

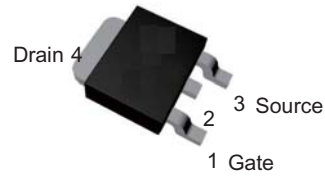
Features

- 40V/80A,
 $R_{DS(ON)} = 4.6 \text{ } \Omega$ (max.) @ $V_{GS}=10V$
 $R_{DS(ON)} = 5. \text{ m } \Omega$ (max.) @ $V_{GS}=4.5V$
- Reliable and Rugged
- Lead Free and Green Devices Available
(RoHS Compliant)

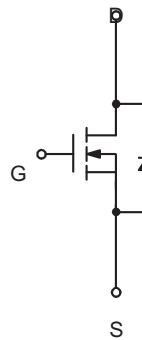
Applications

- SMPS Synchronous Rectification
- Load Switch
- DC-DC Conversion

Pin Description



Top View of TO-252-3



N-Channel MOSFET

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	40	V
V_{GSS}	Gate-Source Voltage	± 20	
T_J	Maximum Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	
I_S	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$ 80 ^a	A
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$ 80 ^a	
		$T_C=100^\circ\text{C}$ 38	
I_{DM}	Pulsed Drain Current	$T_C=25^\circ\text{C}$ 120 ^b	
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ 50	W
		$T_C=100^\circ\text{C}$ 20	
R_{qJC}	Thermal Resistance-Junction to Case	Steady State 2.5	$^\circ\text{C/W}$
I_D	Continuous Drain Current	$T_A=25^\circ\text{C}$ 18	A
		$T_A=70^\circ\text{C}$ 14	
P_D	Maximum Power Dissipation	$T_A=25^\circ\text{C}$ 2.5	W
		$T_A=70^\circ\text{C}$ 1.6	
R_{qJA}	Thermal Resistance-Junction to Ambient	$t = 10\text{s}$ 17	$^\circ\text{C/W}$
		Steady State 50	
I_{AS}^c	Avalanche Current, Single pulse ($L=0.5\text{mH}$)	30	A
E_{AS}^c	Avalanche Energy, Single pulse ($L=0.5\text{mH}$)	225	mJ

Note a : Package is limited to 60A.

Note b : Pulse width limited by max. junction temperature.

Note c : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_J=25^\circ\text{C}$).

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{\text{GS}}=0\text{V}, I_{\text{DS}}=250\text{mA}$	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{\text{DS}}=32\text{V}, V_{\text{GS}}=0\text{V}$ $T_J=85^\circ\text{C}$	-	-	1	mA
			-	-	30	
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{\text{DS}}=V_{\text{GS}}, I_{\text{DS}}=250\text{mA}$	1.5	1.9	2.5	V
I_{GSS}	Gate Leakage Current	$V_{\text{GS}}=\pm 20\text{V}, V_{\text{DS}}=0\text{V}$	-	-	± 100	nA
$R_{\text{DS(on)}}^d$	Drain-Source On-state Resistance	$V_{\text{GS}}=10\text{V}, I_{\text{DS}}=30\text{A}$ $T_J=125^\circ\text{C}$	-	3.9	4.6	m Ω
			-	5.72	-	
		$V_{\text{GS}}=4.5\text{V}, I_{\text{DS}}=15\text{A}$	-	4.75	5.9	
Gfs	Forward Transconductance	$V_{\text{DS}}=5\text{V}, I_{\text{DS}}=15\text{A}$	-	60	-	S

Electrical Characteristics (Cont.) ($T_A = 25^\circ\text{C}$ unless otherwise noted)

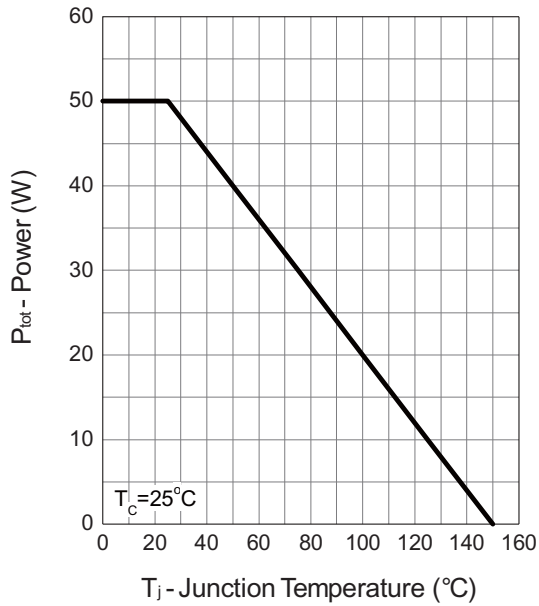
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Diode Characteristics						
V_{SD}^d	Diode Forward Voltage	$I_{SD}=20\text{A}, V_{GS}=0\text{V}$	-	0.75	1.1	V
t_{rr}	Reverse Recovery Time	$I_{DS}=30\text{A}, dI_{SD}/dt=100\text{A/ms}$	-	19.8	-	ns
t_a	Charge Time		-	11	-	
t_b	Discharge Time		-	8.8	-	
Q_{rr}	Reverse Recovery Charge		-	6	-	nC
Dynamic Characteristics ^e						
R_G	Gate Resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, F=1\text{MHz}$	1	1.5	2	W
C_{iss}	Input Capacitance	$V_{GS}=0\text{V},$ $V_{DS}=15\text{V},$ Frequency=1.0MHz	1917	2390	2868	pF
C_{oss}	Output Capacitance		260	372	484	
C_{rss}	Reverse Transfer Capacitance		109	179	251	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=15\text{V}, R_L=15\text{W},$ $I_{DS}=1\text{A}, V_{GEN}=10\text{V},$ $R_G=6\text{W}$	-	17	32	ns
t_r	Turn-on Rise Time		-	9	17	
$t_{d(OFF)}$	Turn-off Delay Time		-	52	95	
t_f	Turn-off Fall Time		-	17	32	
Gate Charge Characteristics ^e						
Q_g	Total Gate Charge	$V_{DS}=15\text{V}, V_{GS}=4.5\text{V},$ $I_{DS}=30\text{A}$	-	20	38	nC
Q_g	Total Gate Charge		-	42	59	
Q_{gth}	Threshold Gate Charge	$V_{DS}=15\text{V}, V_{GS}=10\text{V},$ $I_{DS}=30\text{A}$	-	3.6	5	
Q_{gs}	Gate-Source Charge		-	7	9.8	
Q_{gd}	Gate-Drain Charge		-	9	12.6	

Note d : Pulse test ; pulse width \pm 300ms, duty cycle \pm 2%.

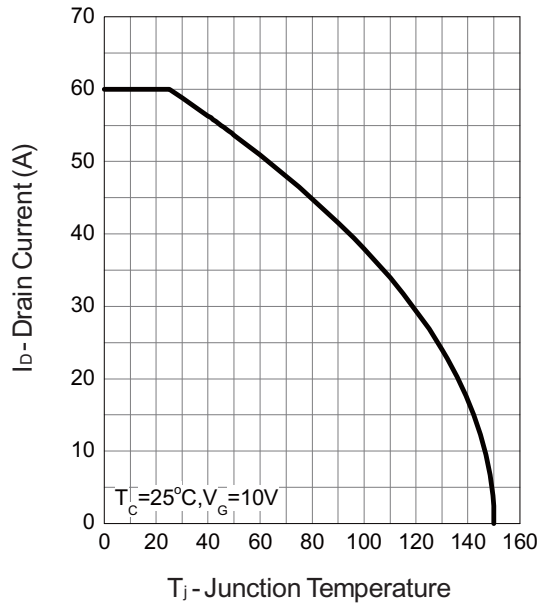
Note e : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

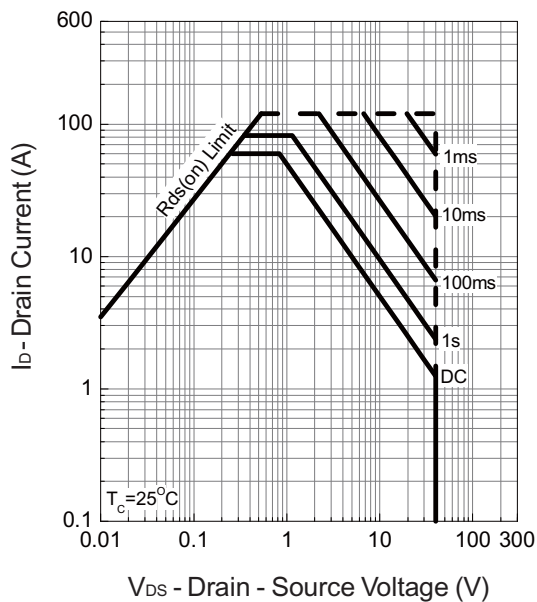
Power Dissipation



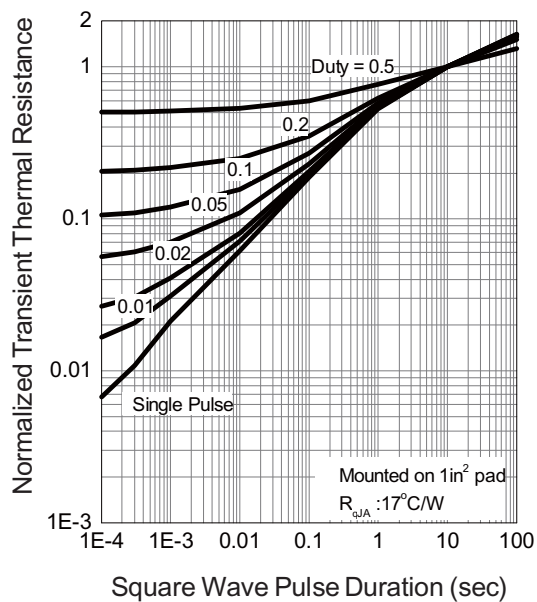
Drain Current



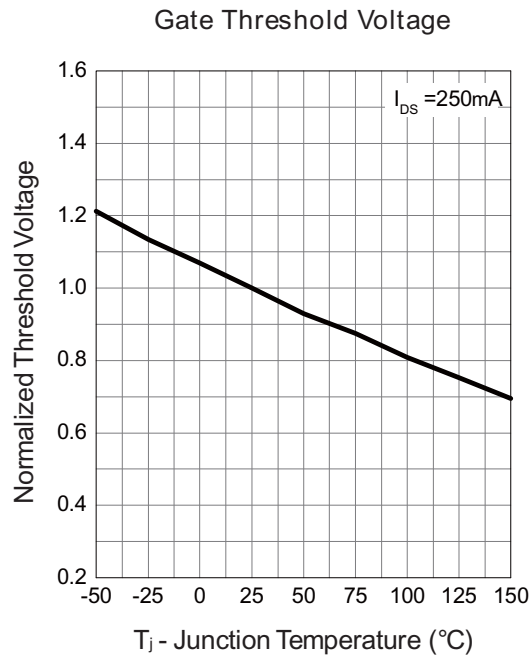
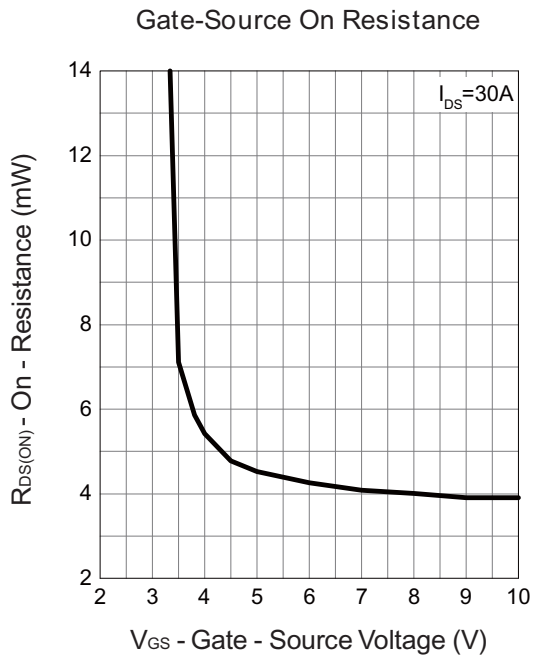
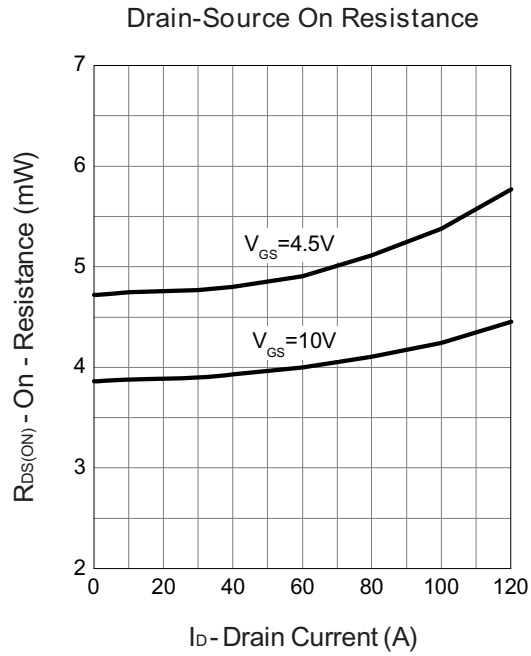
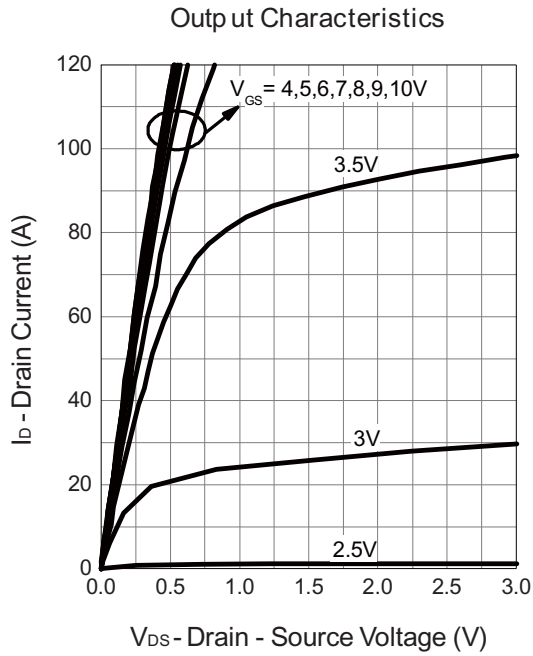
Safe Operation Area



Thermal Transient Impedance

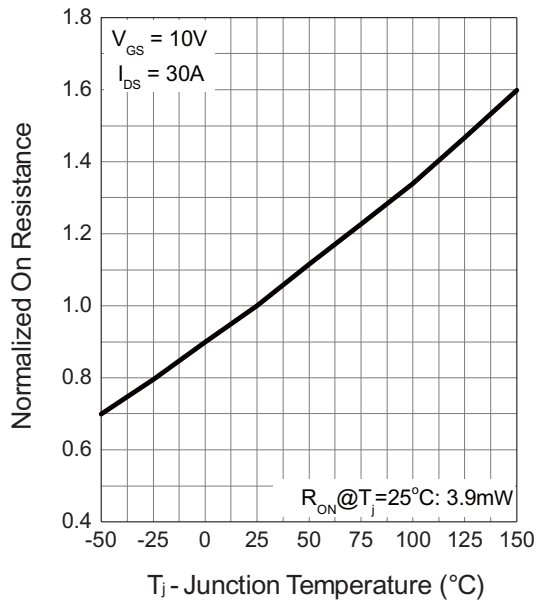


Typical Operating Characteristics (Cont.)

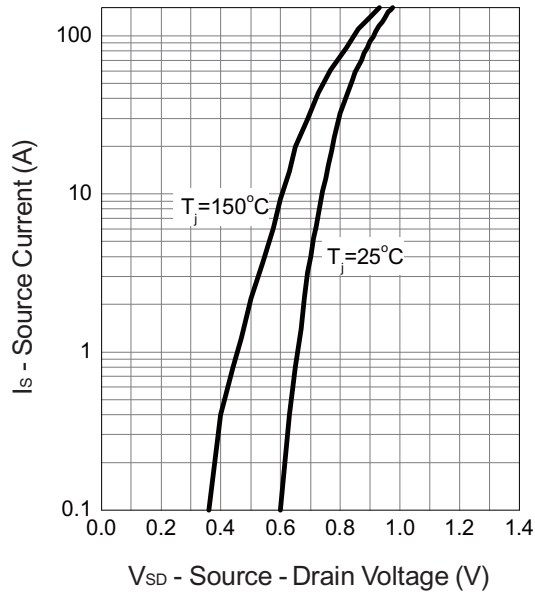


Typical Operating Characteristics (Cont.)

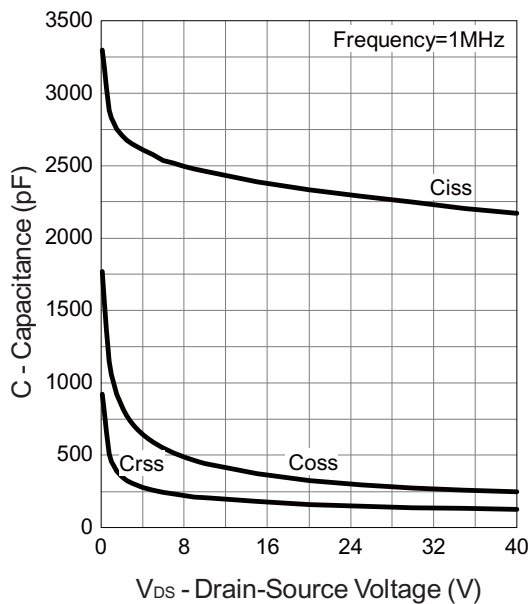
Drain-Source On Resistance



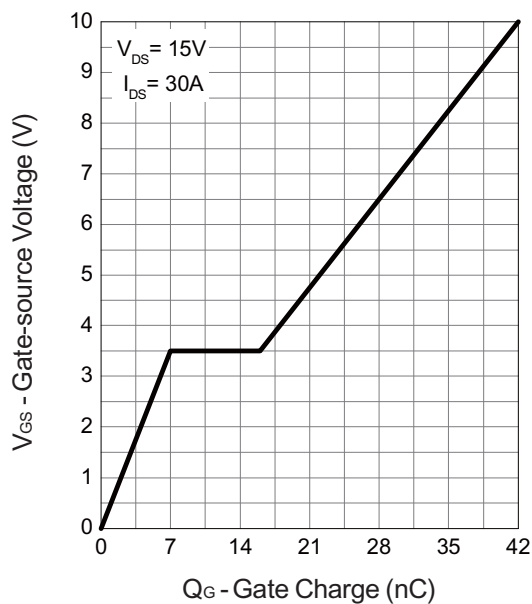
Source-Drain Diode Forward



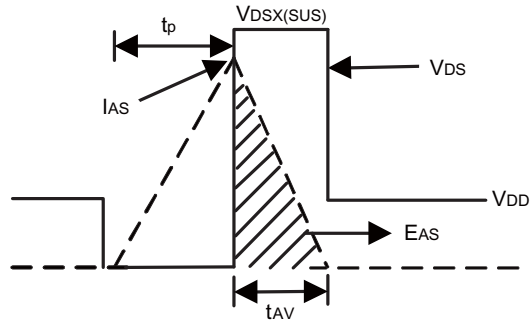
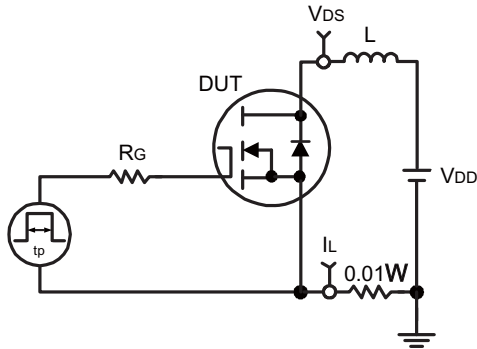
Capacitance



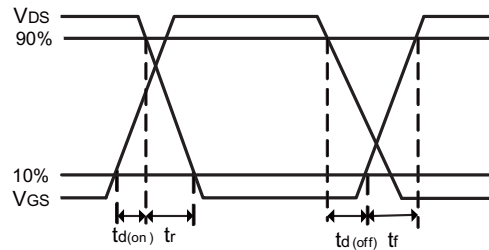
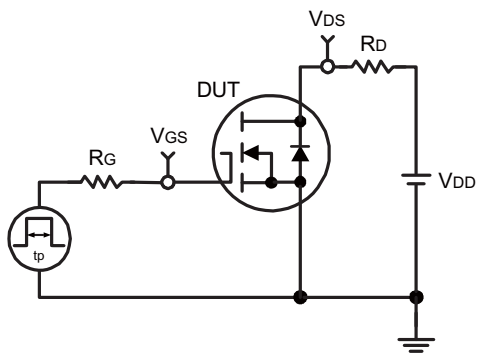
Gate Charge



Avalanche Test Circuit and Waveforms



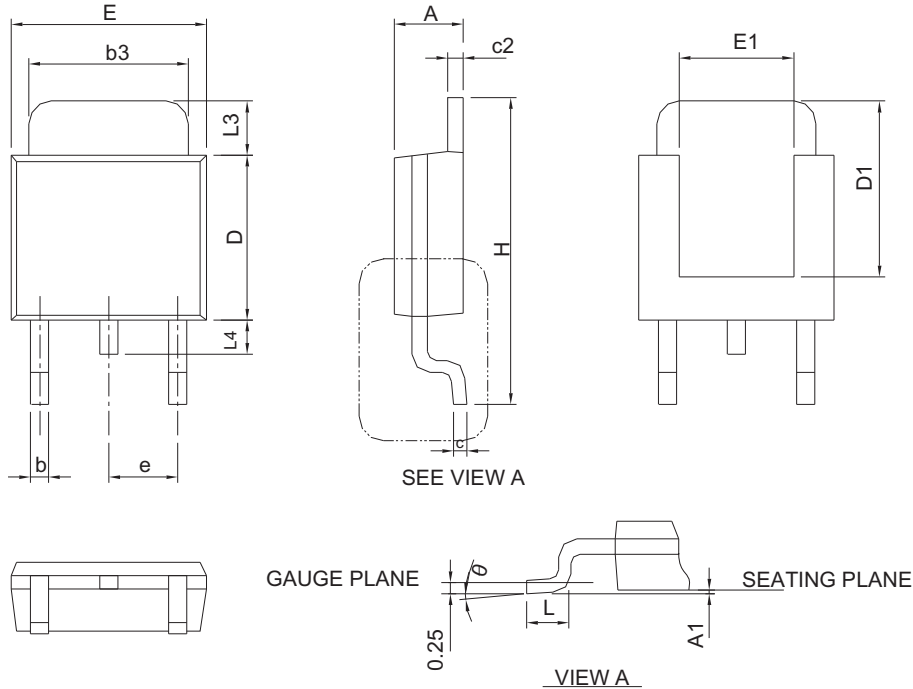
Switching Time Test Circuit and Waveforms





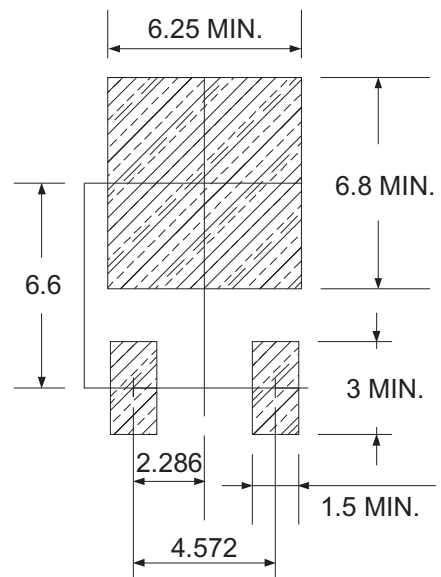
Package Information

TO-252-3



SYMBOL	TO-252-3			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1	-	0.13	-	0.005
b	0.50	0.89	0.020	0.035
b3	4.95	5.46	0.195	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	2.29 BSC		0.090 BSC	
H	9.40	10.41	0.370	0.410
L	0.90	1.78	0.035	0.070
L3	0.89	2.03	0.035	0.080
L4	-	1.02	-	0.040
θ	0°	8°	0°	8°

RECOMMENDED LAND PATTERN



UNIT: mm

Note : Follow JEDEC TO-252 .