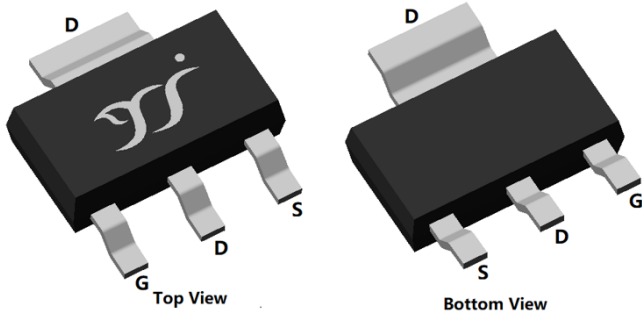
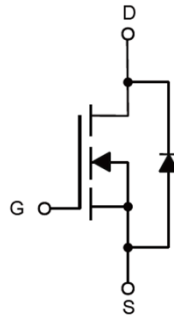


## N-Channel Enhancement Mode Field Effect Transistor



SOT-223



### Product Summary

- $V_{DS}$  100V
- $I_D$  4.0A
- $R_{DS(ON)}$  (at  $V_{GS}=10V$ ) < 110mohm
- $R_{DS(ON)}$  (at  $V_{GS}=4.5V$ ) < 120mohm

### General Description

- Trench Power MV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

### Applications

- DC-DC Converters
- Power management functions

### ■ Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		$V_{DS}$	100	V
Gate-source Voltage		$V_{GS}$	$\pm 20$	V
Drain Current	$T_A=25^\circ\text{C}$	$I_D$	4	A
	$T_A=70^\circ\text{C}$		3.2	
Pulsed Drain Current <sup>A</sup>		$I_{DM}$	16	A
Total Power Dissipation @ $T_A=25^\circ\text{C}$		$P_D$	2.5	W
Thermal Resistance Junction-to-Ambient <sup>B</sup>		$R_{\theta JA}$	50	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Case		$R_{\theta JC}$	16	$^\circ\text{C/W}$
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55~+150	$^\circ\text{C}$

### ■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJM04N10A	F2	1004	2500	/	40000	13" reel
			2500	5000	25000	13" reel



# YJM04N10A

## ■ Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	100			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V			1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V			±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA	1.1	1.8	3.0	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> =4A		95	110	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> =3.2A		100	120	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =4A, V <sub>GS</sub> =0V		0.8	1.2	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>				4	A
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f=1MHZ		1070		pF
Output Capacitance	C <sub>oss</sub>			33		
Reverse Transfer Capacitance	C <sub>rss</sub>			30		
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =50V, I <sub>D</sub> =10A		26		nC
Gate-Source Charge	Q <sub>gs</sub>			5.4		
Gate-Drain Charge	Q <sub>gd</sub>			5.8		
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> =10A, di/dt=100A/us		30.1		
Reverse Recovery Time	t <sub>rr</sub>			40		
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =50V, R <sub>L</sub> =6.4Ω R <sub>GEN</sub> =3Ω		7		ns
Turn-on Rise Time	t <sub>r</sub>			24		
Turn-off Delay Time	t <sub>D(off)</sub>			24		
Turn-off fall Time	t <sub>f</sub>			31		

A. Pulse Test: Pulse Width ≤ 300us, Duty cycle ≤ 2%.

B. R<sub>θJA</sub> is the sum of the junction-to-lead and lead-to-ambient thermal resistance, where the lead thermal reference is defined as the solder mounting surface of the drain pins. R<sub>θJL</sub> is guaranteed by design, while R<sub>θJA</sub> is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.



■ Typical Performance Characteristics

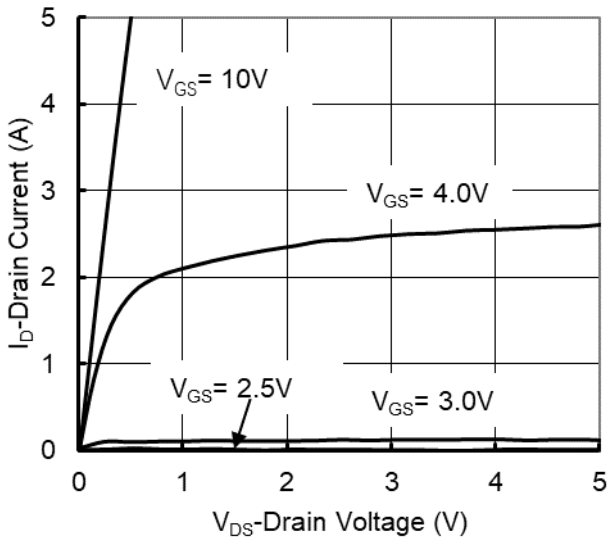


Figure 1. Output Characteristics

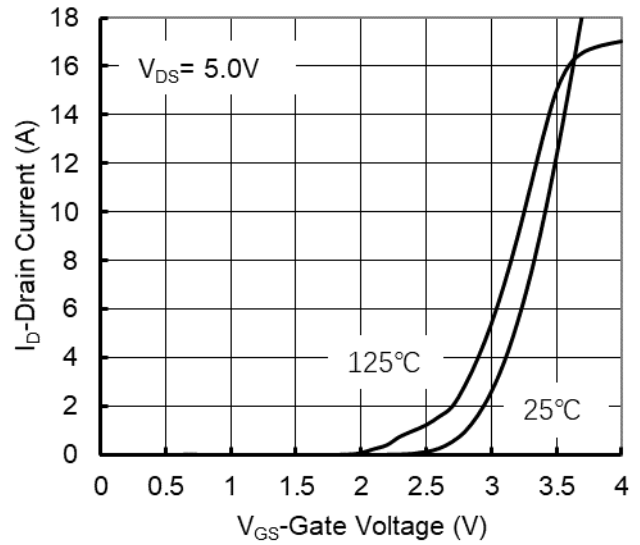


Figure 2. Transfer Characteristics

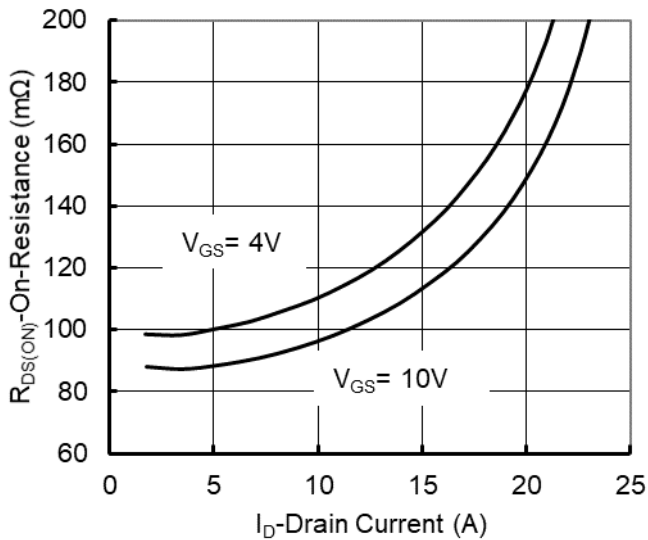


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

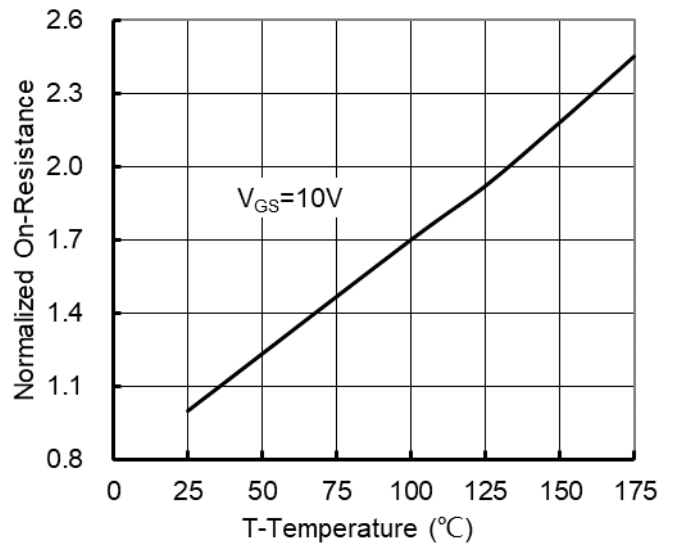


Figure 4. On-Resistance vs. Junction Temperature

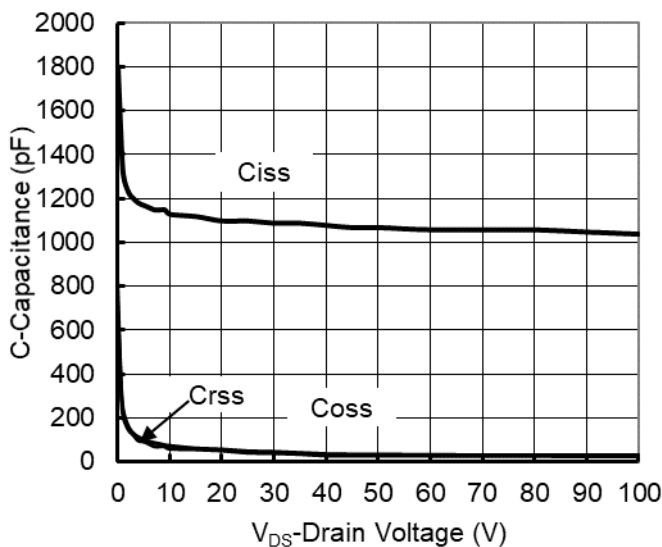


Figure 5. Capacitance Characteristics

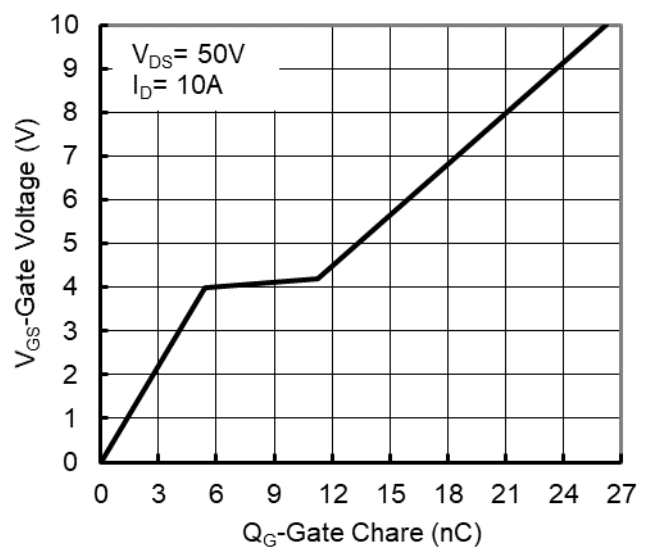


Figure 6. Gate Charge

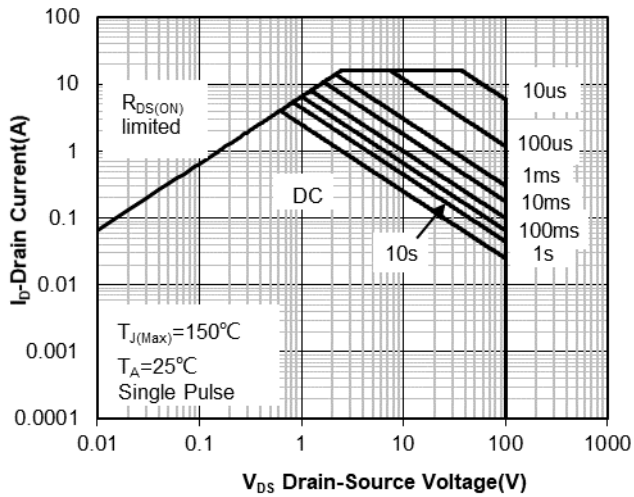


Figure 7. Safe Operation Area

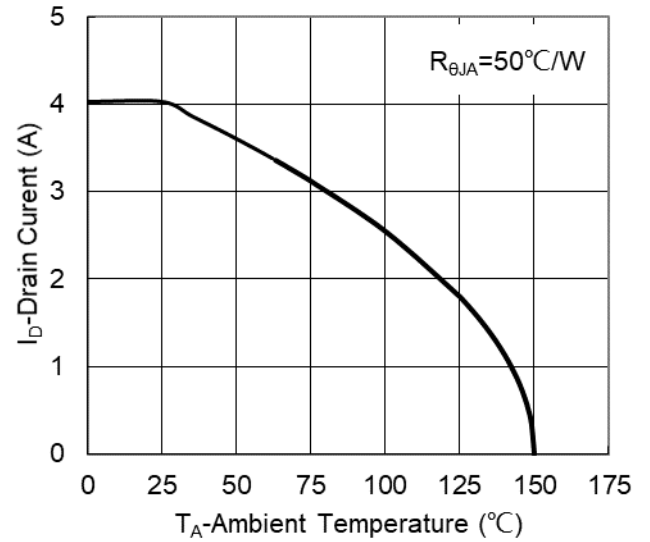


Figure 8. Maximum Continuous Drain Current vs Ambient Temperature

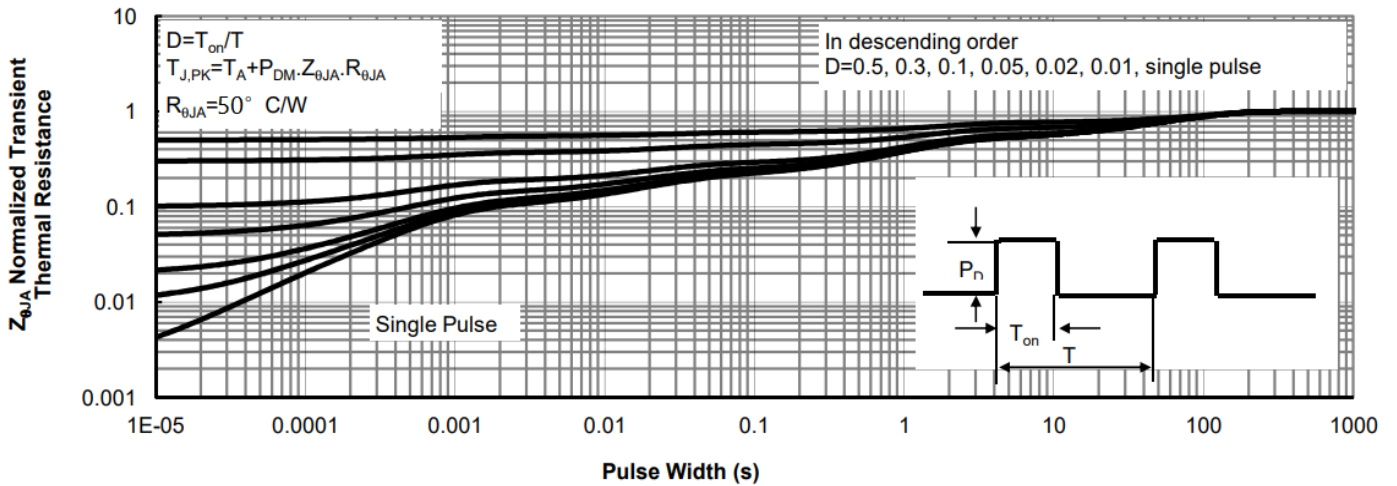
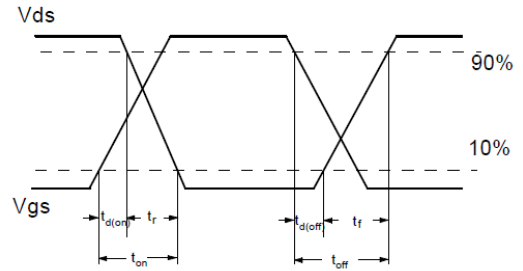
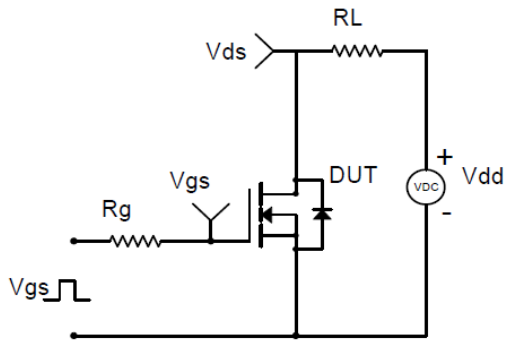
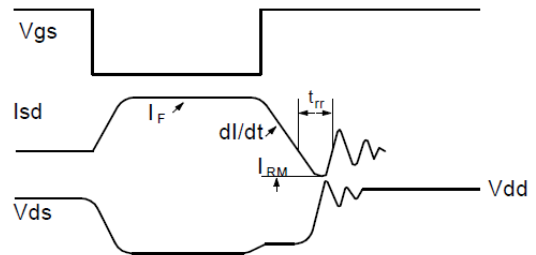
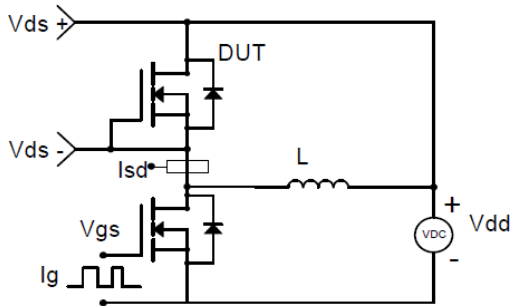


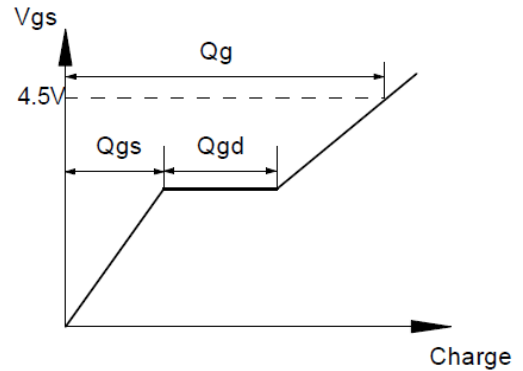
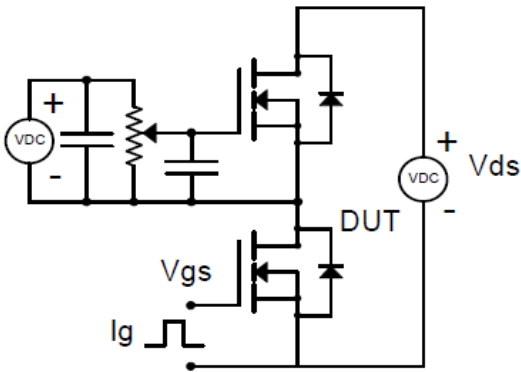
Figure 9. Normalized Maximum Transient Thermal Impedance



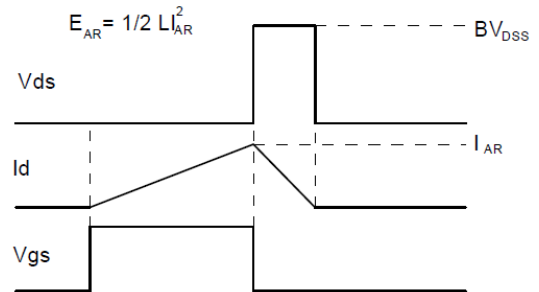
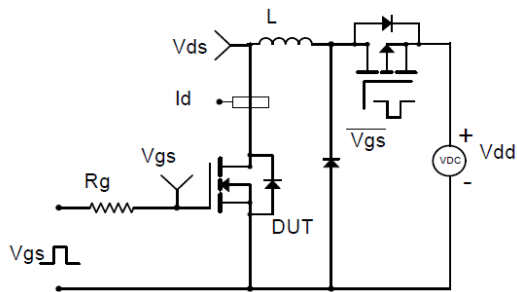
**Resistive Switching Test Circuit & Waveforms**



**Diode Recovery Test Circuit & Waveforms**



**Gate Charge Test Circuit & Waveform**



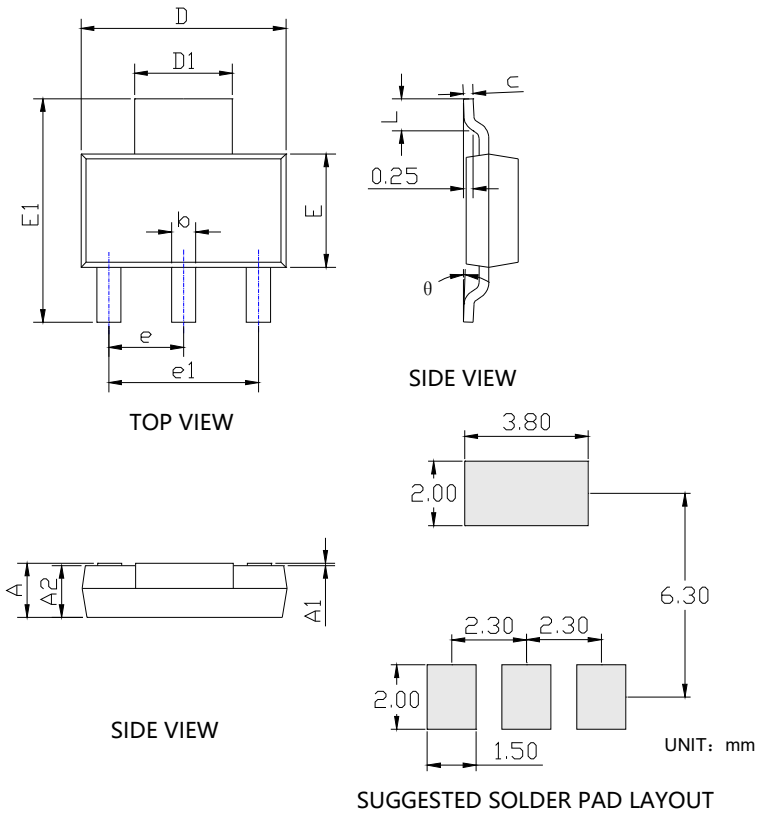
**Unclamped Inductive Switching (UIS) Test Circuit & Waveforms**



# YJM04N10A

## ■ SOT-223 Package information

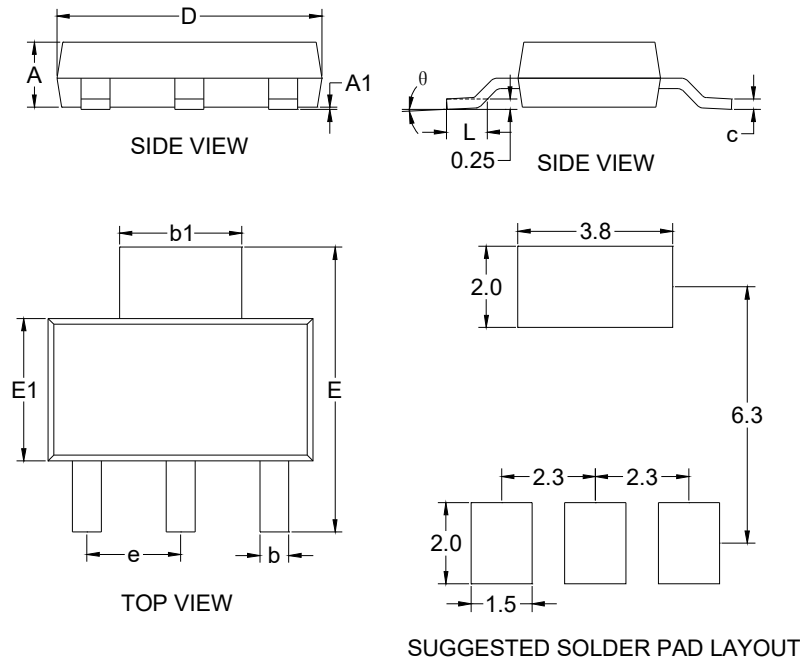
TYPE B:



SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.060	0.071	1.520	1.800
A1	0.000	0.004	0.000	0.100
A2	0.059	0.067	1.500	1.700
b	0.026	0.032	0.660	0.820
c	0.010	0.014	0.250	0.350
D	0.244	0.252	6.200	6.400
D1	0.114	0.122	2.900	3.100
E	0.130	0.146	3.300	3.700
E1	0.269	0.278	6.830	7.070
e	0.091BSC		2.300BSC	
e1	0.177	0.185	4.500	4.700
L	0.035	0.045	0.900	1.150
$\theta$	0°	10°	0°	10°

**NOTE:**  
 1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.  
 2. TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.  
 3. THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.

TYPE A:



DIM	DIMENSIONS			
	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.0591	0.0670	1.5000	1.7000
A1	0.0008	0.0039	0.0200	0.1000
b	0.0259	0.0330	0.6600	0.8400
b1	0.1140	0.1220	2.9000	3.1000
c	0.0090	0.0138	0.2300	0.3500
D	0.2480	0.2640	6.3000	6.7000
E	0.2637	0.2874	6.7000	7.3000
E1	0.1290	0.1460	3.3000	3.7000
e	0.0866	0.0945	2.2000	2.4000
L	0.0295	0.0492	0.7500	1.2500
$\theta$	0°	10°	0°	10°



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