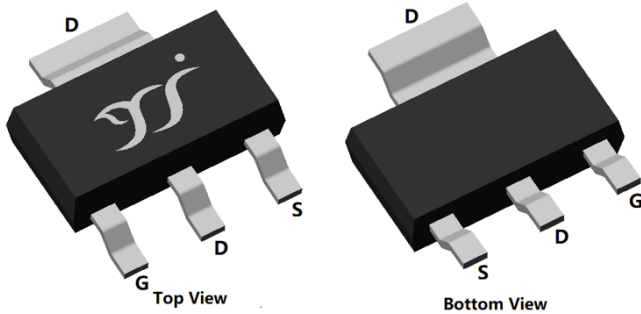
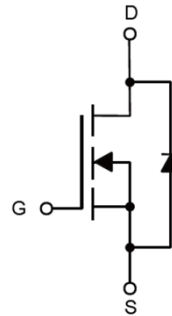


## N-Channel Enhancement Mode Field Effect Transistor



SOT-223



### Product Summary

• $V_{DS}$	60V
• $I_D$	5.0A
• $R_{DS(ON)}$ ( at $V_{GS}= 10V$ )	44mohm
• $R_{DS(ON)}$ ( at $V_{GS}= 4.5V$ )	49mohm

### General Description

- Trench Power MV MOSFET technology
- High density cell design for Low  $R_{DS(ON)}$
- High Speed switching
- Moisture Sensitivity Level 3
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

### Applications

- Battery protection
- Load switch
- Power management

### ■ Absolute Maximum Ratings ( $T_A=25$ unless otherwise noted)

Parameter		Symbol	Maximum	Unit
Drain-source Voltage		$V_{DS}$	60	V
Gate-source Voltage		$V_{GS}$	$\pm 20$	V
Drain Current	$T_A=25^\circ\text{C}$ @ Steady State	$I_D$	5.0	A
	$T_A=70^\circ\text{C}$ @ Steady State		4.0	
Pulsed Drain Current <sup>A</sup>		$I_{DM}$	25	A
Total Power Dissipation @ $T_A=25^\circ\text{C}$		$P_D$	2.5	W
Thermal Resistance Junction-to-Ambient @ Steady State <sup>B</sup>		$R_{\theta JA}$	50	$^\circ\text{C}/\text{W}$
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
YJM05N06A	F2	6005	2500	/	40000	13" reel
			2500	5000	25000	13" reel



# YJM05N06A

## ■ Electrical Characteristics (T<sub>J</sub>=25 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	60			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, 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	1.0	1.5	2.5	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> =5.0A		35	44	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> =4.0A		39	49	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =5.0A, V <sub>GS</sub> =0V		0.8	1.2	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>				5.0	A
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHZ		1018		pF
Output Capacitance	C <sub>oss</sub>			70		
Reverse Transfer Capacitance	C <sub>rss</sub>			62		
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, I <sub>D</sub> =10A		26		nC
Gate Source Charge	Q <sub>gs</sub>			5.4		
Gate Drain Charge	Q <sub>gd</sub>			6.5		
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> =20A, di/dt=500A/us		11.7		
Reverse Recovery Time	t <sub>rr</sub>			23		
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =30V, I <sub>D</sub> =2A, R <sub>GEN</sub> =3Ω		10		ns
Turn-on Rise Time	t <sub>r</sub>			20		
Turn-off Delay Time	t <sub>D(off)</sub>			29		
Turn-off Fall Time	t <sub>f</sub>			21		

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

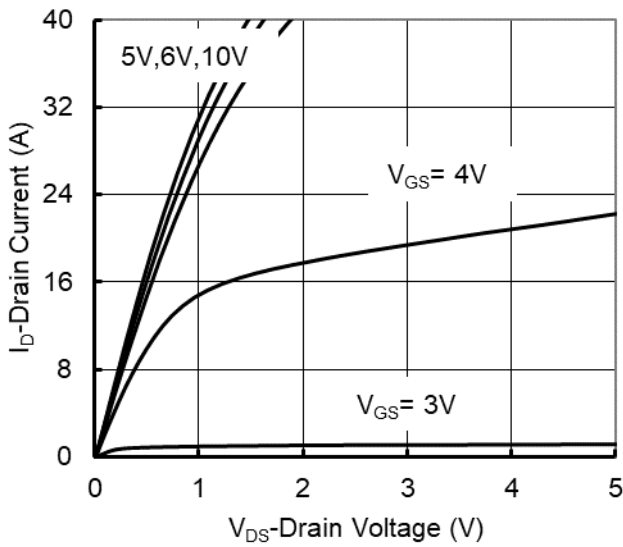


Figure 1. Output Characteristics

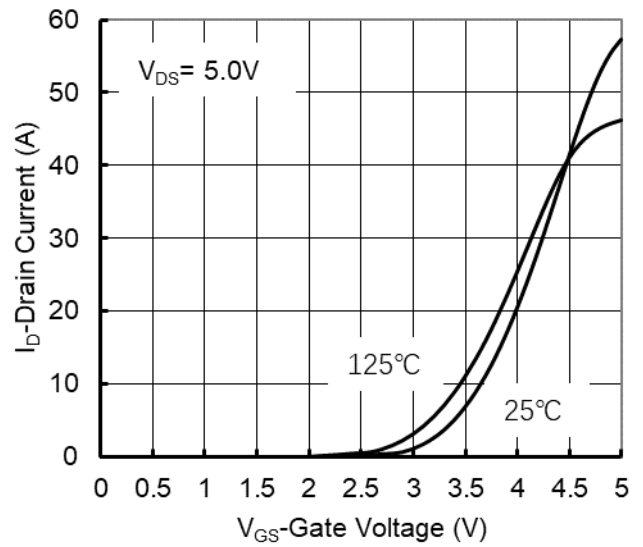


Figure 2. Transfer Characteristics

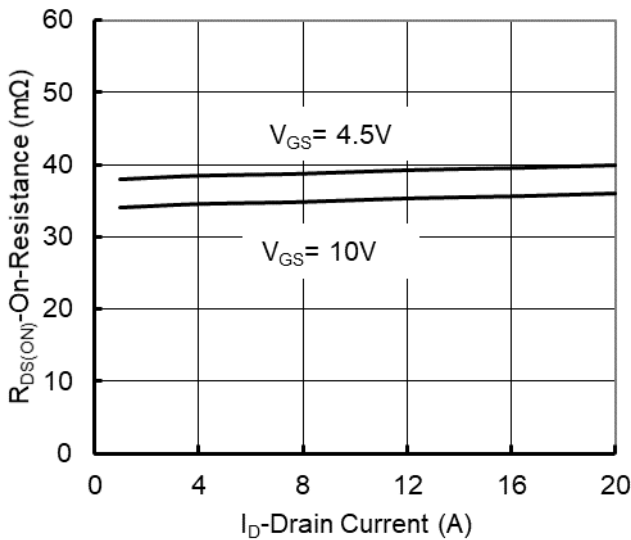


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

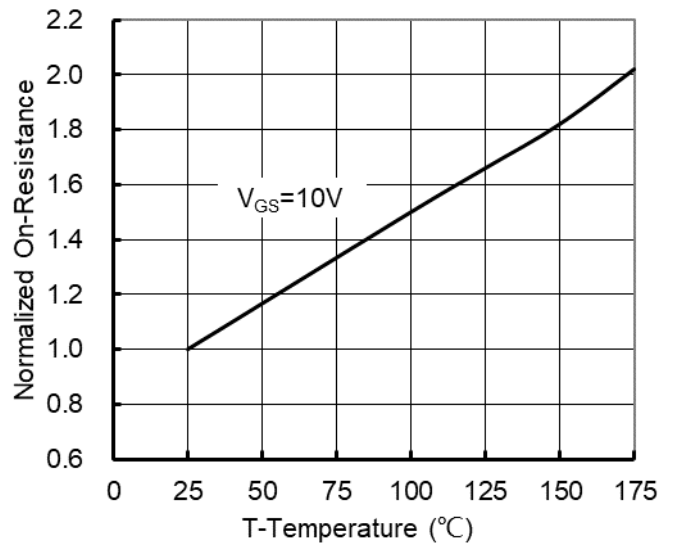


Figure 4. On-Resistance vs. Junction Temperature

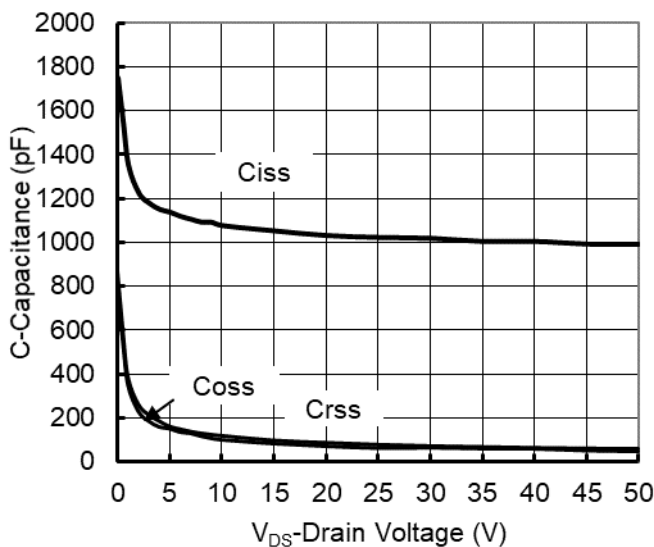


Figure 5. Capacitance Characteristics

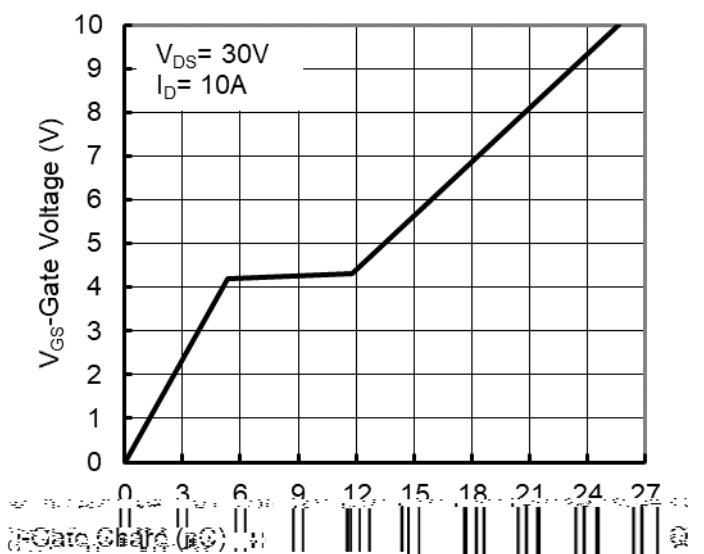


Figure 6. Gate Charge



# YJM05N06A

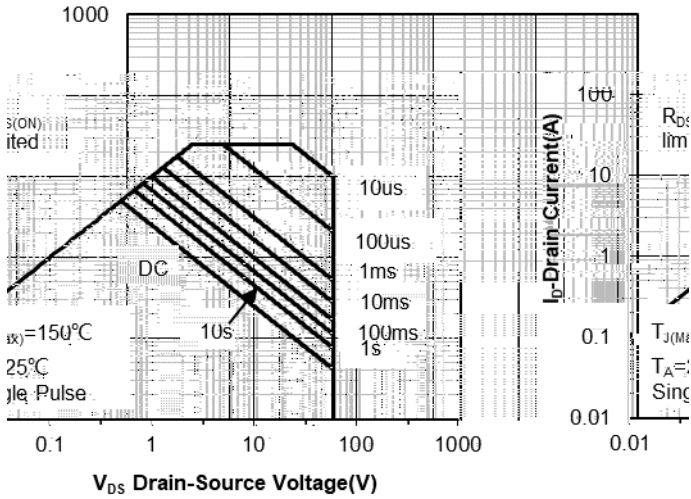


Figure 7. Safe Operation Area

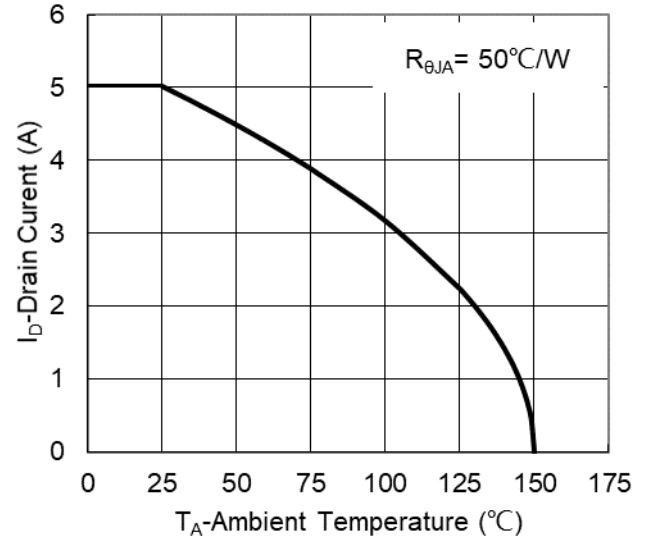


Figure 8. Maximum Continuous Drain Current vs Ambient Temperature

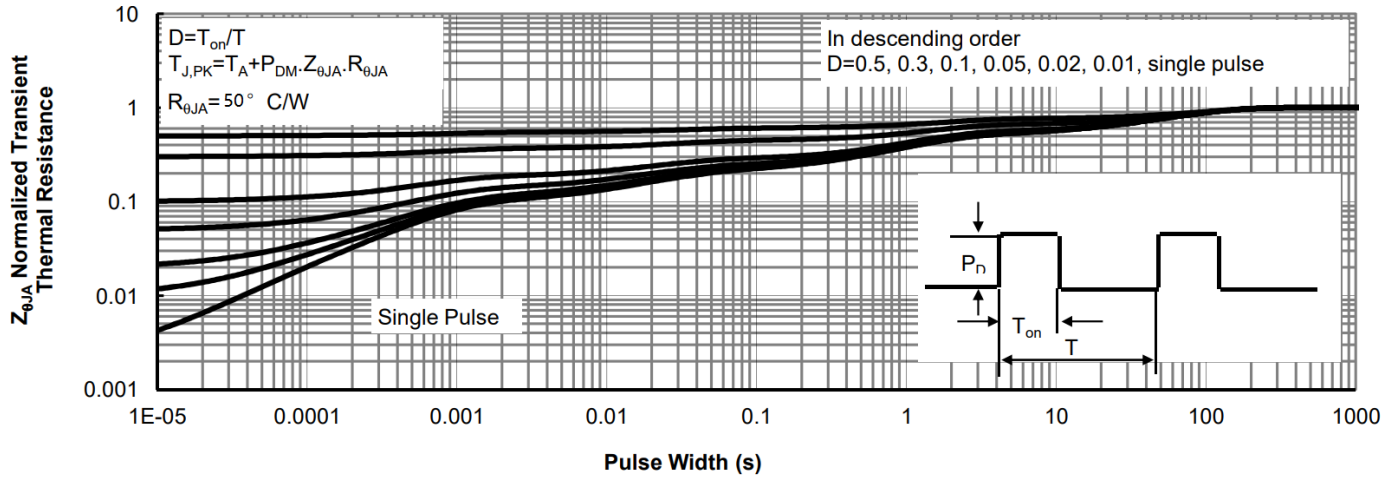
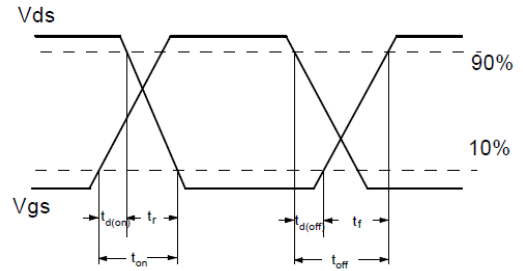
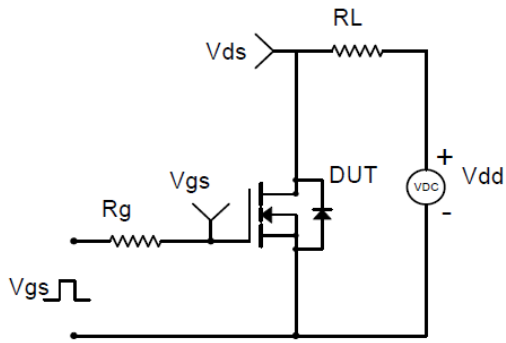
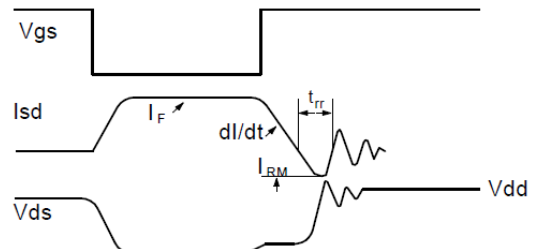
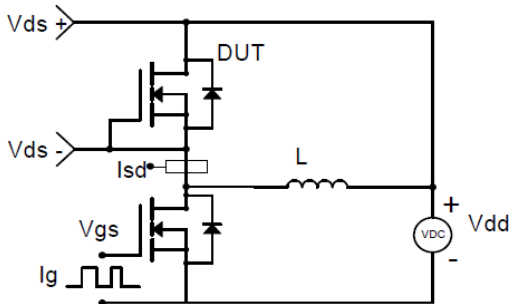


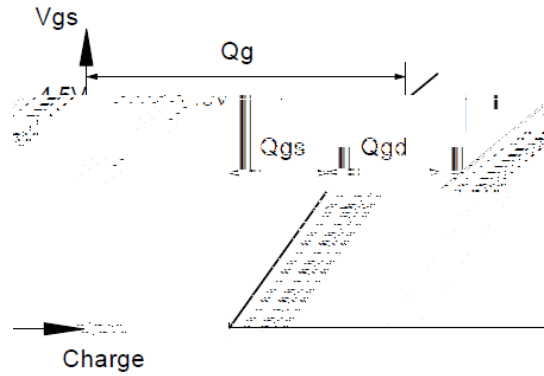
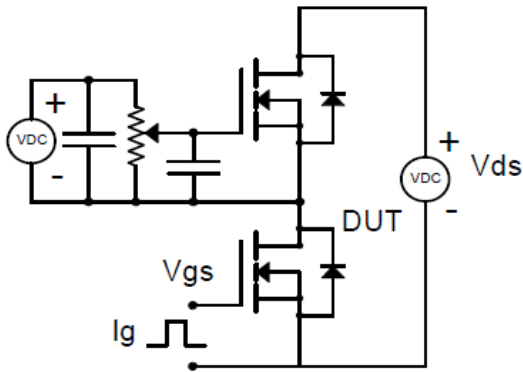
Figure 9. Normalized Maximum Transient Thermal Impedance



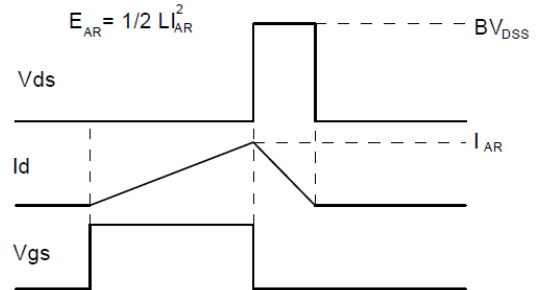
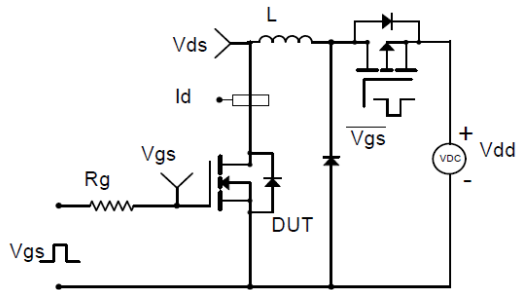
**Resistive Switching Test Circuit & Waveforms**



**Diode Recovery Test Circuit & Waveforms**



**Gate Charge Test Circuit & Waveform**



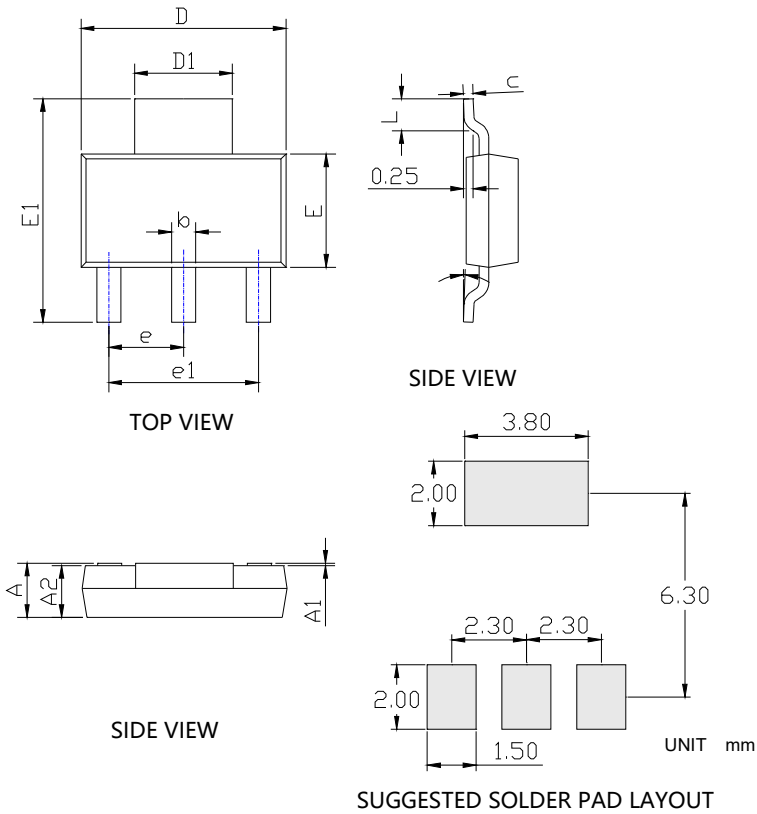
**Unclamped Inductive Switching (UIS) Test Circuit & Waveforms**



# YJM05N06A

## ■SOT-223 Package information

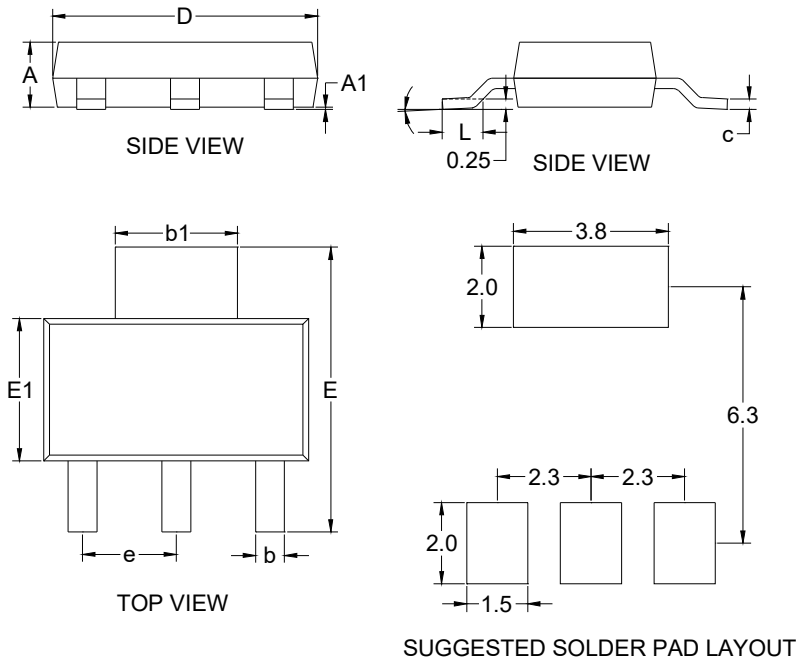
TYPE B:



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
	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
	0°	10°	0°	10°



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