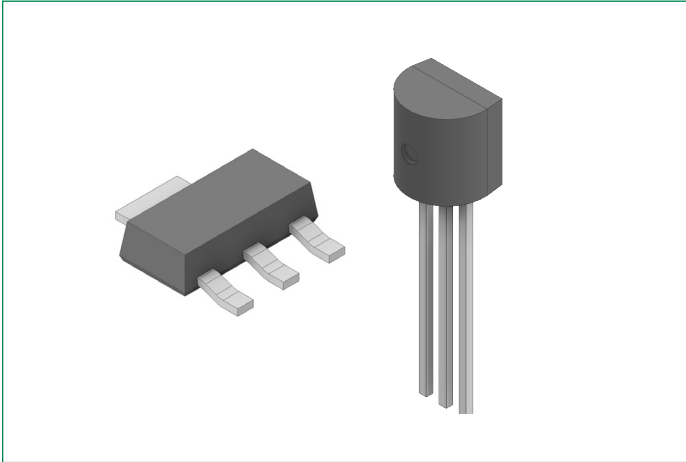


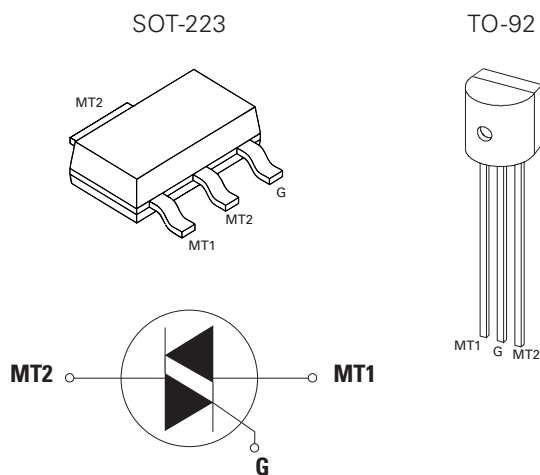
# L01 Series

## EV Series 1 A Sensitive TRIACs

HF RoHS



### Pinout Diagram



**MT1:** Main Terminal 1; **MT2:** Main Terminal 2; **G:** Gate

### Description

This 1 A bi-directional solid state switch series offers direct interface to microprocessor drivers in TO-92 and surface mount packages. The die voltage blocking junctions are glass-passivated to ensure long term reliability and parametric stability.

### Features

- RoHS compliant and halogen-free
- Surge current capability > 10 A
- Static dv/dt > 20 V/μs
- Blocking voltage ( $V_{DRM}$ ) capability up to 800 V

### Applications

The L01 EV Series is especially designed for white goods applications such as valve controls in washing machines as well as replacement of mechanical and hybrid relays where long life is required.

### Product Summary

Characteristic	Value	Unit
$I_{T(RMS)}$	1	A
$V_{DRM}/V_{RRM}$	400 to 800	V
$I_{GT}$	3 to 10	mA

## Maximum Ratings

Symbol	Characteristics	Conditions			Value	Units
$I_{T(RMS)}$	On-state RMS Current	TO-92	$T_C = 50\text{ }^\circ\text{C}$	Full sine wave	1.0	A
		SOT-223	$T_L = 90\text{ }^\circ\text{C}$			
$I_{TSM}$	Non-repetitive Surge Peak On-state Current	$f = 50\text{ Hz}$		$T_{vj}$ initial = $25\text{ }^\circ\text{C}$ , Single cycle	10	A
		$f = 60\text{ Hz}$			12	
$I^2t$	$I^2t$ Value for Fusing	$f = 50\text{ Hz}$		$t_p = 10\text{ ms}$	0.50	A <sup>2</sup> s
		$f = 60\text{ Hz}$		$t_p = 8.3\text{ ms}$	0.59	
di/dt	Critical Rate of Rise of On-state Current	$I_G = 2 \times I_{GT}$		$T_{vj} = 125\text{ }^\circ\text{C}$	20	A/ $\mu\text{s}$
$I_{GM}$	Peak Gate Current	$t_p = 10\text{ }\mu\text{s}$		$T_{vj} = 125\text{ }^\circ\text{C}$	1	A
$P_{G(AV)}$	Average Gate Power Dissipation	$T_{vj} = 125\text{ }^\circ\text{C}$			0.1	W
$T_{stg}$	Storage Temperature Range	–			–40 to 150	$^\circ\text{C}$
$T_{vj}$	Virtual Junction Temperature Range	–			–40 to 125	$^\circ\text{C}$

## Electrical Characteristics ( $T_{vj} = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

Symbol	Characteristics	Conditions	Quadrant	Limit	Value			Units
					L0103Ny	L0107xy	L0109xy	
$I_{GT}$	DC Gate Trigger Current	$V_D = 12\text{ V}$ , $R_L = 60\text{ }\Omega$	I – II – III	Min.	–	–	–	mA
			IV		–	–	5.7	
			I – II – III	Max.	3	5	10	
			IV		5	7	10	
$V_{GT}$	DC Gate Trigger Voltage	$V_D = 12\text{ V}$ , $R_L = 60\text{ }\Omega$	All quadrants	Max.	1.3			V
$I_H$	Holding Current	Gate Open		Max.	7	10	10	mA
$dv/dt_{(cr)}$	Critical Rate-of-rise of Off-stage Voltage	$T_{vj} = 110\text{ }^\circ\text{C}$ , $V_D = V_{DRM}$ , Exponential Waveform, Gate Open		Min.	10	20	50	V/ $\mu\text{s}$
$dv/dt_{(com)}$	Critical Rate-of-rise of Commutating Voltage	$(di/dt)_c = 0.54\text{ A/ms}$ , $T_{vj} = 110\text{ }^\circ\text{C}$		Min.	0.5	1.0	2.0	V/ $\mu\text{s}$
$t_{gt}$	Turn-on Time	$I_G = 25\text{ mA}$ , $P_W = 15\text{ }\mu\text{s}$ , $I_T = 1.2\text{ A}_{pk}$		Max.	2.0			$\mu\text{s}$

Note: x = voltage, y = package

## Static Characteristics ( $T_{vj} = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

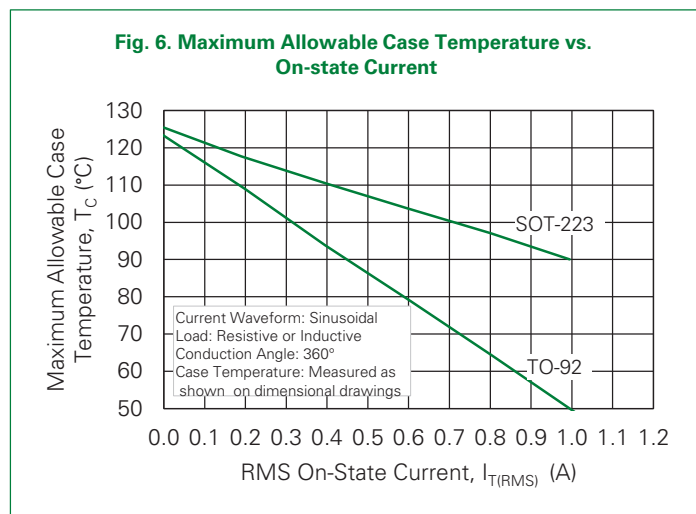
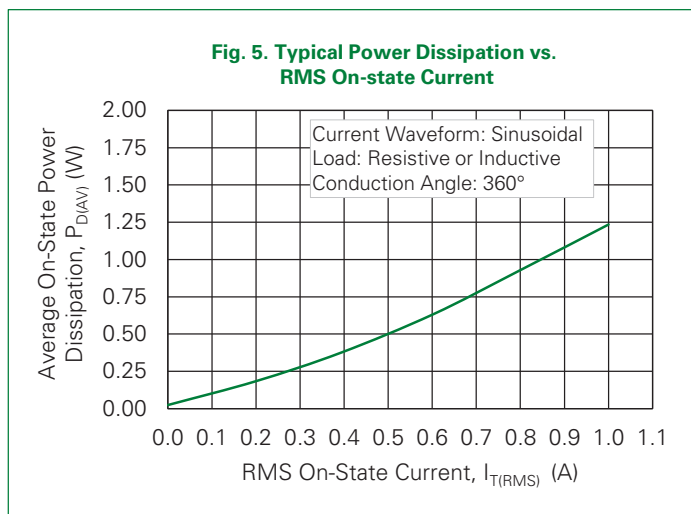
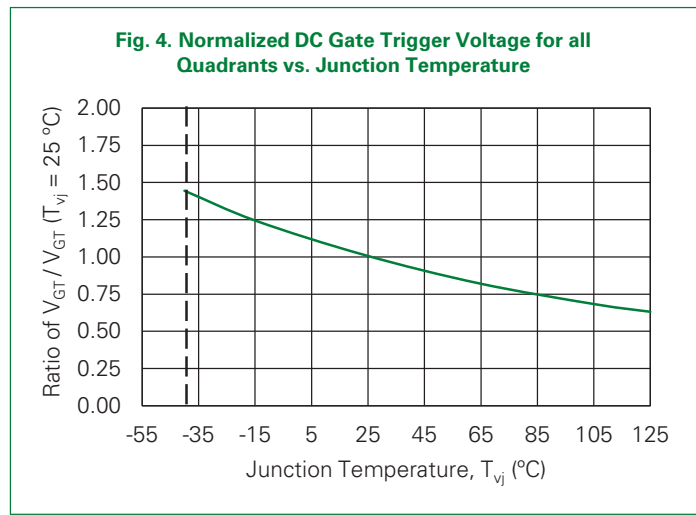
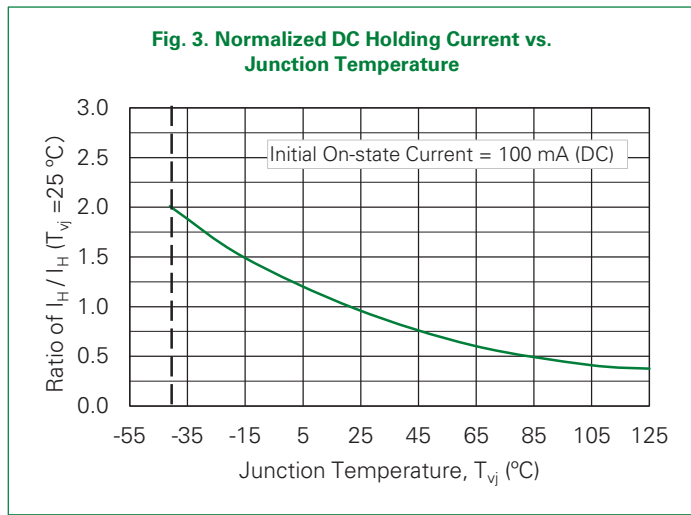
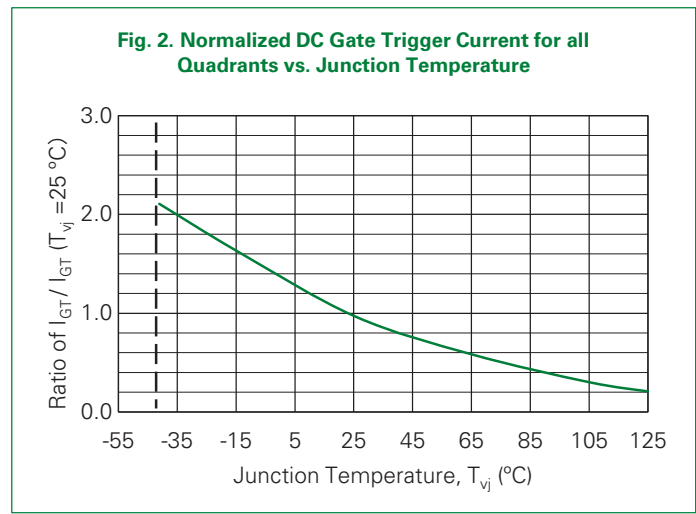
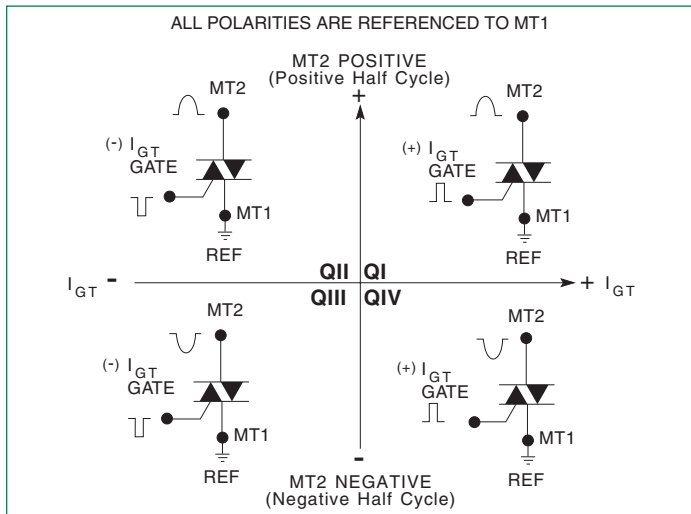
Symbol	Characteristics	Conditions	Maximum Value	Units
$V_{TM}$	Peak On-state Voltage	$I_T = 1.4\text{ A}_{pk}$	1.60	V
$I_{DRM}$	Repetitive Peak Off-state Current	$V_D = V_{DRM}$ , $T_{vj} = 25\text{ }^\circ\text{C}$	5	$\mu\text{A}$
		$V_D = V_{DRM}$ , $T_{vj} = 125\text{ }^\circ\text{C}$	100	

## Thermal Characteristics

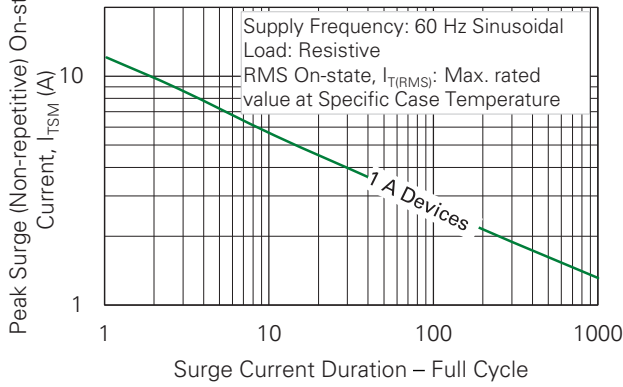
Symbol	Characteristics	Conditions		Value	Units
$R_{th(j-c)}$	Thermal Resistance, Junction to Case (AC)	$I_T = 1.0\text{ A}_{(RMS)}$ <sup>1</sup>	TO-92	50	K/W
			SOT-223	23	
$R_{th(j-a)}$	Thermal Resistance, Junction to Ambient	$I_T = 1.0\text{ A}_{(RMS)}$ <sup>1</sup>	TO-92	100	K/W
			SOT-223	55	

Note 1: 60 Hz AC resistive load condition, 100% conduction

Characteristic Curves



**Fig. 7. Surge Peak On-state Current vs. Number of Cycles**

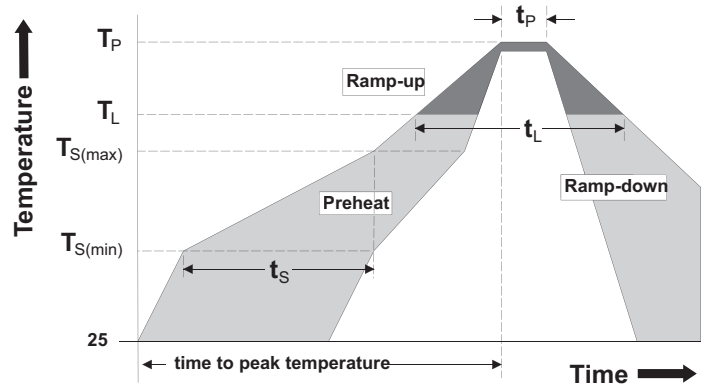


Notes:

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

Characteristic		Value
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) ( $t_g$ )	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 ( $t_L$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )		260 <sup>+0/-5</sup> °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



### Environmental Specifications

Test	Specifications and Conditions
AC Blocking	MIL-STD-750, M-1040, Cond A Applied Peak AC voltage @ 125 °C for 1008 hours
Temperature/Humidity	EIA / JEDEC, JESD22-A101, 1008 hours; 320 V - DC: 85 °C; 85 % relative humidity
Temperature Cycling	MIL-STD-750, M-1051, 100 cycles; -40 °C to +150 °C; 15-min dwell-time
High-temperature Storage	MIL-STD-750, M-1031, 1008 hours; 150 °C
Low-temperature 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

### Physical Specifications

Characteristic	Value
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.

## Product Selector

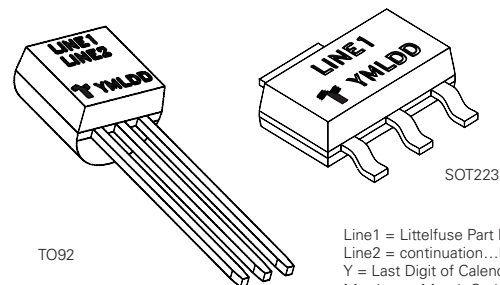
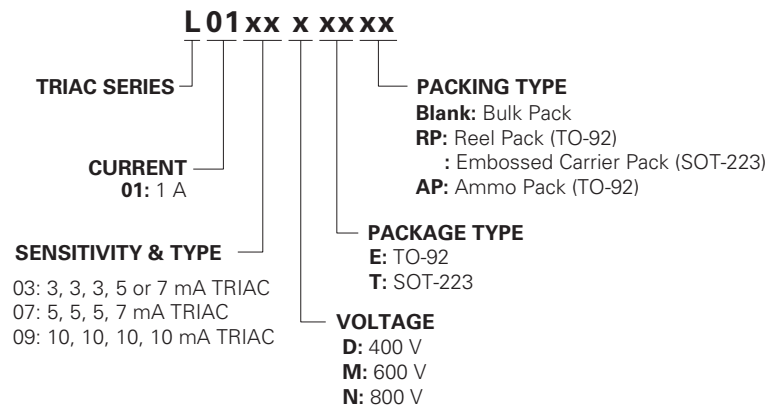
Part Number	Voltage			Gate Sensitivity Quadrants		Package
	400 V	600 V	800 V	I – II – III	IV	
L0103DE	X	–	–	3 mA	5 mA	TO-92
L0103ME	–	X	–	3 mA	5 mA	TO-92
L0103NE	–	–	X	3 mA	7 mA	TO-92
L0103DT	X	–	–	3 mA	5 mA	SOT-223
L0103MT	–	X	–	3 mA	5 mA	SOT-223
L0103NT	–	–	X	3 mA	7 mA	SOT-223
L0107DE	X	–	–	5 mA	7 mA	TO-92
L0107ME	–	X	–	5 mA	7 mA	TO-92
L0107NE	–	–	X	5 mA	7 mA	TO-92
L0107DT	X	–	–	5 mA	7 mA	SOT-223
L0107MT	–	X	–	5 mA	7 mA	SOT-223
L0107NT	–	–	X	5 mA	7 mA	SOT-223
L0109DE	X	–	–	10 mA	10 mA	TO-92
L0109ME	–	X	–	10 mA	10 mA	TO-92
L0109NE	–	–	X	10 mA	10 mA	TO-92
L0109DT	X	–	–	10 mA	10 mA	SOT-223
L0109MT	–	X	–	10 mA	10 mA	SOT-223
L0109NT	–	–	X	10 mA	10 mA	SOT-223

## Packing Options

Part Number	Marking	Weight	Packing Mode	Base Quantity
L01xxxE	L01xxxE	0.217 g	Bulk	2500
L01xxxEAP	L01xxxE	0.217 g	Ammo Pack	2000
L01xxYERP	L01xxxE	0.217 g	Tape & Reel	2000
L01xxYTRP	L01xxYT	0.120 g	Tape & Reel	1000

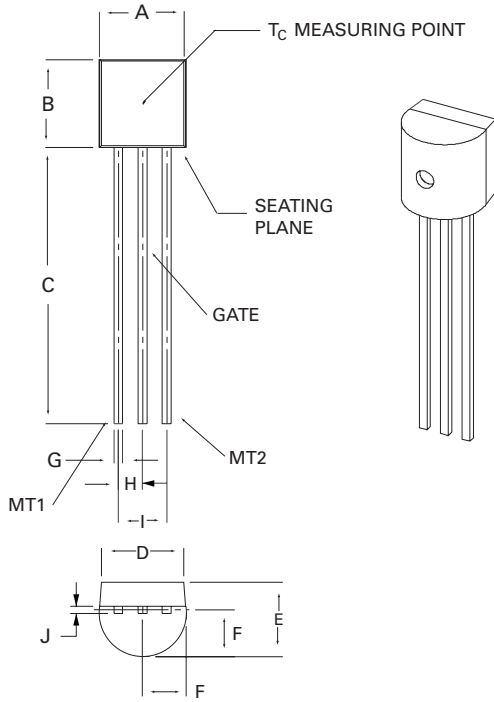
Note: xx = gate sensitivity, y = voltage

## Part Numbering and Marking



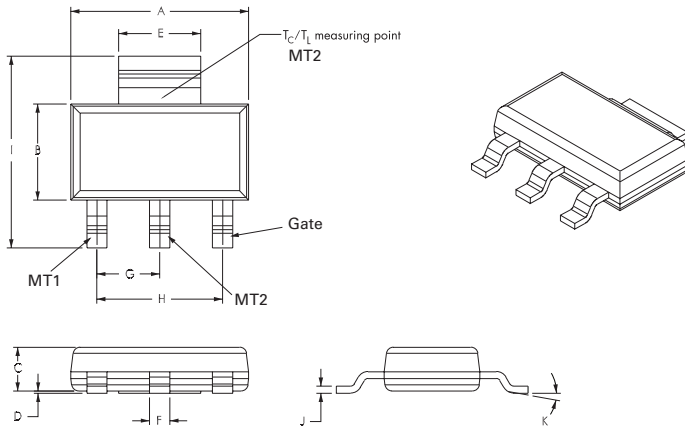
Line1 = Littelfuse Part Number  
Line2 = continuation...Littelfuse Part Number  
Y = Last Digit of Calendar Year  
M = Letter Month Code (A-L for Jan-Dec)  
L = Location Code  
DD = Calendar Date

Package Dimensions TO-92



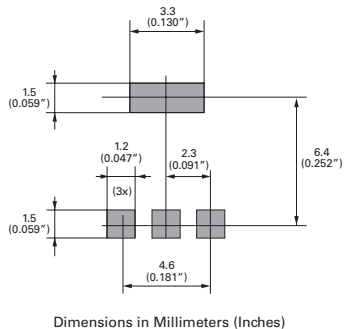
Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.450	5.200	0.175	0.205
B	4.320	5.330	0.170	0.210
C	12.70	–	0.500	–
D	3.430	–	0.135	–
E	3.180	4.190	0.125	0.165
F	2.040	2.660	0.080	0.105
G	0.407	0.533	0.016	0.021
H	1.150	1.390	0.045	0.055
I	2.420	2.660	0.095	0.105
J	0.380	0.500	0.015	0.020

Package Dimensions SOT-223



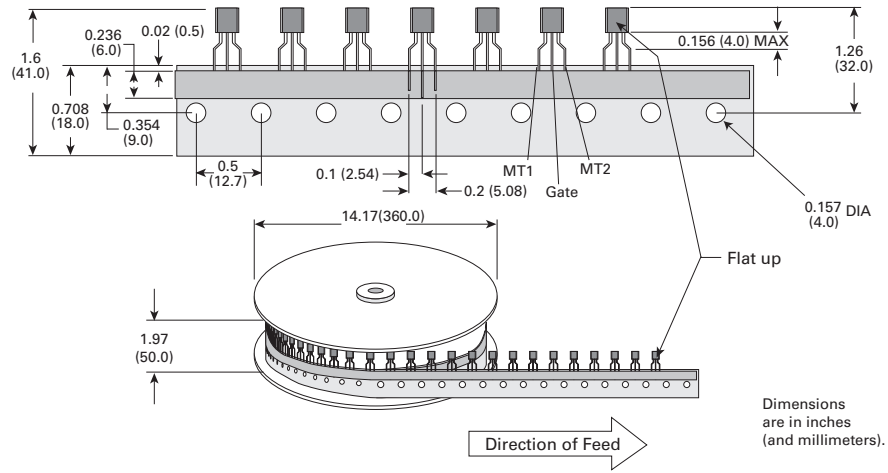
Symbol	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.30	6.50	6.70	0.248	0.256	0.264
B	3.30	3.50	3.70	0.130	0.138	0.146
C	–	–	1.80	–	–	0.071
D	0.02	–	0.10	0.001	–	0.004
E	2.90	3.00	3.15	0.114	0.118	0.124
F	0.60	0.70	0.85	0.024	0.027	0.034
G	–	2.30	–	–	0.090	–
H	–	4.60	–	–	0.181	–
I	6.70	7.00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

Pad Layout for SOT-223



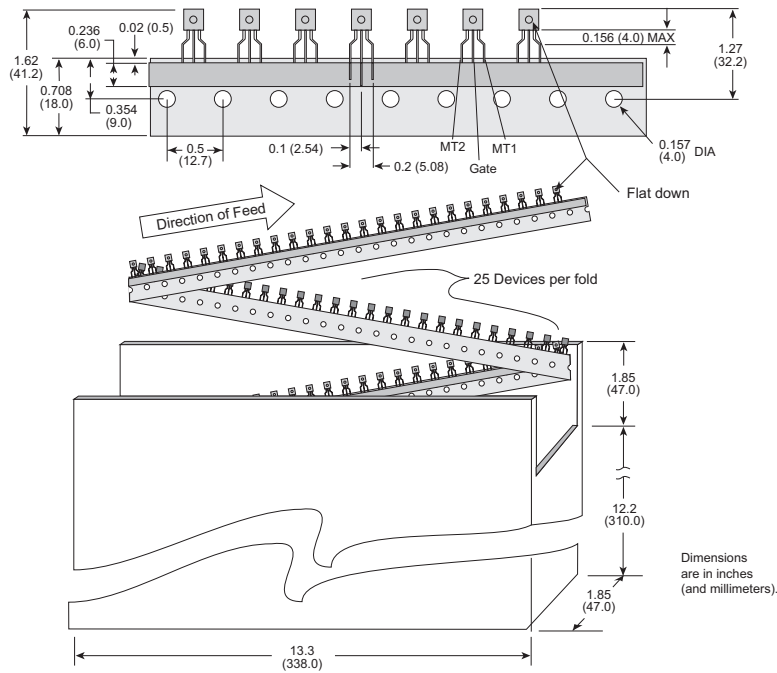
## TO-92 (3-lead) Reel Pack (RP) Radial Leaded Specifications

Meets all EIA-468-C Standards

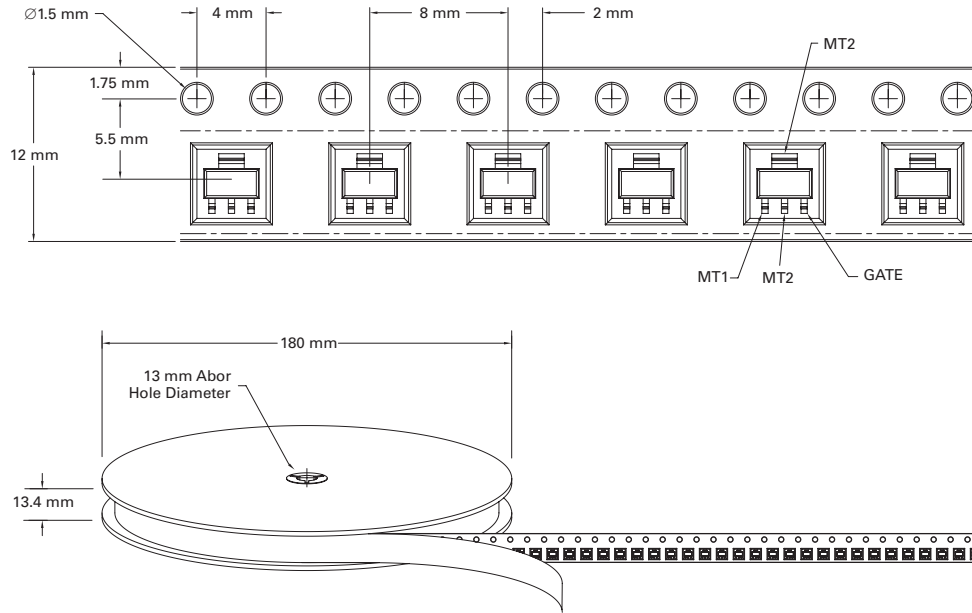


## TO-92 (3-lead) Ammo Pack (AP) Radial Leaded Specifications

Meets all EIA-468-C Standards



## SOT-223 Reel Pack (RP) Specifications



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