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LX8 Series

EV Series 0.8 Amp Sensitive Triacs

HF RoHS



Description

solid state switch series offering direct interface to microprocessor drivers in economical TO-92 and surface mount packages. The die voltage blocking junctions are glass-passivated to ensure long term reliability and parametric stability.

Features & Benefits

- RoHS compliant and Halogen-Free
- Blocking voltage (VDRM) capability — up to 600V
- Surge capability > 9.5Amps
- Static dv/dt > 10 Volts/µsec
- Thru hole and surface mount packages

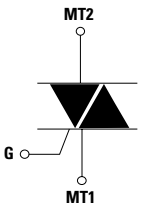
Main Features

Symbol	Value	Unit
$I_{T(RMS)}$	0.8	A
V_{DRM}/V_{RRM}	400 to 600	V
I_{GT}	3 to 5	mA

Applications

The LX8 EV Series is especially designed for low current applications such as heating controls in hair care products, as well as replacement of mechanical switch contacts where long life is required.

Schematic Symbol



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Absolute Maximum Ratings

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)	TO-92	T_C = 50°C	0.8A	A
		SOT-89	T_C = 60°C		
		SOT-223	T_L = 90°C		
I_{TSM}	Non repetitive surge peak on-state current (Single cycle, T_J initial = 25°C)	-	F = 50 Hz	8.0	A
		-	F = 60 Hz	9.5	
I^2t	I^2t Value for fusing	t_p = 10 ms	F = 50 Hz	0.32	A^2s
		t_p = 8.3 ms	F = 60 Hz	0.37	
di/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT}		T_J = 110°C	20	A/µs
I_{GTM}	Peak gate current	t_p = 10 µs	T_J = 110°C	1	A
$P_{G(AV)}$	Average gate power dissipation		T_J = 110°C	0.1	W
T_{stg}	Storage junction temperature range			-40 to 150	°C
T_J	Operating junction temperature range			-40 to 110	°C

Electrical Characteristics (TJ = 25°C, unless otherwise specified)

Symbol	Description	Test Conditions	Quadrant	Limit	Value		Unit
					LX803xy	LX807xy	
I_{GT}	DC Gate Trigger Current	V_D = 12V R_L = 60 Ω	I – II – III, IV	MAX.	3 5	5 7	mA
V_{GT}	DC Gate Trigger Voltage		ALL	MAX.	1.3	1.3	V
I_H	Holding Current	Gate Open		MAX.	5	5	mA
dv/dt	Critical Rate-of-Rise of Off-State Voltage	T_J = 110°C, V_D = V_{DRM} Exponential WaveformGate Open		MIN.	10	10	V/µs
(dv/dt)c	Critical Rate-of-Rise of Commutating Voltage	(di/dt)c = 0.43A/ms T_J = 110°C		MIN.	1.5	1.5	V/µs
t_{gt}	Turn-On Time	I_G = 25mA PW = 15µs I_T = 1.2A (pk)		MAX.	2.0	2.0	µs

Note: x = voltage, y = package

Static Characteristics (TJ = 25°C, unless otherwise specified)

Symbol	Description	Test Conditions	Limit	Value	Unit
V_{TM}	Peak On-State Voltage	I_{TM} = 1.13A (pk)	MAX	1.60	V
I_{DRM}	Off-State Current, Peak Repetitive	V_D= V_{DRM} T_J = 25°C	MAX	5	µA
		V_D= V_{DRM} T_J = 110°C		100	µA

Thermal Resistances

Symbol	Description	Test Conditions		Value	Unit
$R_{th(JC)}$	Junction to case (AC)	I_T = 0.8A $_{(RMS)}$ [1]	TO-92	60	°C/W
			SOT-89	50	
			SOT-223	25	
$R_{th(j-a)}$	Junction to ambient	I_T = 0.8A $_{(RMS)}$ [1]	TO-92	150	°C/W
			SOT-89	90	
			SOT-223	60	

1. 60Hz AC resistive load condition, 100% conduction.

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Figure 1: Definition of Quadrants

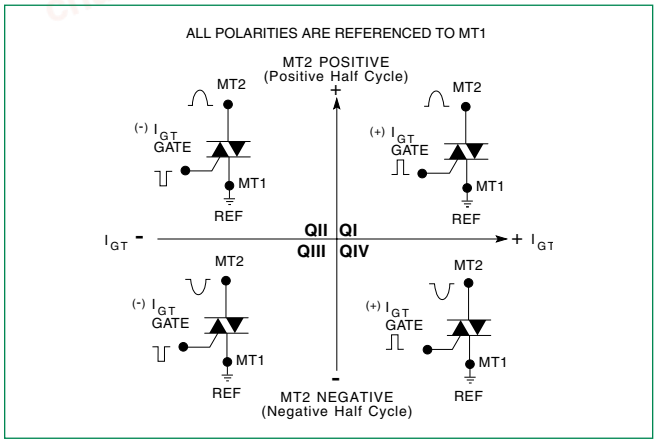


Figure 2: Normalized DC Gate Trigger Current for All Quadrants vs. Junction Temperature

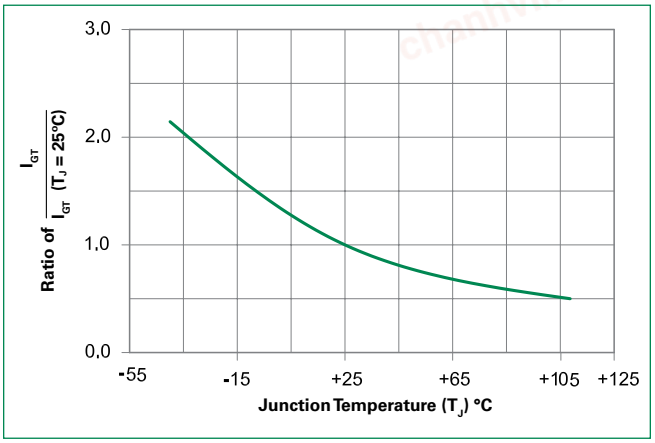


Figure 3: Normalized DC Holding Current vs. Junction Temperature

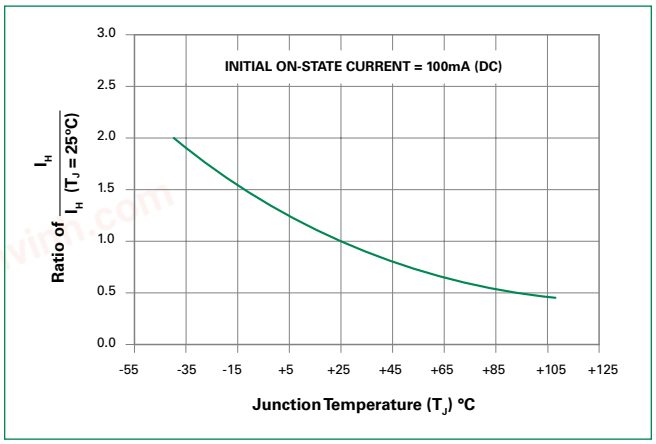


Figure 4: Normalized DC Gate Trigger Voltage for All Quadrants vs. Junction Temperature

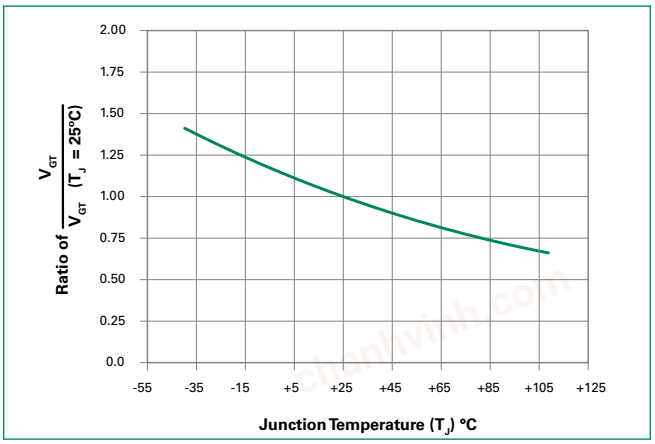


Figure 5: Power Dissipation (Typical) vs. RMS On-State Current

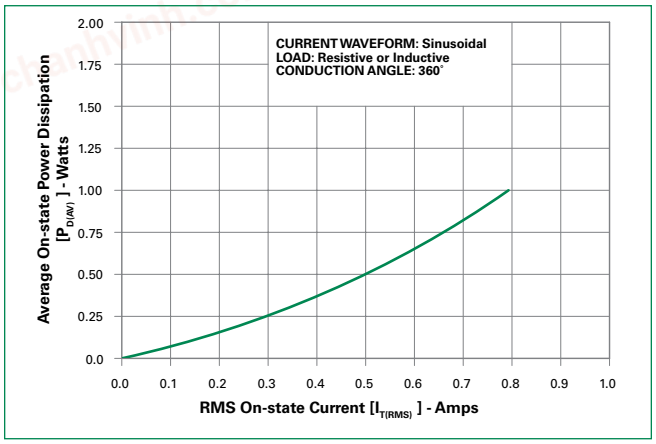
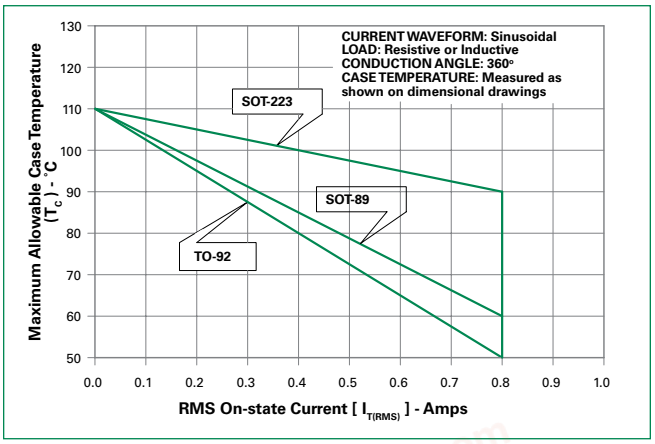


Figure 6: Maximum Allowable Case Temperature vs. On-State Current

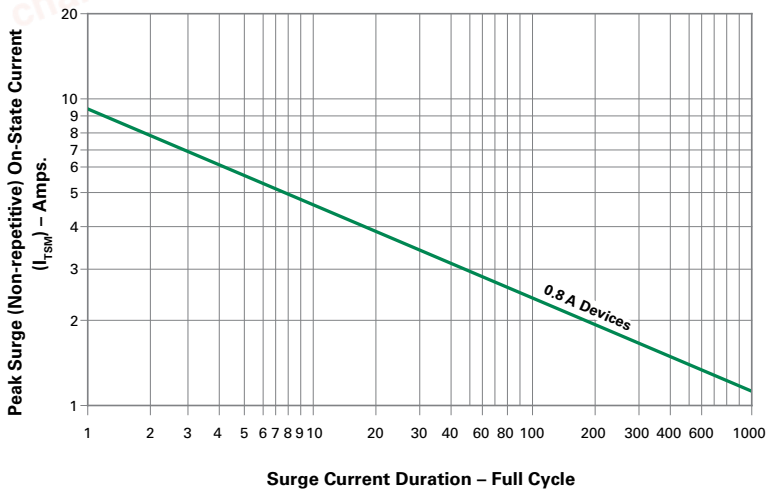


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Figure 7: Surge Peak On-State Current vs. Number of Cycles

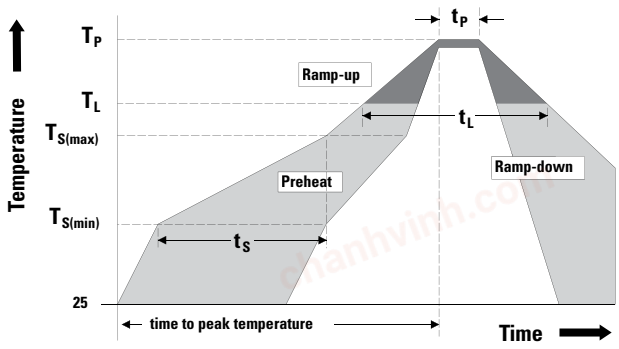


Supply Frequency: 60Hz Sinusoidal
Load: Resistive
RMS On-State Current [$I_{T(RMS)}$]: Max Rated Value at Specific Case Temperature

Notes:
1. Gate control may be lost during and immediately following surge current interval.
2. Overload may not be repeated until junction temperature has returned to steady-state rated value.

Soldering Parameters

Reflow Condition		Pb – Free assembly
Pre Heat	**- Temperature Min ($T_{s(min)}$)**	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus Temp) (T_L) to peak		5°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		5°C/second max
Reflow	**- Temperature (T_L) (Liquidus)**	217°C
	- Time (min to max) (t_s)	60 – 150 seconds
Peak Temperature (T_P)		$260^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		5°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		280°C



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Physical Specifications

Terminal Finish	100% Matte Tin-plated.
Body Material	UL Recognized compound meeting flammability rating V-0.
Lead Material	Copper Alloy

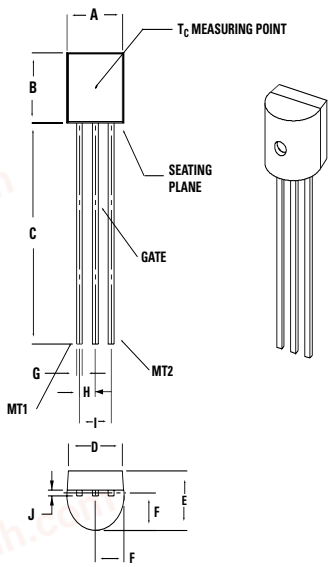
Design Considerations

Careful selection of the correct component for the application's operating parameters and environment will go a long way toward extending the operating life of the Thyristor. Good design practice should limit the maximum continuous current through the main terminals to 75% of the component rating. Other ways to ensure long life for a power discrete semiconductor are proper heat sinking and selection of voltage ratings for worst case conditions. Overheating, overvoltage (including dv/dt), and surge currents are the main killers of semiconductors. Correct mounting, soldering, and forming of the leads also help protect against component damage.

Reliability/Environmental Tests

Test	Specifications and Conditions
AC Blocking	MIL-STD-750, M-1040, Cond A Applied Peak AC voltage @ 110°C for 1008 hours
Temperature Cycling	MIL-STD-750, M-1051, 100 cycles; -40°C to +150°C; 15-min dwell-time
Temperature/Humidity	EIA / JEDEC, JESD22-A101 1008 hours; 320V - DC: 85°C; 85% rel humidity
High Temp Storage	MIL-STD-750, M-103, 1008 hours; 150°C
Low-Temp Storage	1008 hours; -40°C
Resistance to Solder Heat	MIL-STD-750 Method 2031
Solderability	ANSI/J-STD-002, category 3, Test A
Lead Bend	MIL-STD-750, M-2036 Cond E

Dimensions — TO-92 (E Package)



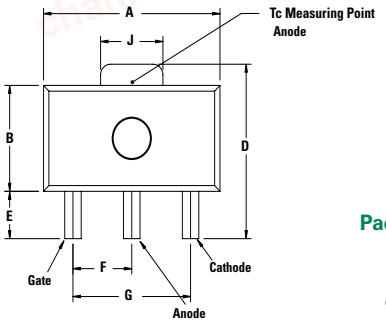
Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.175	0.205	4.450	5.200
B	0.170	0.210	4.320	5.330
C	0.500	-	12.70	-
D	0.135	-	3.430	-
E	0.125	0.165	3.180	4.190
F	0.080	0.105	2.040	2.660
G	0.016	0.021	0.407	0.533
H	0.045	0.055	1.150	1.390
I	0.095	0.105	2.420	2.660
J	0.015	0.020	0.380	0.500

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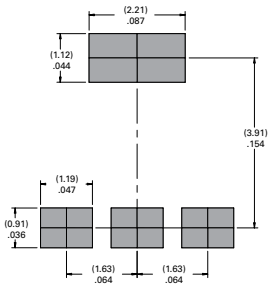
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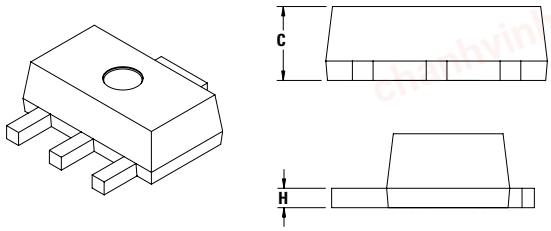
Dimensions – SOT-89



Dimensions in Millimeters (Inches)

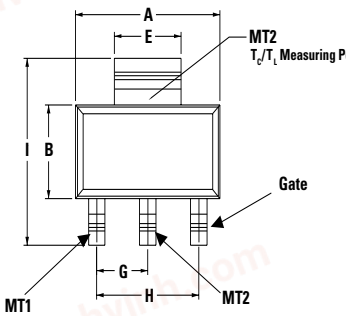
Pad Layout for SOT-89





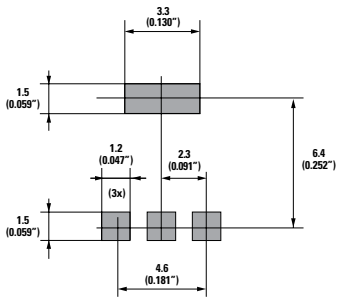
Dimension	Inches			Millimeters		
	Min	Typ	Max	Min	Typ	Max
A	0.173	—	0.181	4.40	—	4.60
B	0.090	—	0.102	2.29	—	2.60
C	0.055	—	0.063	1.40	—	1.60
D	0.155	—	0.167	3.94	—	4.25
E	0.035	—	0.047	0.89	—	1.20
F	0.056	—	0.062	1.42	—	1.57
G	0.115	—	0.121	2.92	—	3.07
H	0.014	—	0.017	0.35	—	0.44
I	0.014	—	0.019	0.36	—	0.48
J	0.064	—	0.072	1.62	—	1.83

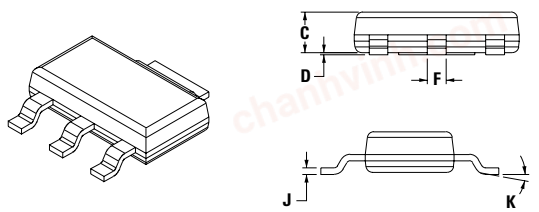
Dimensions – SOT-223



Dimensions in Millimeters (Inches)

Pad Layout for SOT-223





Dimensions	Inches			Millimeters		
	Min	Typ	Max	Min	Typ	Max
A	0.248	0.256	0.264	6.30	6.50	6.70
B	0.130	0.138	0.146	3.30	3.50	3.70
C	—	—	0.071	—	—	1.80
D	0.001	—	0.004	0.02	—	0.10
E	0.114	0.118	0.124	2.90	3.00	3.15
F	0.024	0.027	0.034	0.60	0.70	0.85
G	—	0.090	—	—	2.30	—
H	—	0.181	—	—	4.60	—
I	0.264	0.276	0.287	6.70	7.00	7.30
J	0.009	0.010	0.014	0.24	0.26	0.35
K	10° MAX					

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Product Selector

Part Number	Voltage	Gate Sensitivity Quadrants		Package
		I – II – III	IV	
LX803DE	400 V	3 mA	5 mA	TO-92
LX803ME	600 V	3 mA	5 mA	TO-92
LX803DT	400 V	3 mA	5 mA	SOT-223
LX803MT	600 V	3 mA	5 mA	SOT-223
LX807DE	400 V	5 mA	7 mA	TO-92
LX807ME	600 V	5 mA	7 mA	TO-92
LX807DT	400 V	5 mA	7 mA	SOT-223
LX807MT	600 V	5 mA	7 mA	SOT-223
LX807MB	600 V	5 mA	7 mA	SOT-89

Packing Options

Part Number	Marking	Weight	Packing Mode	Base Quantity
LX8xxyE	LX8xxyE	0.217 g	Bulk	2500
LX8xxyEAP	LX8xxyE	0.217 g	Ammo Pack	2000
LX8xxyERP	LX8xxyE	0.217 g	Tape & Reel	2000
LX8xxyTRP	LX8xxyT	0.120 g	Tape & Reel	1000
LX8xxyBRP	8xx	0.053 g	Tape & Reel	1000

Note: xx = gate sensitivity, y = voltage

Part Numbering System

L X8 xx x x xx

Triac Series

Current
X8: 0.8A

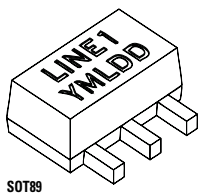
Sensitivity & Type
03: 3, 3, 3, 5mA Triac
07: 5, 5, 5, 7mA Triac

Package Type
E: TO-92
B: SOT-89
T: SOT-223

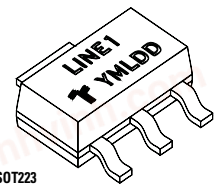
Voltage
D: 400V
M: 600V

Packing Type
Blank: Bulk Pack
RP: Reel Pack (TO-92)
: Embossed Carrier Pack (SOT-223) (SOT-89)
AP: Ammo Pack (TO-92)

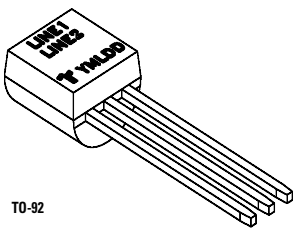
Part Marking System



SOT89



SOT223



TO-92

Line1 = Littelfuse Part Number
Line2 = continuation…Littelfuse Part Number
Y = Last Digit of Calendar Year
M = Letter Month Code (A-L for Jan-Dec)
L = Location Code
DD = Calendar Date

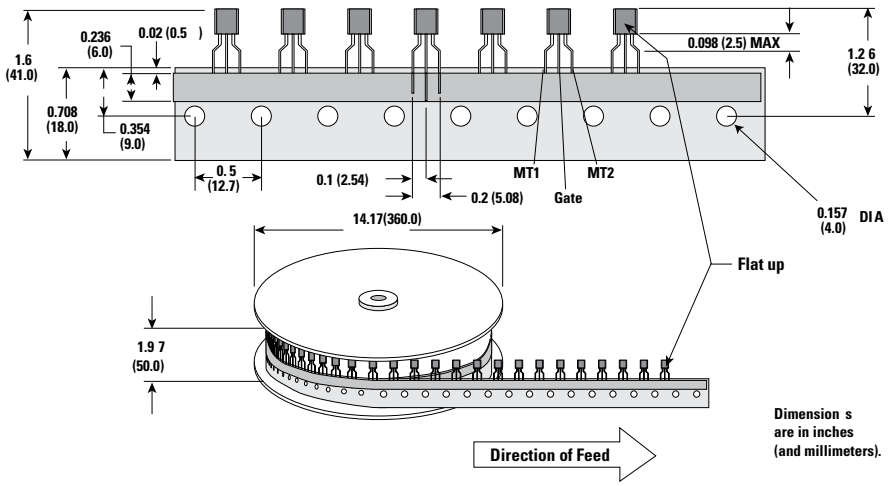
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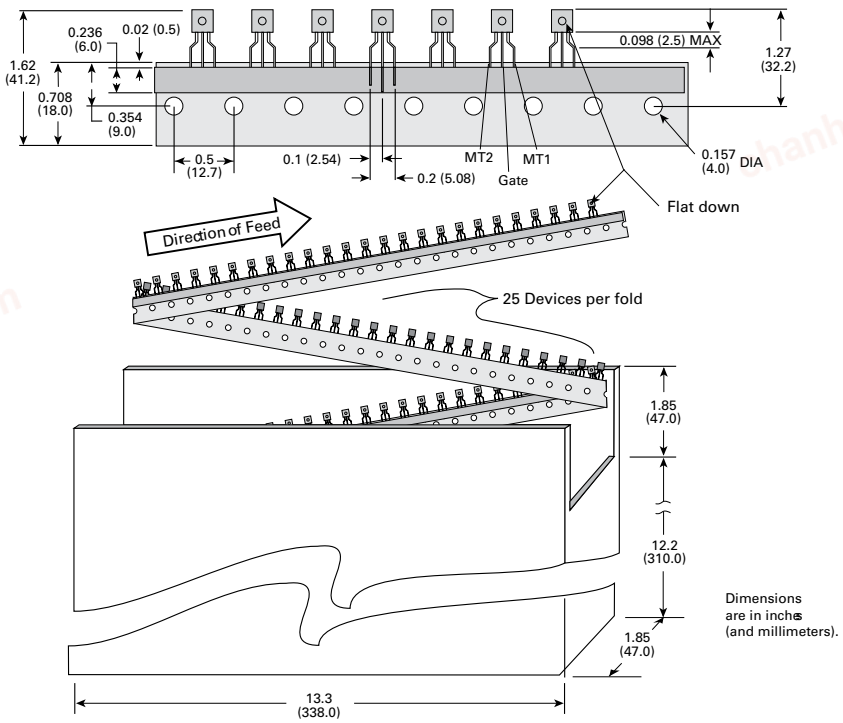
TO-92 (3-lead) Reel Pack (RP) Radial Leaded Specifications

Meets all EIA-468-C Standards



TO-92 (3-lead) Ammo Pack (AP) Radial Leaded Specifications

Meets all EIA-468-C Standards

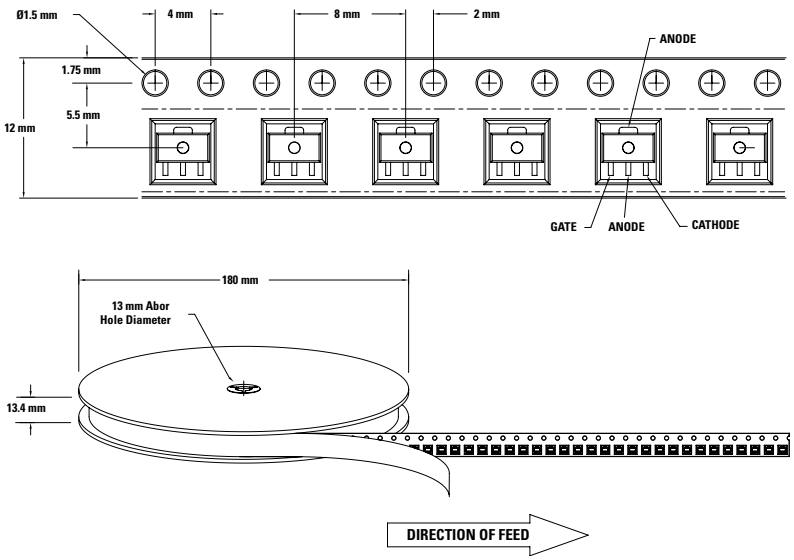


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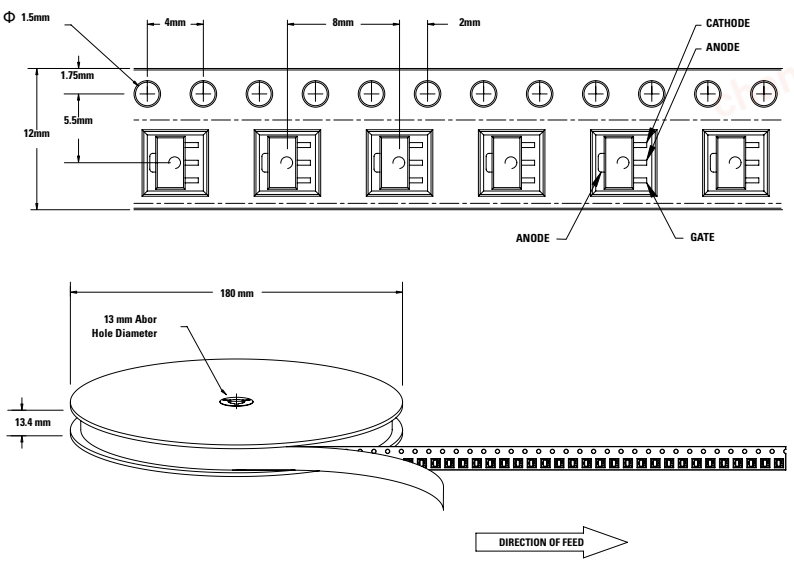
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SOT-89 Reel Pack (RP) Specifications



SOT-89 Reel Pack (RP1) Specifications

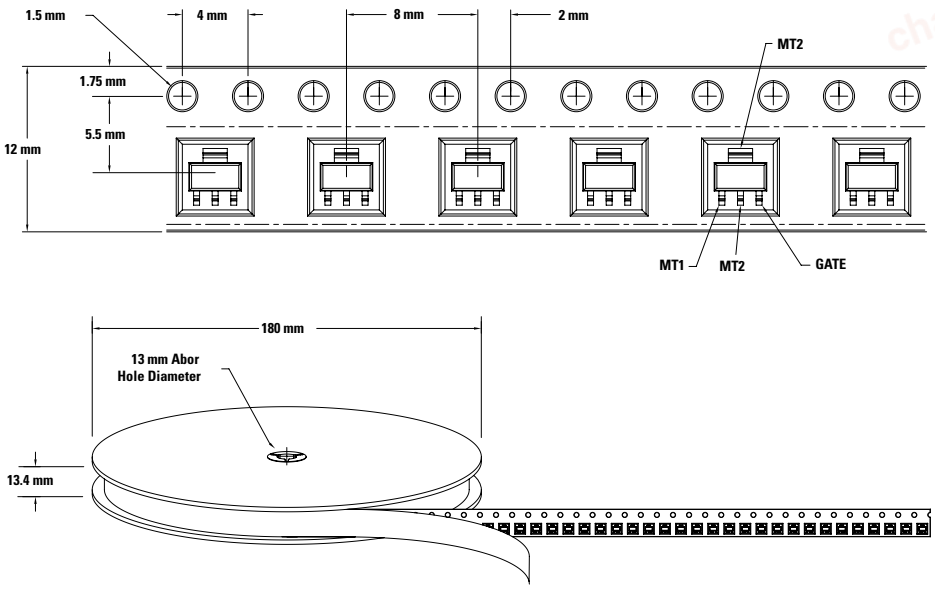


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SOT-223 Reel Pack (RP) Specifications



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