



# YJD88G12A

## N-Channel Enhancement Mode Field Effect Transistor

### Product Summary

$V_{DS}$	120V
$I_D$	88A
$R_{DS(ON)}$ ( at $V_{GS}=10V$ )	10m
$R_{DS(ON)}$ ( at $V_{GS}=4.5V$ )	12m
100% EAS Tested	
100% $V_{DS}$ Tested	

### General Description

Split gate trench MOSFET technology  
Excellent package for heat dissipation  
High density cell design for low  $R_{DS(ON)}$   
Moisture Sensitivity Level 1  
Epoxy Meets UL 94 V-0 Flammability Rating  
Halogen Free

### Applications

Power switching application  
Uninterruptible power supply  
DC-DC convertor

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

Parameter	Symbol	Limit	Unit
Drain-source Voltage	$V_{DS}$	120	V
Gate-source Voltage	$V_{GS}$	$\pm 20$	V



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## Electrical Characteristics ( $T_J=25$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	120	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=120V, V_{GS}=0V$	-	-	1	$\mu A$
		$V_{DS}=120V, V_{GS}=0V, T_J=150^\circ C$	-	-	100	
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	2	3	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=44A$	-	7.5	10	m
		$V_{GS}=10V, I_D=20A$	-	7.5	10	
		$V_{GS}=4.5V, I_D=20A$	-	8.5	12	
Diode Forward Voltage	$V_{SD}$	$I_S=44A, V_{GS}=0V$	-	0.9	1.2	V
Gate resistance	$R_G$	$f=1MHz, \text{Open drain}$	-	0.8	-	
Maximum Body-Diode Continuous Current	$I_S$		-	-	88	A
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=60V, V_{GS}=0V, f=1MHz$	-	4700	-	$\mu F$
Output Capacitance	$C_{oss}$		-	420	-	
Reverse Transfer Capacitance	$C_{rss}$		-	40	-	
<b>Switching Parameters</b>						
Total Gate Charge	$Q_g$	$V_{GS}=10V, V_{DS}=60V, I_D=44A$	-	72	-	nC
Gate-Source Charge	$Q_{gs}$		-	20	-	
Gate-Drain Charge	$Q_{gd}$		-	8	-	
Reverse Recovery Charge	$Q_{rr}$	$I_F=44A, di/dt=100A/us$	-	195	-	nC
Reverse Recovery Time	$t_{rr}$		-	86	-	ns
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DD}=60V, I_D=44A$ $R_{GEN}=2.2$	-	19	-	ns
Turn-on Rise Time	$t_r$		-	36	-	
Turn-off Delay Time	$t_{D(off)}$		-	45	-	
Turn-off fall Time	$t_f$		-	45	-	

A. Repetitive rating; pulse width limited by max. junction temperature.

B.  $T_J=25^\circ C, V_{DD}=50V, V_{GS}=10V, R_G=25, L=2mH, I_{AS}=19.5A$ .

C.  $P_g$  is based on max. junction temperature, using junction-case thermal resistance.

D. The value of  $R_{JA}$  is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in the still air environment with  $T_A=25^\circ C$ . The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.



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## Typical Electrical and Thermal Characteristics Diagrams

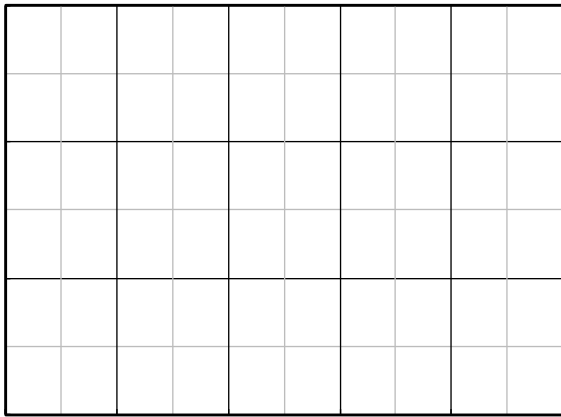


Figure 1. Output Characteristics

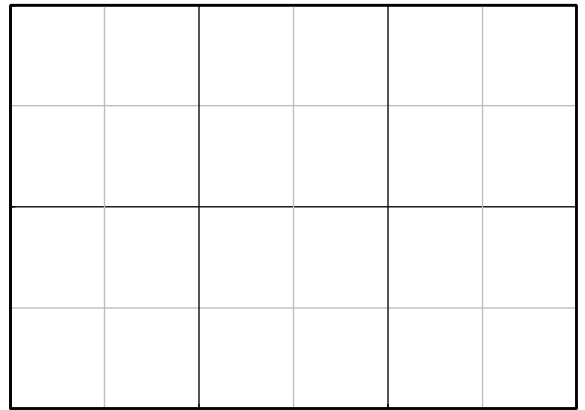


Figure 2. Transfer Characteristics

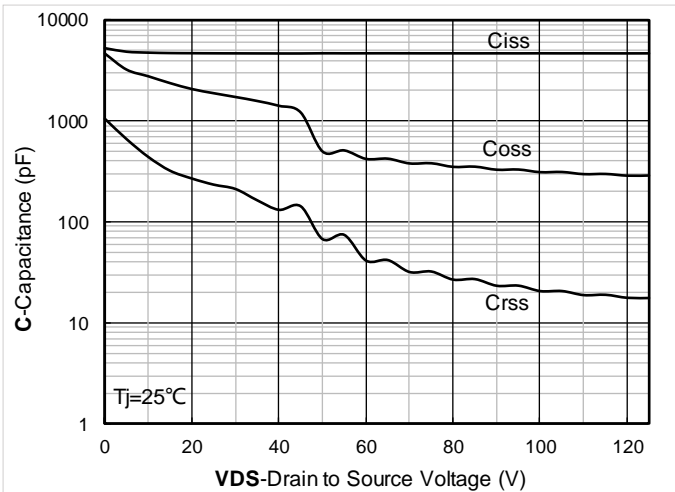


Figure 3. Capacitance Characteristics

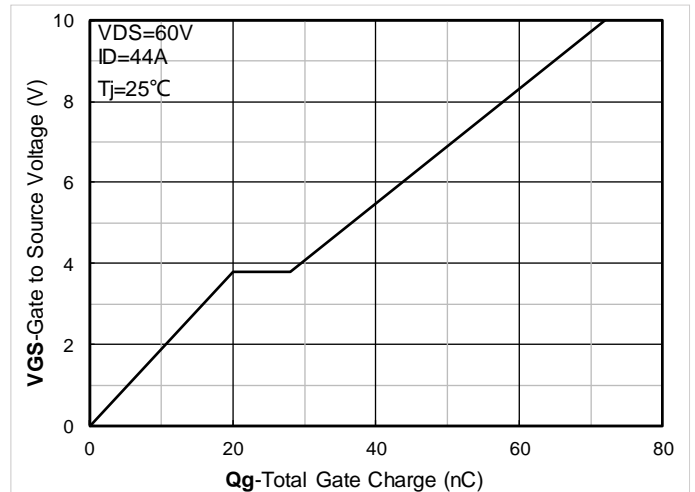


Figure 4. Gate Charge

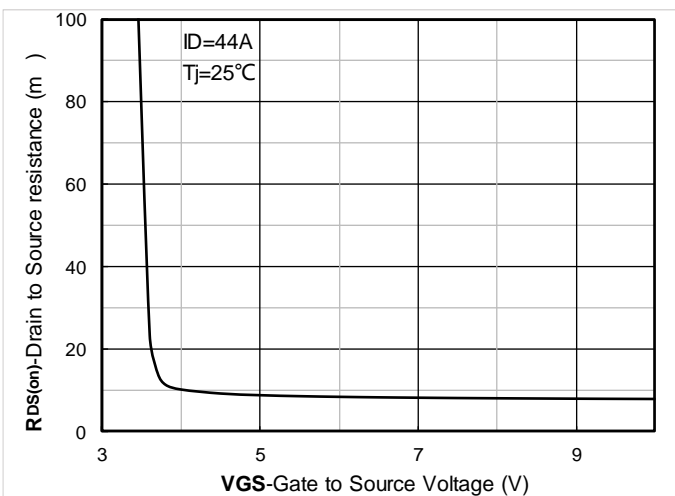


Figure 5. On-Resistance vs Gate to Source Voltage

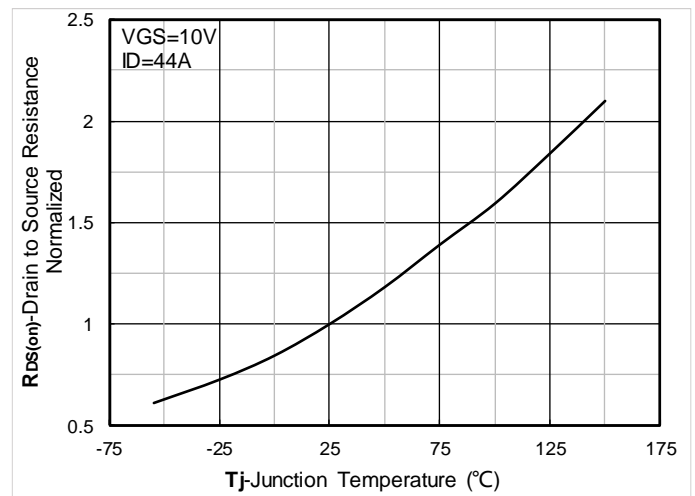


Figure 6. Normalized On-Resistance



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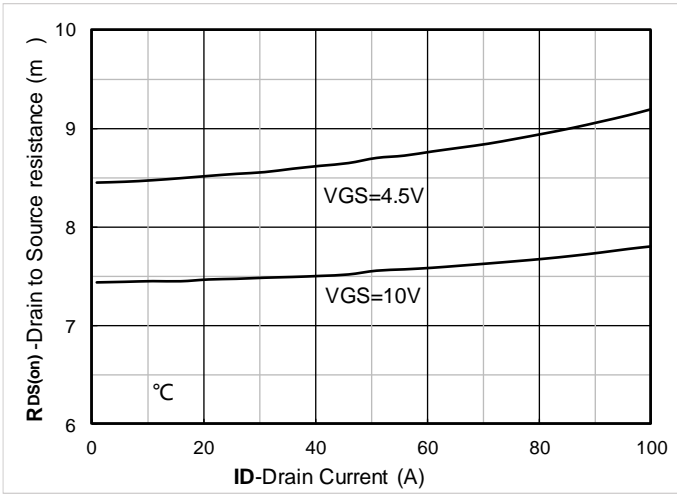


Figure 7. RDS(on) VS Drain Current

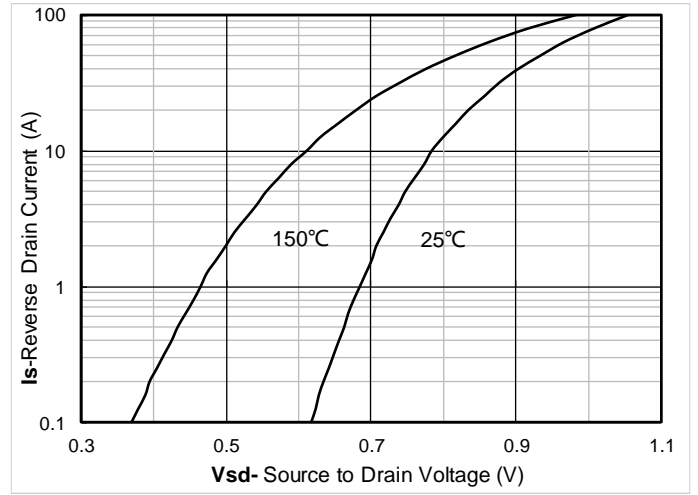


Figure 8. Forward characteristics of reverse diode

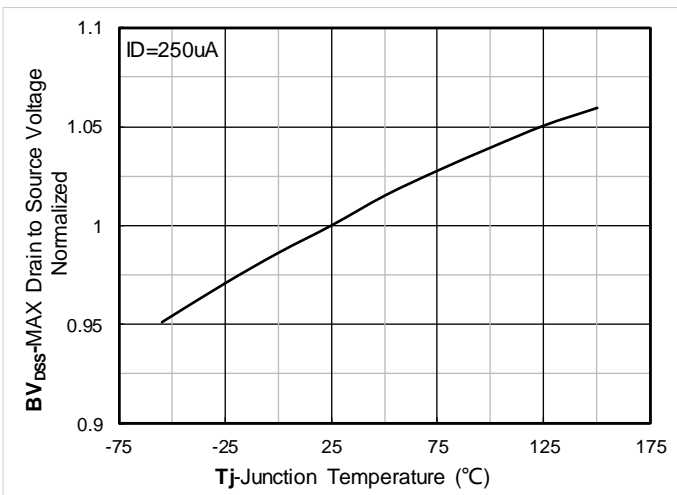


Figure 9. Normalized breakdown voltage

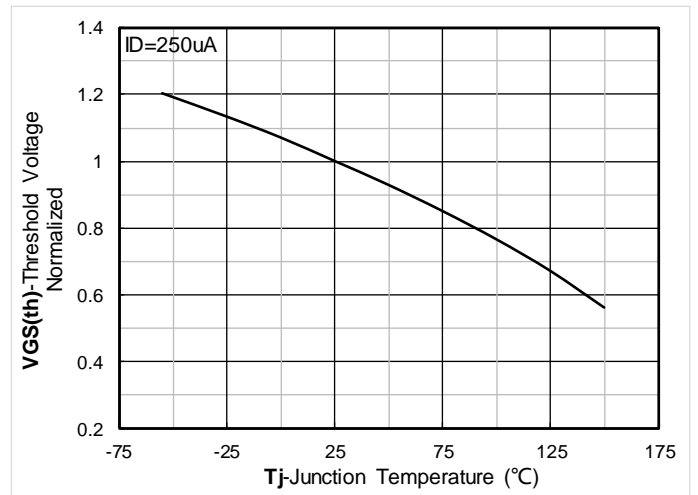


Figure 10. Normalized Threshold voltage

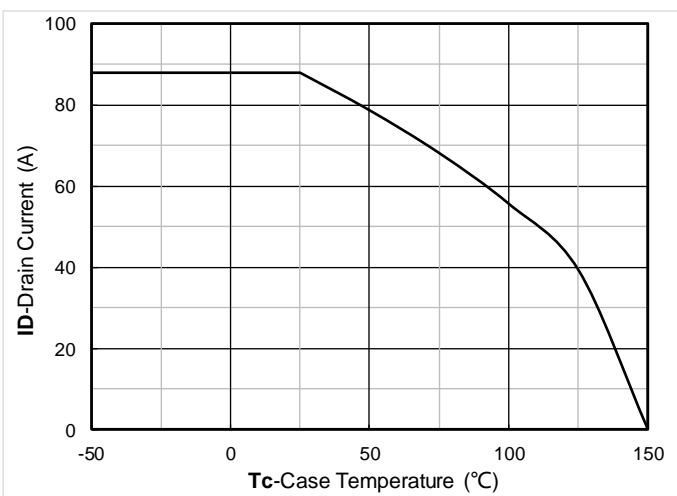


Figure 11. Current dissipation

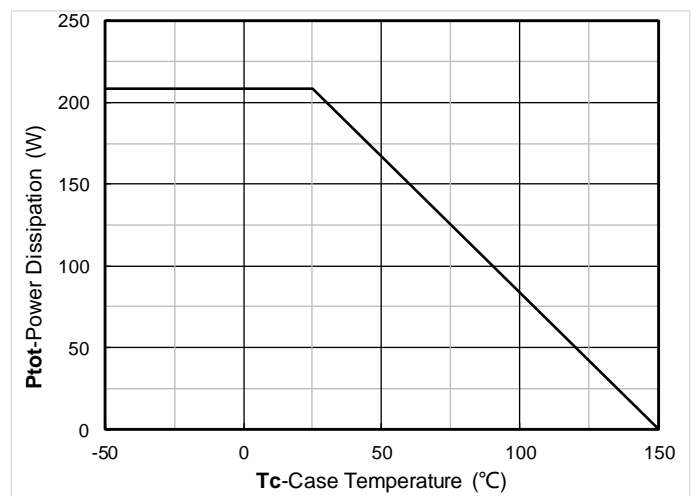


Figure 12. Power dissipation



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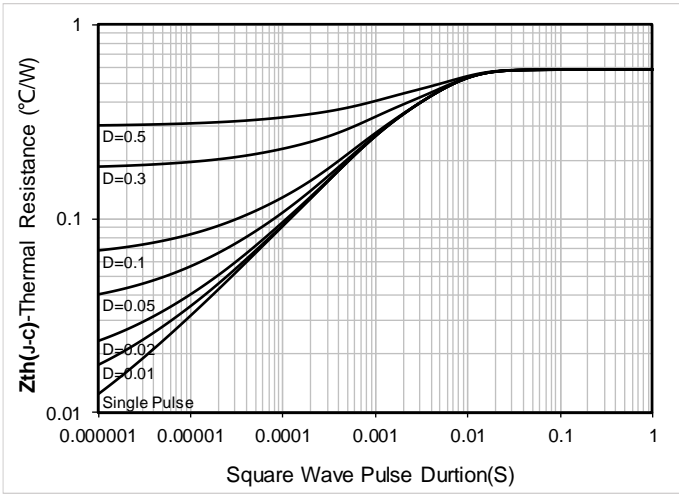


Figure 13. Maximum Transient Thermal Impedance

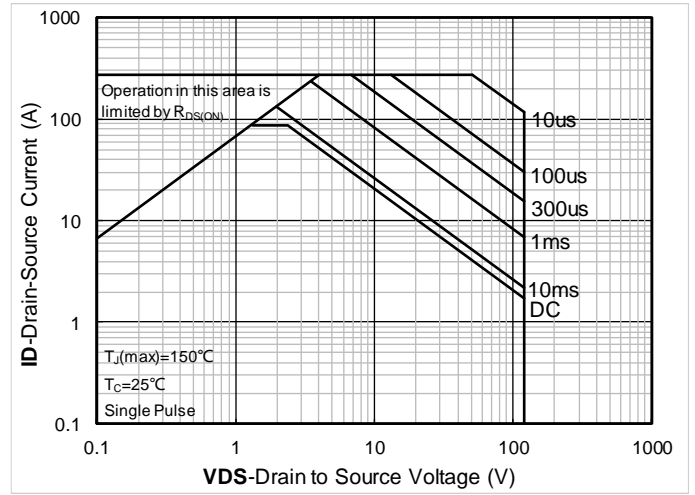
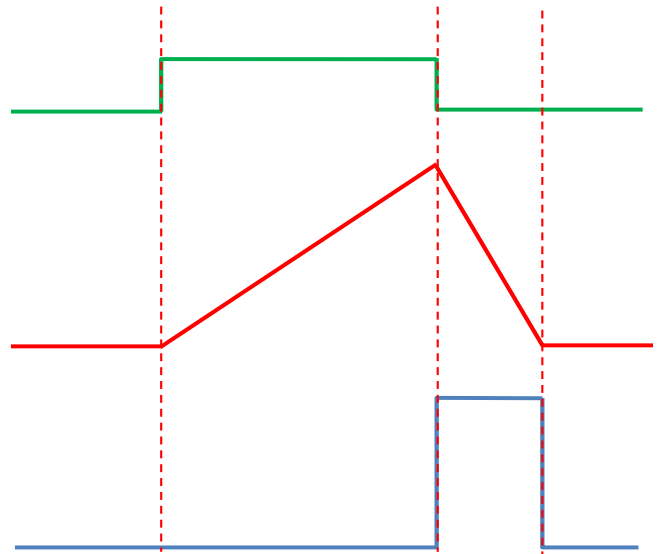
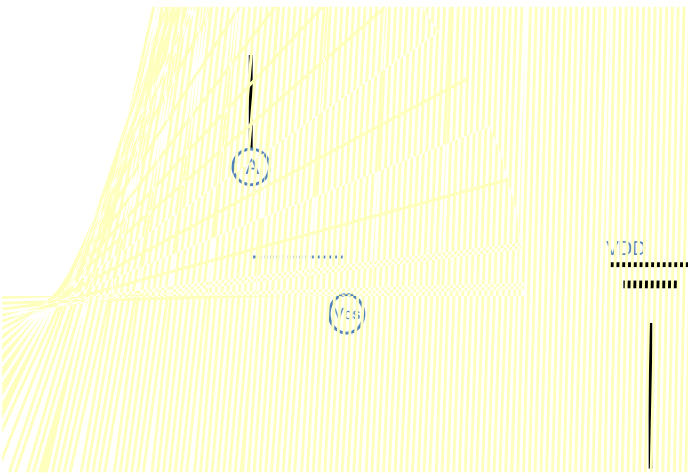


Figure 14. Safe Operation Area

## Test Circuits & Waveforms

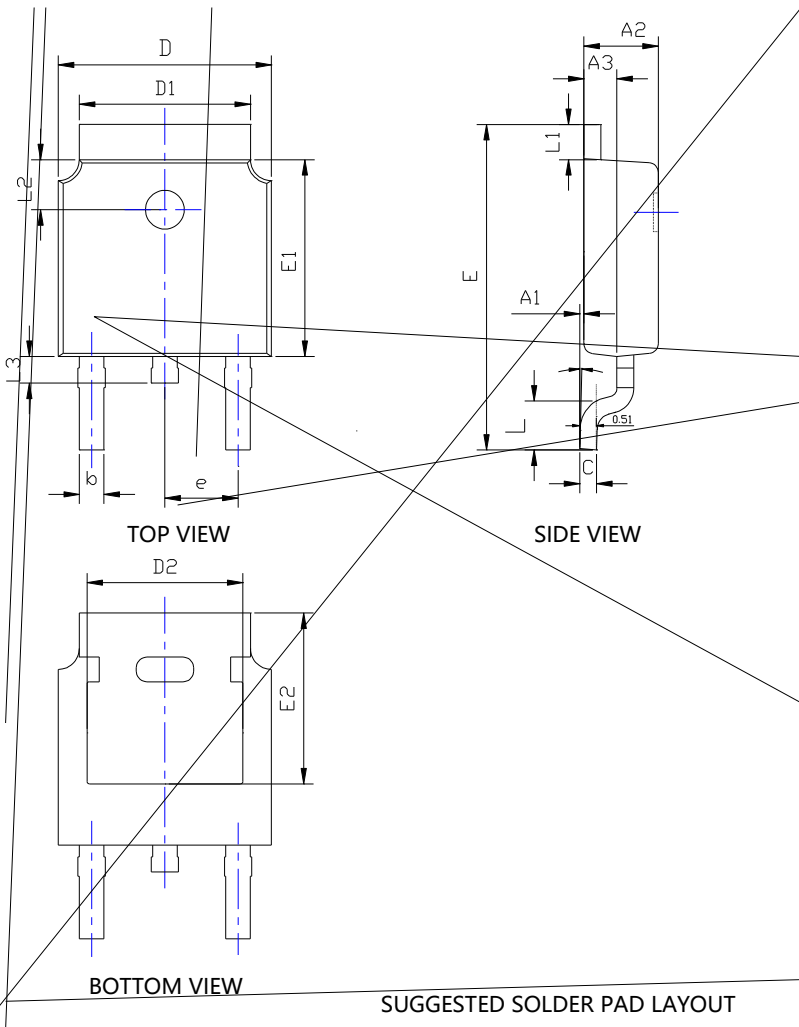






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## TO-252-B Package information



SYMBOL	DIMENSIONS					
	INCHES			Millimeter		
	MIN.	NOM.		MIN.	MAX.	
A1	0.000					0.200
A2	0.087	0.091				2.400
A3	0.035	0.039				1.100
b	0.026	0.030				0.864
c	0.018	0.020				0.584
D	0.256	0.260				6.700
D1						
D2	0.181	0.189		4.600		4.950
E	0.390	0.398		9.900		10.300
E1	0.236	0.240		6.0		6.200

**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.

