
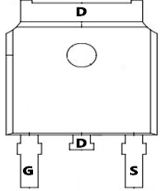
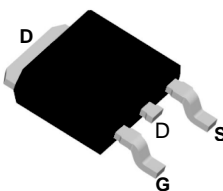
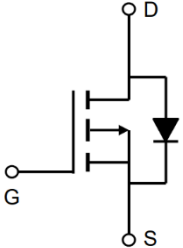


TM80P02D

P -Channel Enhancement Mosfet

<p>General Description</p> <ul style="list-style-type: none"> • Low $R_{DS(ON)}$ • RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Load switch • PWM 	<p>General Features</p> <p>$V_{DS} = -20V$ $I_D = -80A$</p> <p>$R_{DS(ON)} = 4.5m\Omega$ (typ.) @ $V_{GS} = -4.5V$</p> <p>100% UIS Tested 100% R_g Tested</p> 
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D:TO-252-3L

Marking: 80P02

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current	I_D	$T_C = 25^\circ C$	-80
		$T_C = 100^\circ C$	-52
Pulsed Drain Current ¹	I_{DM}	-296	A
Single Pulse Avalanche Energy ²	EAS	80	mJ
Total Power Dissipation	$T_C = 25^\circ C$	P_D	43.1
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ³	$R_{\theta JA}$	65	°C/W
Thermal Resistance from Junction-to-Case	$R_{\theta JC}$	2.9	°C/W



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Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static Characteristics							
Drain-Source Breakdown Voltage	V_{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-20	-	-	V	
Gate-body Leakage current	I_{GSS}	V _{DS} = 0V, V _{GS} = ±12V	-	-	±100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	V _{DS} = -20V, V _{GS} = 0V	T _J =25°C	-	-	-1	μA
			T _J =100°C	-	-	-100	
Gate-Threshold Voltage	V_{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-0.4	-0.7	-1	V	
Drain-Source On-Resistance ⁴	R_{DS(on)}	V _{GS} = -4.5V, I _D = -10A	-	4.5	5.4	mΩ	
		V _{GS} = -2.5V, I _D = -10A	-	5.5	6.9		
Forward Transconductance ⁴	g_{fs}	V _{DS} = -4.5V, I _D = -10A	-	56	-	S	
Dynamic Characteristics⁵							
Input Capacitance	C_{iss}	V _{DS} = -10V, V _{GS} = 0V, f = 1MHz	-	4770	-	pF	
Output Capacitance	C_{oss}		-	665	-		
Reverse Transfer Capacitance	C_{rss}		-	570	-		
Gate Resistance	R_g	f = 1MHz	-	9.6	-	Ω	
Switching Characteristics⁵							
Total Gate Charge	Q_g	V _{GS} = -4.5V, V _{DS} = -10V, I _D = -10A	-	55	-	nC	
Gate-Source Charge	Q_{gs}		-	5.2	-		
Gate-Drain Charge	Q_{gd}		-	10	-		
Turn-On Delay Time	t_{d(on)}	V _{GS} = -4.5V, V _{DD} = -10V, R _G = 3Ω, I _D = -10A	-	22	-	ns	
Rise Time	t_r		-	38	-		
Turn-Off Delay Time	t_{d(off)}		-	110	-		
Fall Time	t_f		-	62	-		
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴	V_{SD}	I _S = -10A, V _{GS} = 0V	-	-	-1.2	V	
Continuous Source Current	I_S	T _C =25°C	-	-	-80	A	

Note :

1. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C.
2. The EAS data shows Max. rating. The test condition is V_{DD}= -25V, V_{GS}= -10V, L= 0.4mH, I_{AS}= -20A.
3. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.



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Typical Characteristics

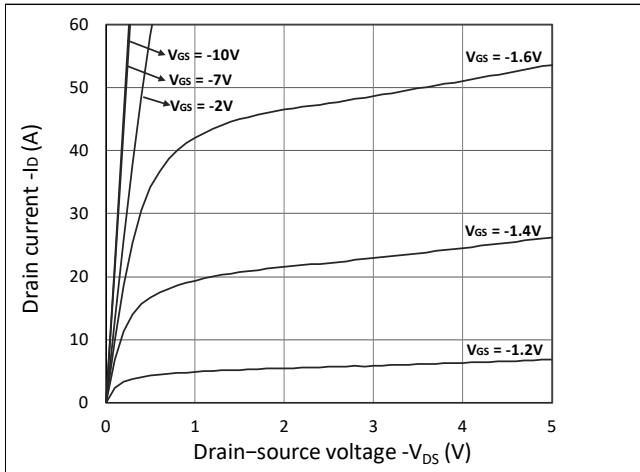


Figure 1. Output Characteristics

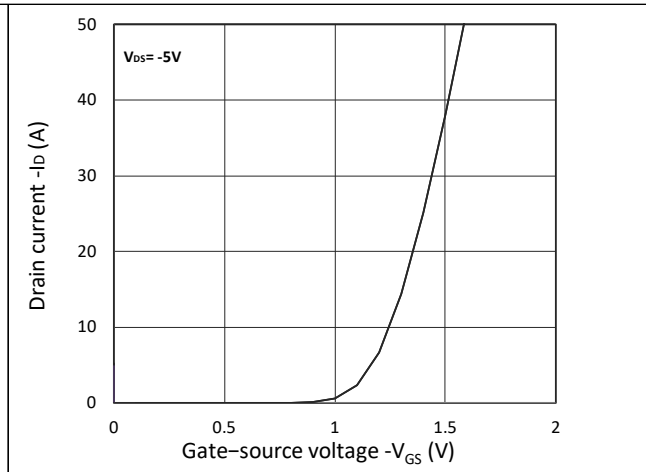


Figure 2. Transfer Characteristics

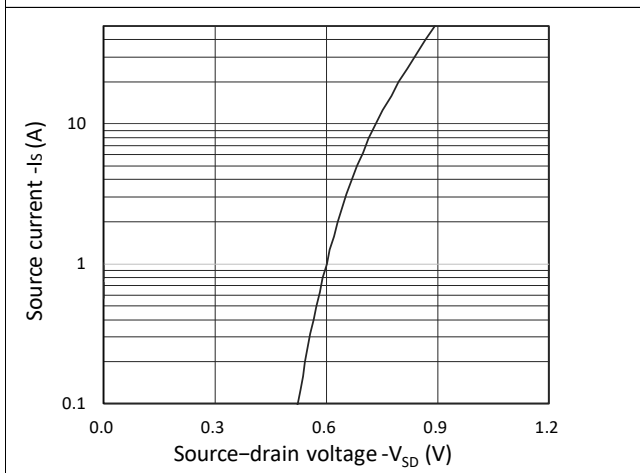


Figure 3. Forward Characteristics of Reverse

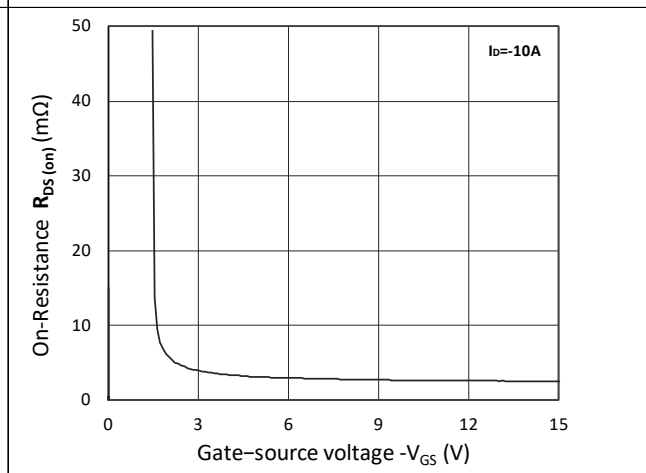


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

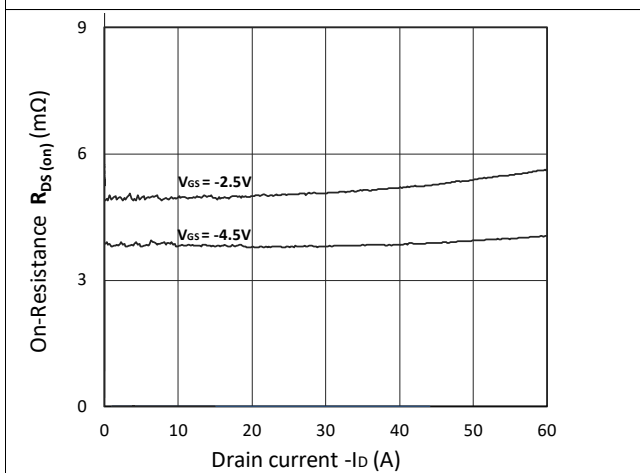


Figure 5. $R_{DS(ON)}$ vs. I_D

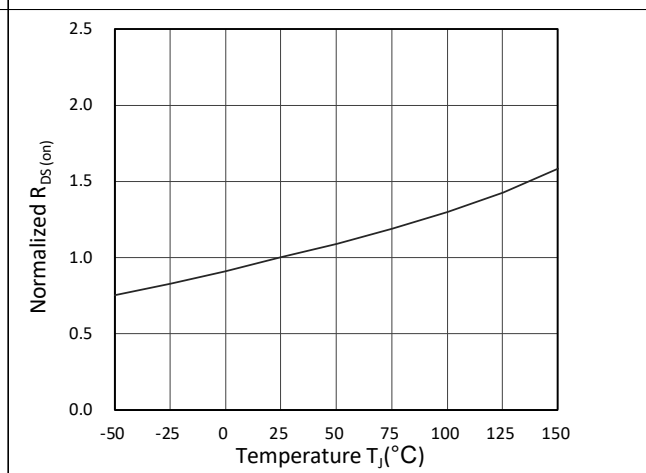


Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature

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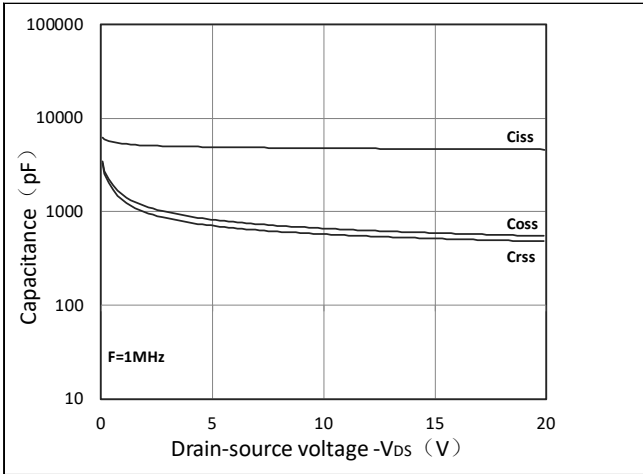


Figure 7. Capacitance Characteristics

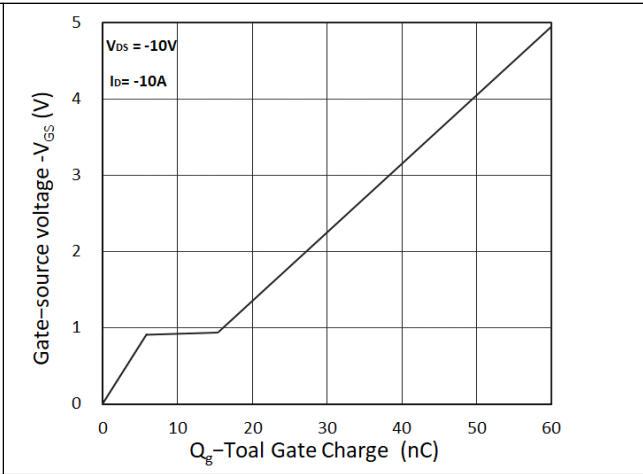


Figure 8. Gate Charge Characteristics

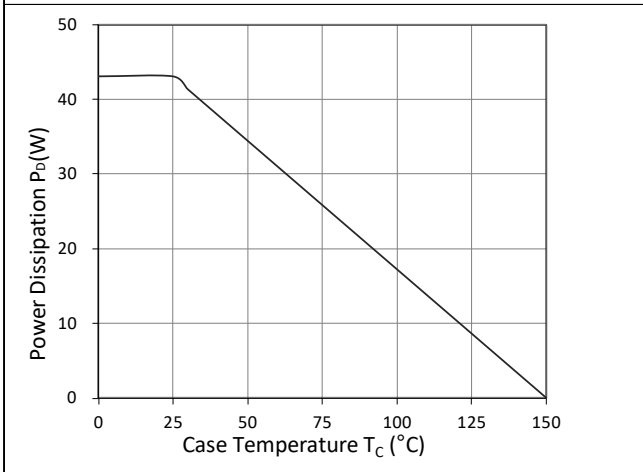


Figure 9. Power Dissipation

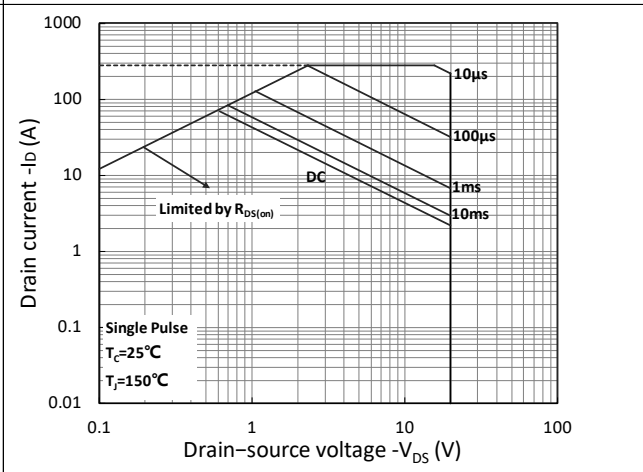


Figure 10. Safe Operating Area

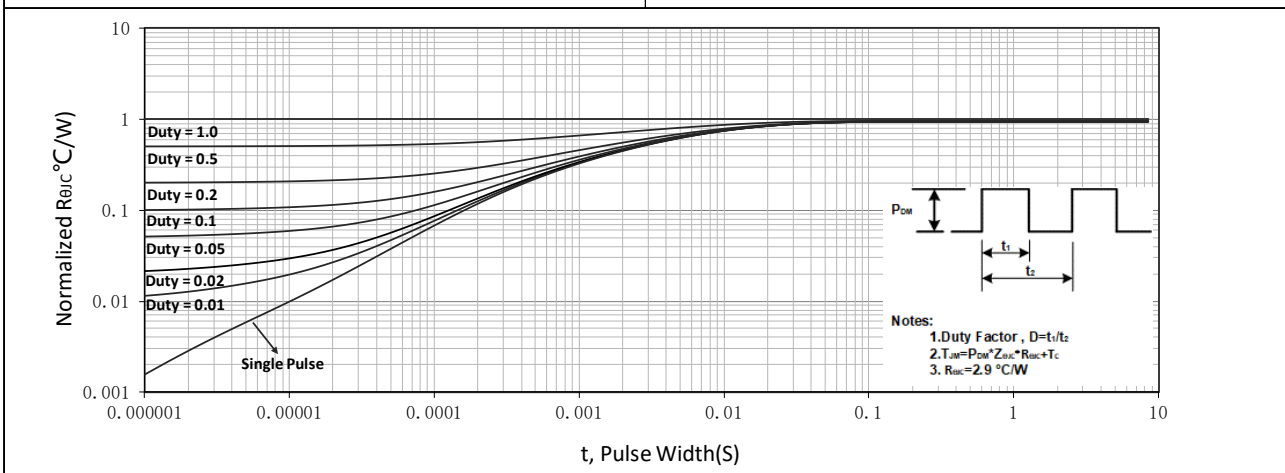


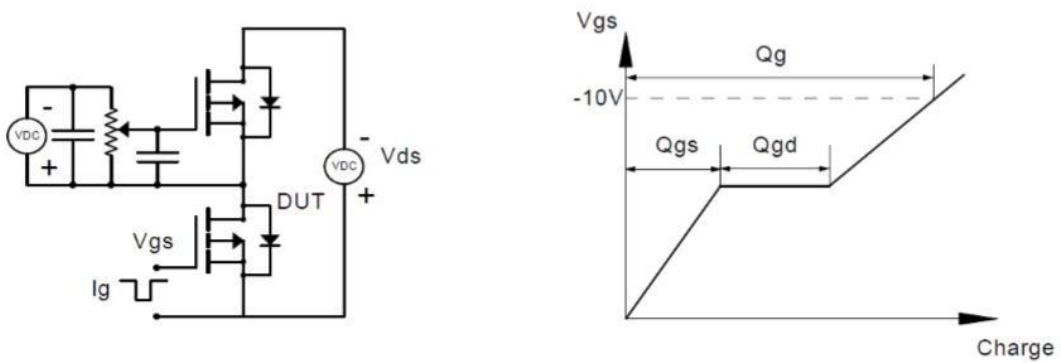
Figure 11. Normalized Maximum Transient Thermal Impedance

TM80P02D

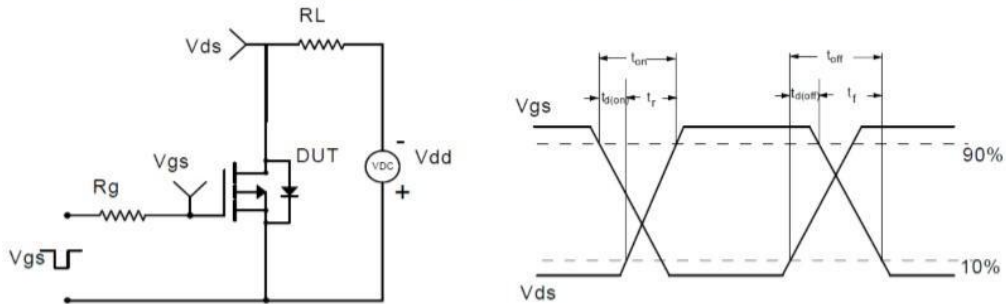
P-Channel Enhancement Mosfet

Test Circuit

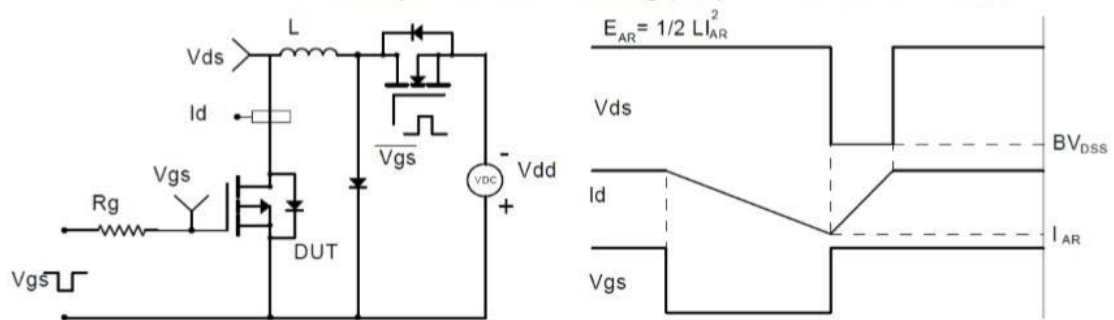
Gate Charge Test Circuit & Waveform



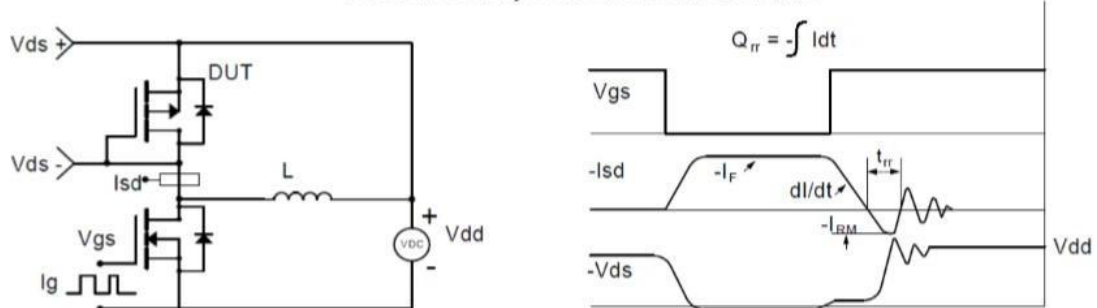
Resistive Switching Test Circuit & Waveforms



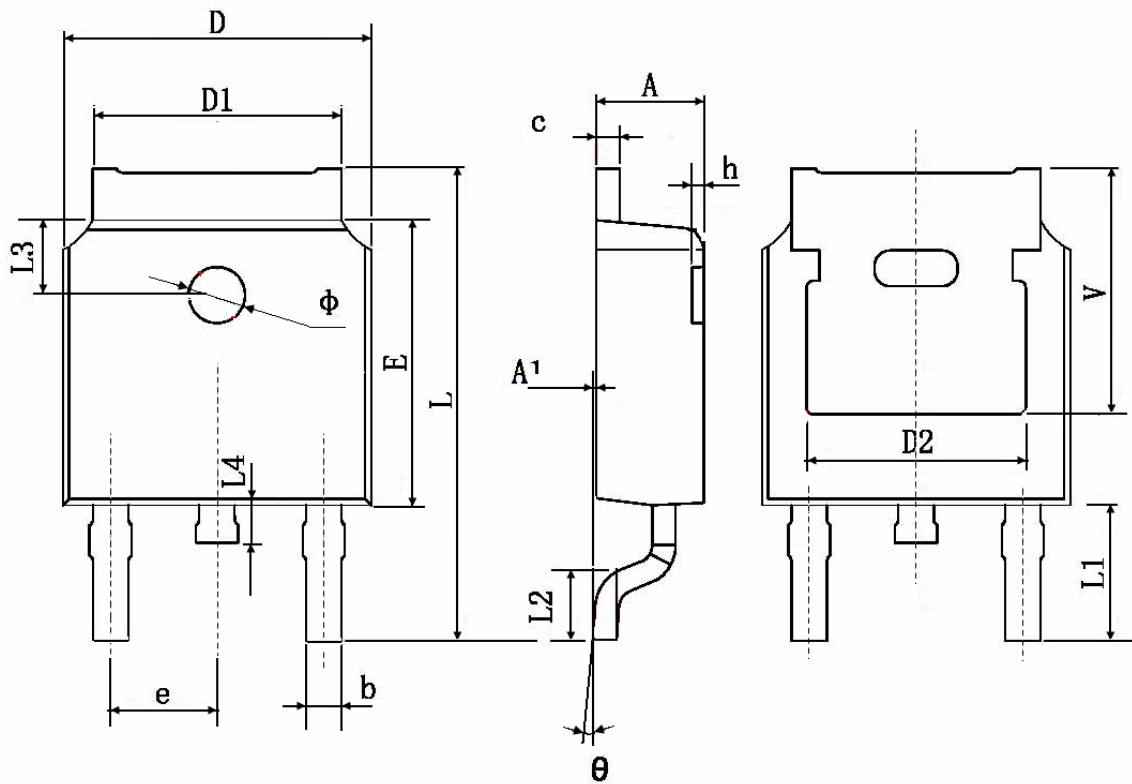
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Mechanical Data: TO-252-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	