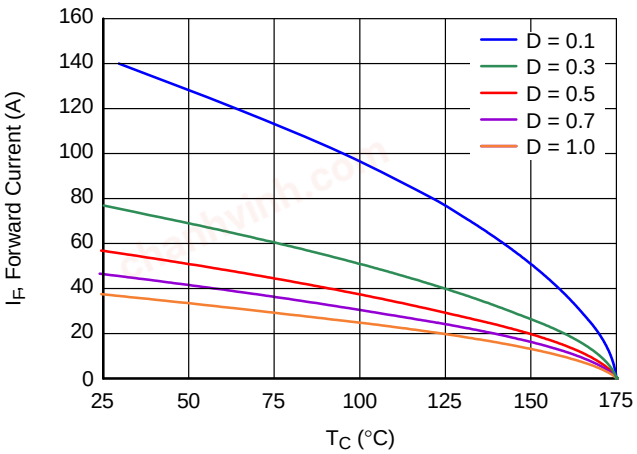


Figure 5. Diode Forward Current

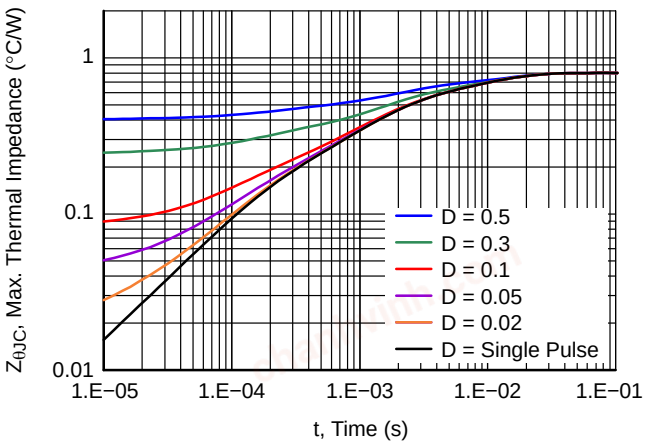


Figure 6. Maximum Transient Thermal Impedance

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TYPICAL PERFORMANCE DIAGRAMS (CONTINUED)

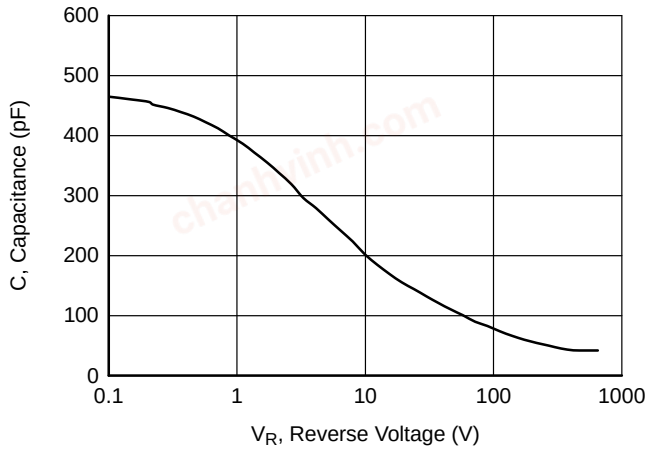


Figure 7. Capacitance vs. Reverse Voltage at 1 MHz

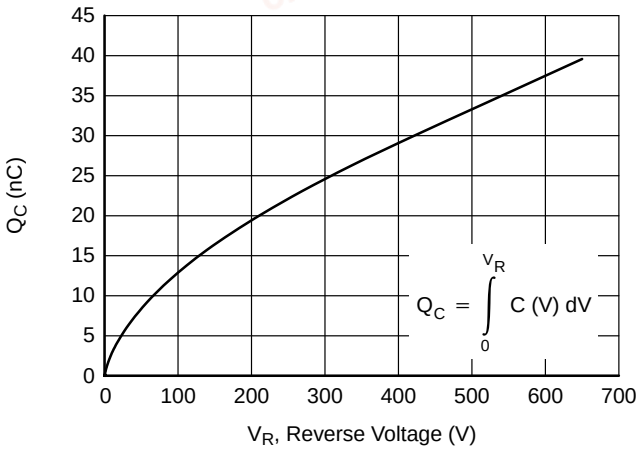


Figure 8. Typical Capacitive Charge vs. Reverse Voltage

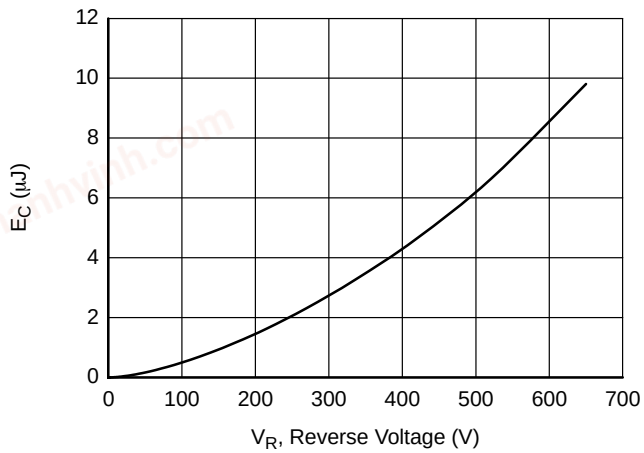


Figure 9. Typical Capacitance Stored Energy vs. Reverse Voltage

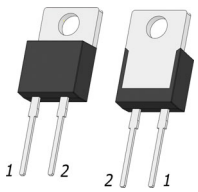
ORDERING INFORMATION

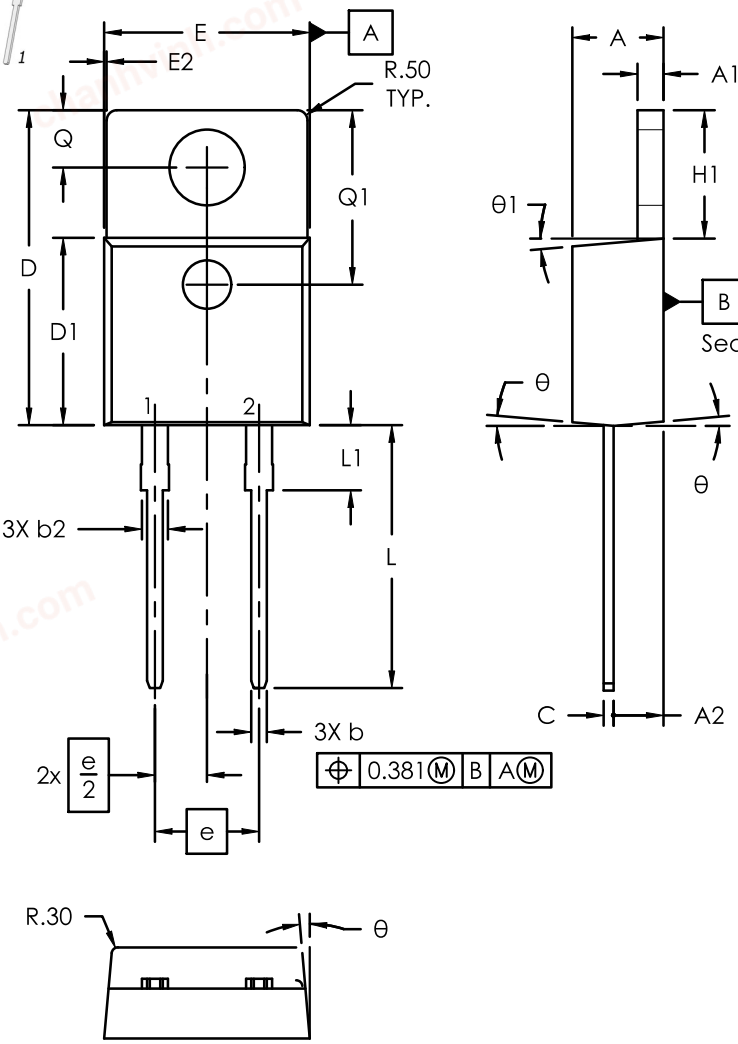
Part Number	Marking	Package	Shipping
UJ3D06512TS	UJ3D06512TS	TO220-2 (Pb-Free, Halogen Free)	1000 / Tube

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TO220−2 10.16x15.37x4.19, 5.08P
CASE 340AZ
ISSUE B

DATE 23 APR 2025





	millimeters		
SYM	MIN	NOM	MAX
A	3.56	4.19	4.83
A1	0.51	0.95	1.40
A2	2.03	2.48	2.92
b	0.38	0.70	1.02
b2	1.02	1.40	1.78
c	0.36	0.56	0.76
D	14.22	15.37	16.51
D1	8.38	8.89	9.40
D2	12.19	12.66	13.13
E	9.65	10.16	10.67
e		5.08 BSC.	
E1	6.86	7.87	8.89
E2	—	—	0.76
L	12.57	13.65	14.73
L1	—	—	6.35
ØP	3.53	3.81	4.09
H1	5.84	6.35	6.86
Q	2.54	2.98	3.43
Q1	8.38	8.51	8.64
θ		5°	
θ1		5°	

NOTES:
1. Dimensioning and Tolerancing as per ASME Y14.5M, 2018.
2. Controlling Dimension : Millimeters
3. Dimensions D and E does not include Mold Flash. These dimensions are measure at the outermost extreme of the plastic body.
4. Through hole diameter value = End Hole Diameter
5. PCB through hole pattern as per IPC-2222

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DESCRIPTION:	**TO220−2 10.16x15.37x4.19, 5.08P**	**PAGE 1 OF 2**

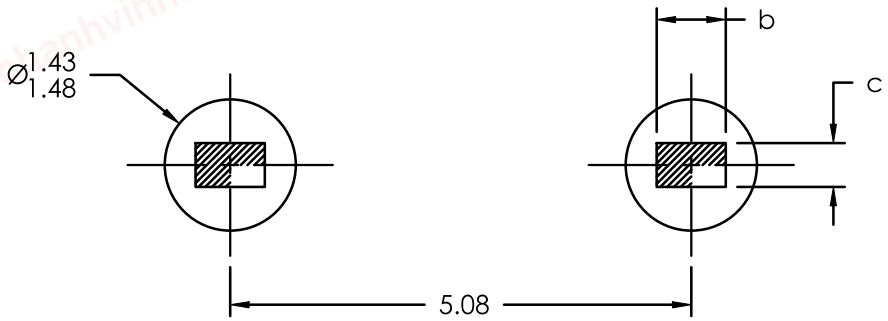
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TO220−2 10.16x15.37x4.19, 5.08P
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DATE 23 APR 2025

RECOMMENDED PCB PATTERN



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