

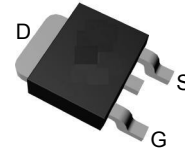
Features

- 650V/15A
 $R_{DS(ON)}=0.23\Omega(\text{typ.})@V_{GS}=10V$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free and Green Devices Available
(RoHS Compliant)

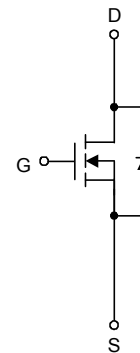
Applications

- AC/DC Power Conversion in Switched Mode Power Supplies (SMPS).
- Uninterruptible Power Supply (UPS).
- Adapter.

Pin Description



Top View of TO-252



N-Channel MOSFET

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		650	V
V _{GSS}	Gate-Source Voltage		±30	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	
I _S	Diode Continuous Forward Current	T _C =25°C	15	A
I _D	Continuous Drain Current	T _C =25°C	15	A
		T _C =100°C	12	
I _{DM} ^a	Pulsed Drain Current	T _C =25°C	45	
P _D	Maximum Power Dissipation	T _C =25°C	42	W
		T _C =100°C	17	
R _{θJC}	Thermal Resistance-Junction to Case		3	°C/W
R _{θJA}	Thermal Resistance-Junction to Ambient		62.5	°C/W
I _{AS} ^b	Avalanche Current, Repetitive	L=10mH	6	A
E _{AS} ^b	Avalanche Energy, Single pulse	L=10mH	180	mJ

Note a : Pulse width limited by maximum junction temperature.

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

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

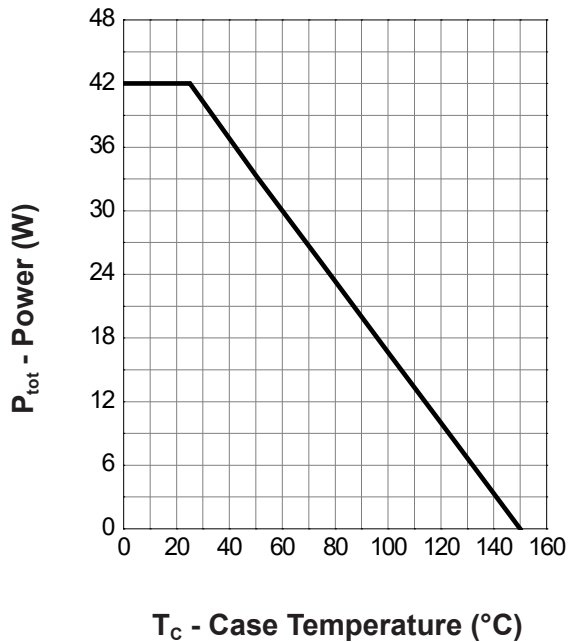
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	650	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =520V, V _{GS} =0V	-	-	1	μA
		T _J =85°C	-	-	30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	2.5	3.5	4.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±30V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^c	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =6A	-	0.23	0.28	Ω
Diode Characteristics						
V _{SD} ^c	Diode Forward Voltage	I _{SD} =12A, V _{GS} =0V	-	0.9	1.3	V
t _{rr} ^d	Reverse Recovery Time	I _{SD} =6A, dI _{SD} /dt=100A/μs	-	243	-	ns
Q _{rr} ^d	Reverse Recovery Charge		-	2.7	-	μC
Dynamic Characteristics ^d						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz	-	7	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =325V, Frequency=1.0MHz	-	1093	1421	pF
C _{oss}	Output Capacitance		-	33	-	
C _{rss}	Reverse Transfer Capacitance		-	6	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =30V, R _L =30Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	15	27	ns
t _r	Turn-on Rise Time		-	12	22	
t _{d(OFF)}	Turn-off Delay Time		-	41	73	
t _f	Turn-off Fall Time		-	108	195	
Gate Charge Characteristics ^d						
Q _g	Total Gate Charge	V _{DS} =325V, V _{GS} =10V, I _{DS} =6A	-	24	36	nC
Q _{gs}	Gate-Source Charge		-	6.1	-	
Q _{gd}	Gate-Drain Charge		-	8.9	-	

Note c : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

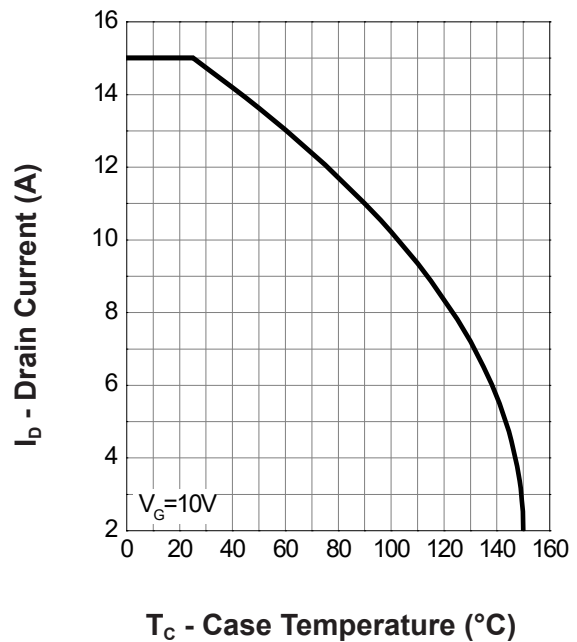
Note d : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

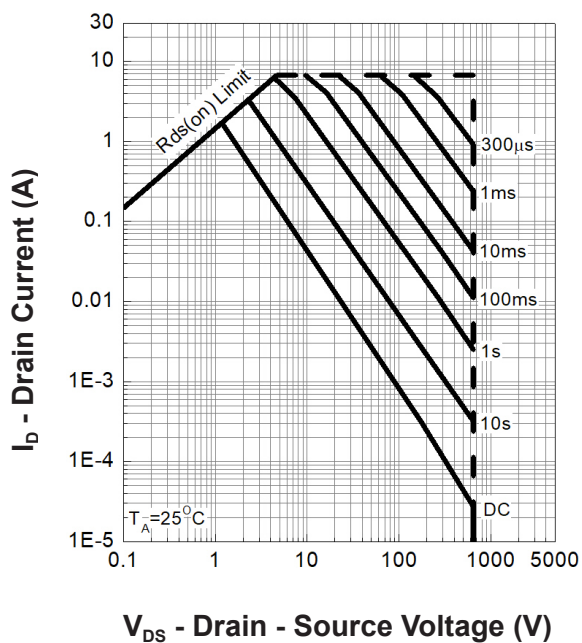
Power Dissipation



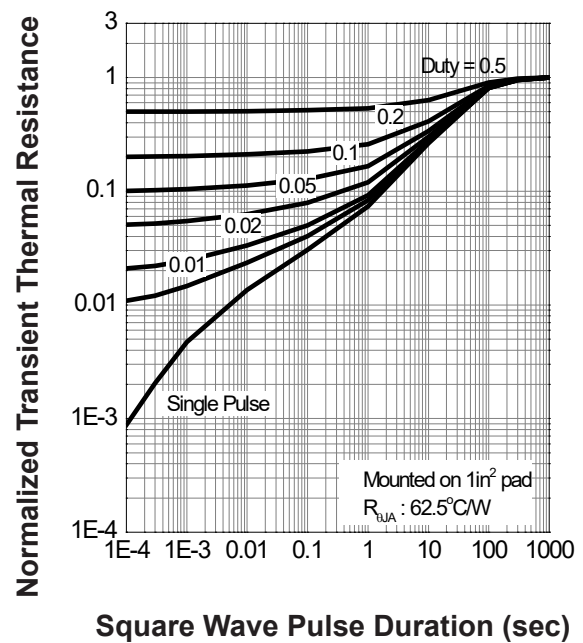
Drain Current



Safe Operation Area

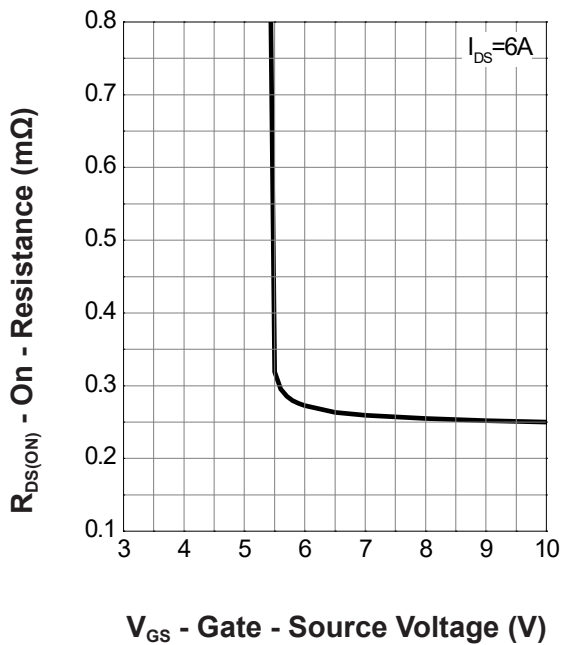


Thermal Transient Impedance

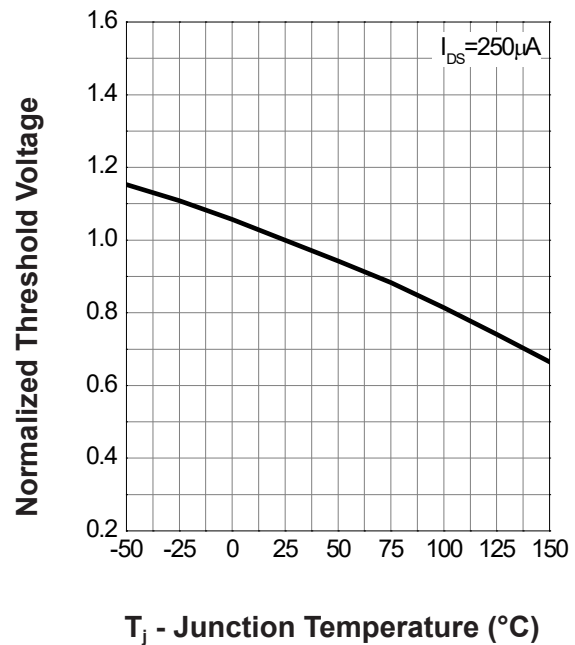


Typical Operating Characteristics(Cont.)

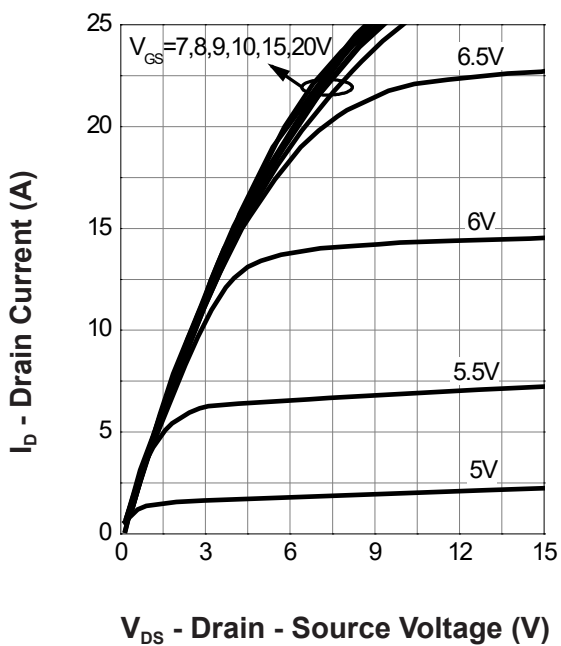
Gate-Source On Resistance



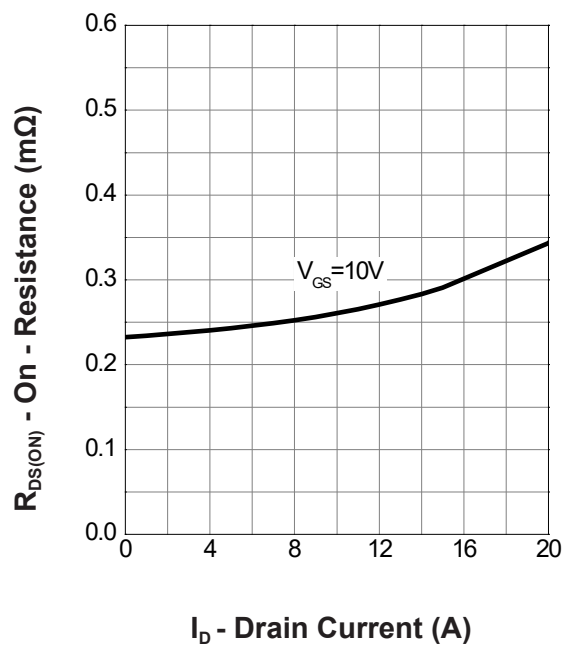
Gate Threshold Voltage



Output Characteristics

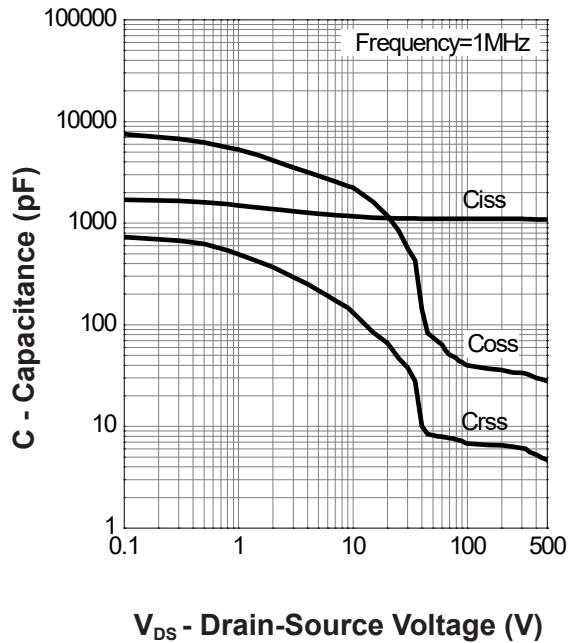


Drain-Source On Resistance

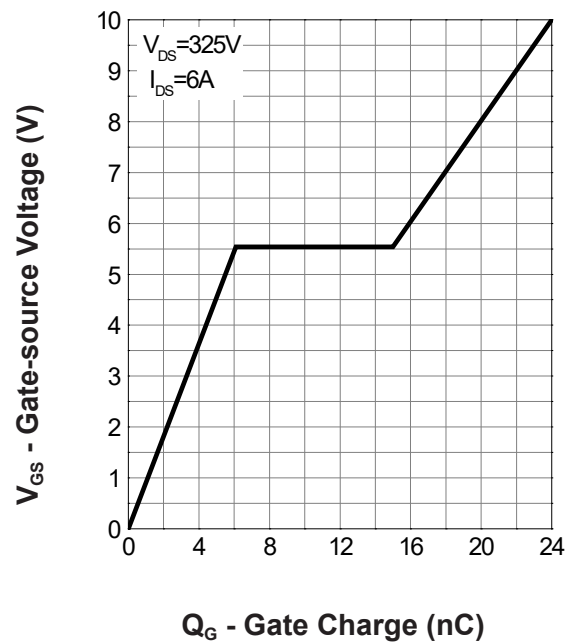


Typical Operating Characteristics(Cont.)

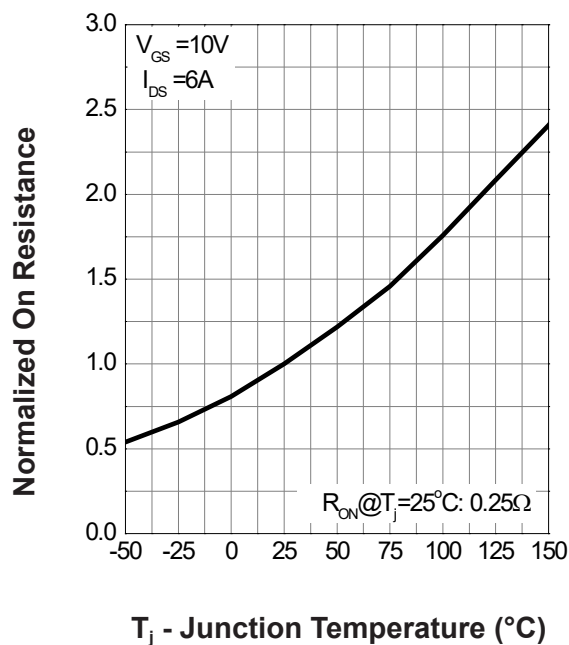
Capacitance



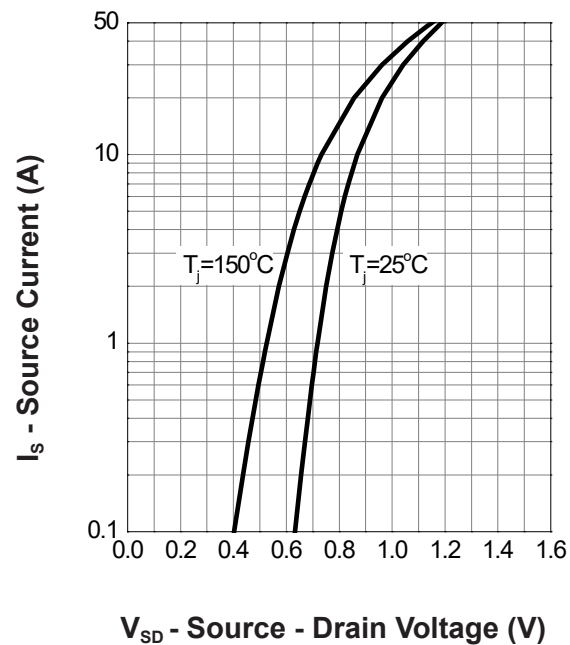
Gate Charge



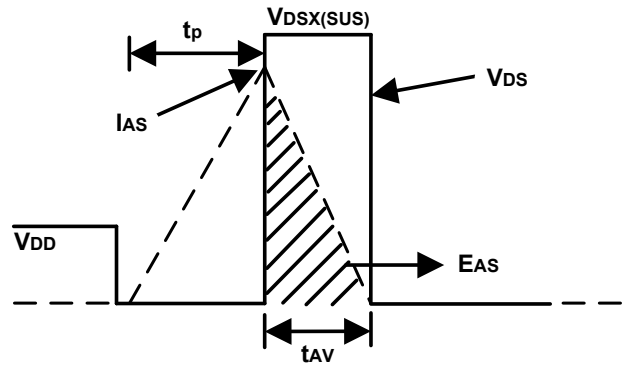
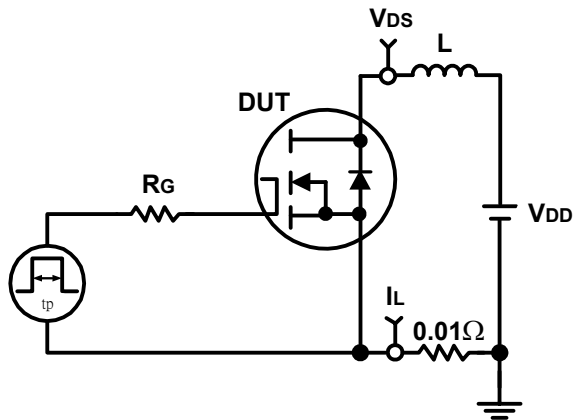
Drain-Source On Resistance



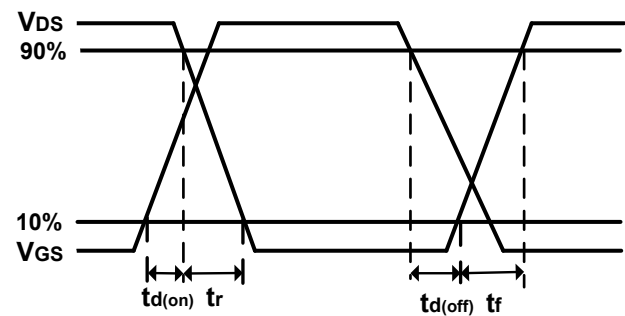
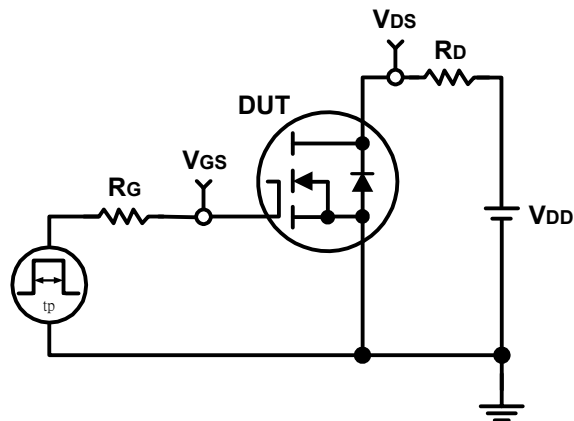
Source-Drain Diode Forward



Avalanche Test Circuit and Waveforms

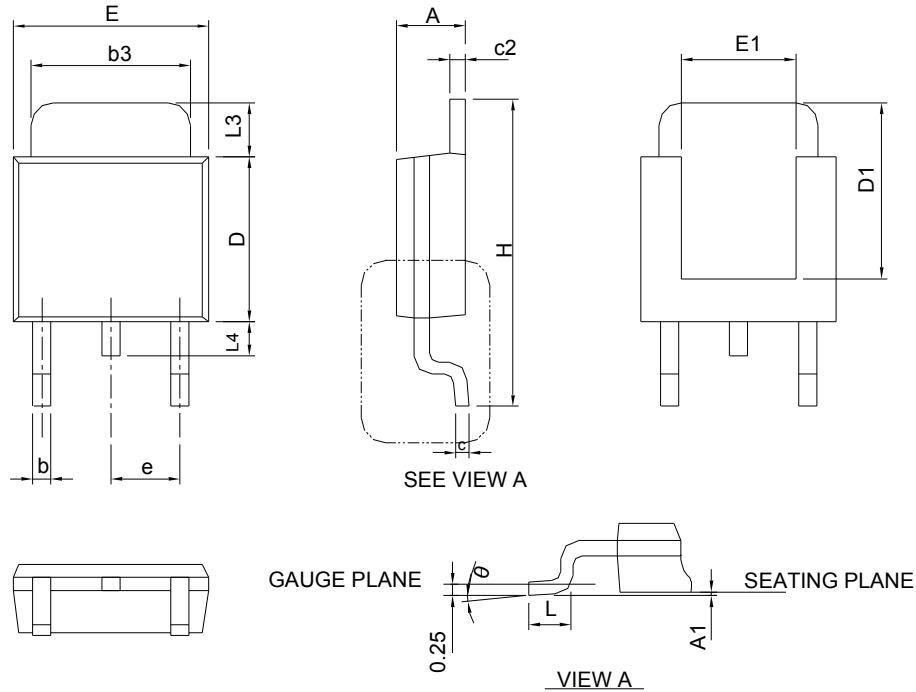


Switching Time Test Circuit and Waveforms



Package Information

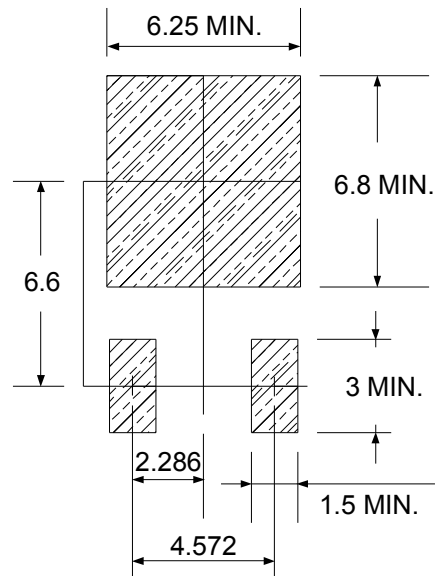
TO-252



SYMBOL	TO-252			
	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°

Note : Follow JEDEC TO-252 .

RECOMMENDED LAND PATTERN



UNIT: mm