

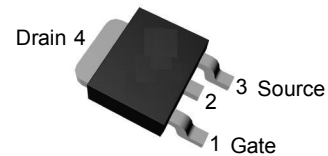
Features

- 650V/20A,
 $R_{DS(ON)} = 260m\Omega(\text{typ.}) @ V_{GS} = 10V$
- Reliable and Rugged
- Avalanche Rated
- Lead Free and Green Devices Available (RoHS Compliant)
- 100% UIS + R_g Tested

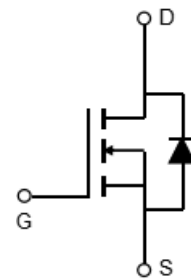
Applications

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

Pin Description



Top View of TO-252-2



N-Channel MOSFET

Absolute Maximum Ratings (T_A = 25°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	°C
I _S	Diode Continuous Forward Current		11 ^a	A
I _{DP} ^b	Pulse Drain Current Tested	T _C =25°C	44 ^a	A
I _D	Continuous Drain Current	T _C =25°C	20 ^a	A
		T _C =100°C	7 ^a	
P _D	Maximum Power Dissipation for TO-220/TO-252-2/TO-251	T _C =25°C	119	W
		T _C =100°C	47.6	
P _D	Maximum Power Dissipation for TO-220FP	T _C =25°C	31.2	
		T _C =100°C	12.5	
R _{θJC}	Thermal Resistance-Junction to Case for TO-220/TO-252-2/TO-251		1.05	°C/W
R _{θJC}	Thermal Resistance-Junction to Case for TO-220FP		4	
R _{θJA}	Thermal Resistance-Junction to Ambient		62.5	
Drain-Source Avalanche Ratings				
dv/dt ^c	MOSFET dv/dt ruggedness		50	V/ns
E _{AS} ^d	Avalanche Energy, Single Pulsed		130	mJ
I _{AR} ^e	Avalanche Current		1.8	A
E _{AR} ^e	Repetitive Avalanche Energy		0.3	mJ

Note a : limited by maximum junction temperature.

Note b : Pulse width limited by safe operating area.

Note c : V_{DS}=520V, I_D=11A.

Note d : I_D=1.8A, V_{DD}=50V, T_J=25°C.

Note e : Repetitive Rating : Pulse width limited by maximum junction temperature.

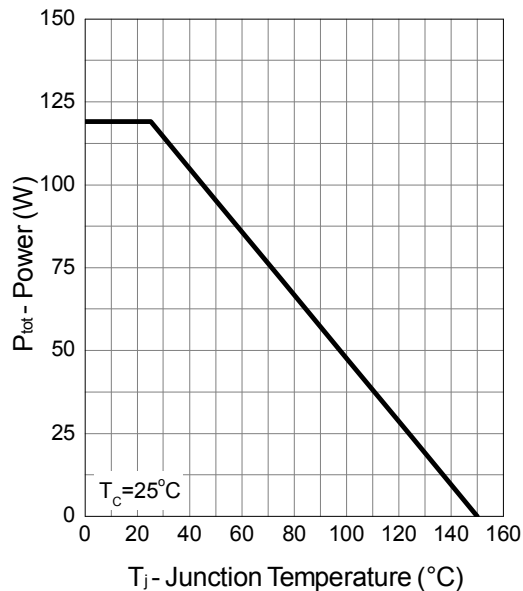
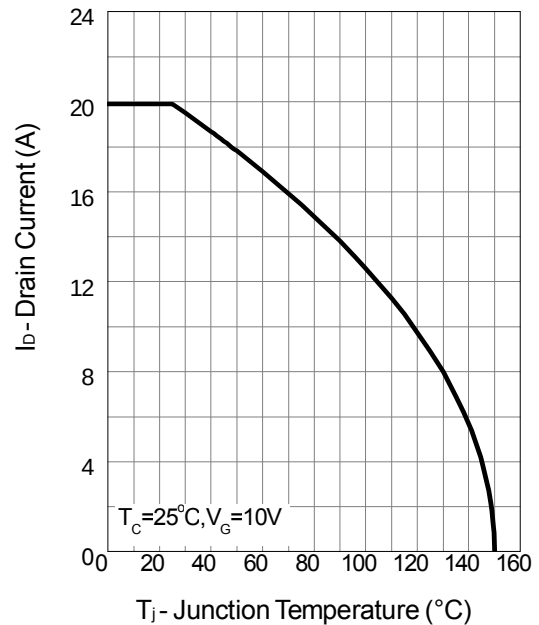
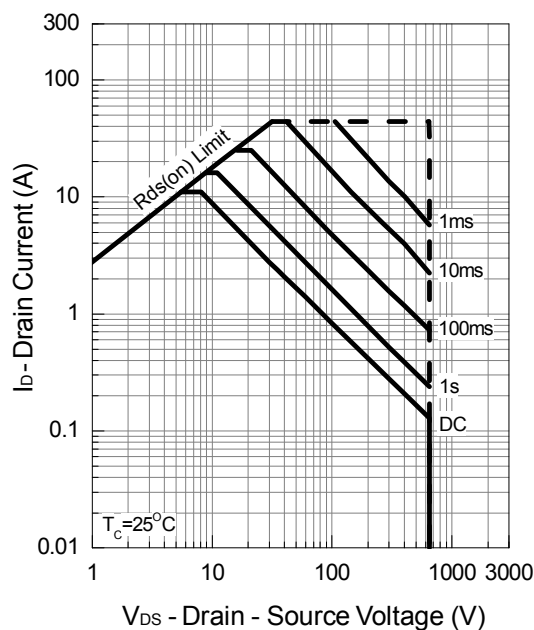
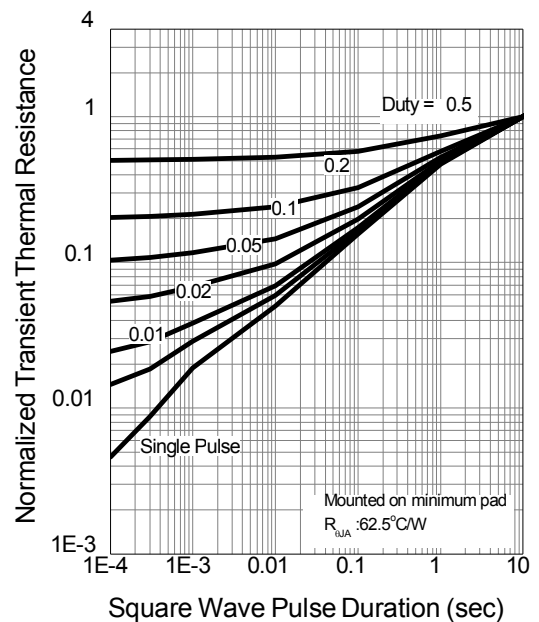
Electrical Characteristics (T_A = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	650	-	-	V
		T _J =150°C	-	750	-	
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =520V, V _{GS} =0V	-	-	1	μA
		T _J =150°C	-	-	200	
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)} ^f	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =4A	-	260	380	mΩ
Diode Characteristics						
V _{SD} ^f	Diode Forward Voltage	I _{SD} =11A, V _{GS} =0V	-	0.9	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} =11A, V _R =390V dI _{SD} /dt=100A/μs	-	260	-	ns
Q _{rr}	Reverse Recovery Charge		-	2.65	-	μC
I _{rm}	Peak Reverse Recovery Current		-	19.5	-	A
Dynamic Characteristics ^g						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	1.9	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, Frequency=1.0MHz	-	790	1025	pF
C _{oss}	Output Capacitance		-	281	-	
C _{rss}	Reverse Transfer Capacitance		-	11	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =400V, R _L =36Ω, I _{DS} =20A, V _{GEN} =10V, R _G =6Ω	-	11	-	ns
T _r	Turn-on Rise Time		-	12	-	
t _{d(OFF)}	Turn-off Delay Time		-	28	-	
T _f	Turn-off Fall Time		-	10	-	
Gate Charge Characteristics ^g						
Q _g	Total Gate Charge	V _{DS} =520V, V _{GS} =10V, I _{DS} =4A	-	23	30	nC
Q _{gs}	Gate-Source Charge		-	5	-	
Q _{gd}	Gate-Drain Charge		-	10	-	

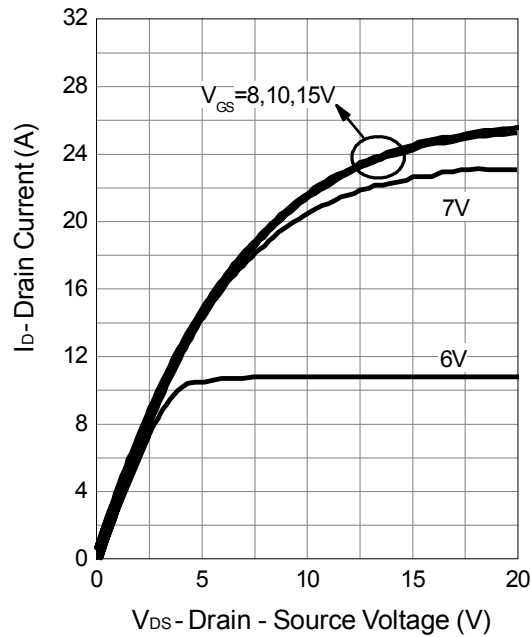
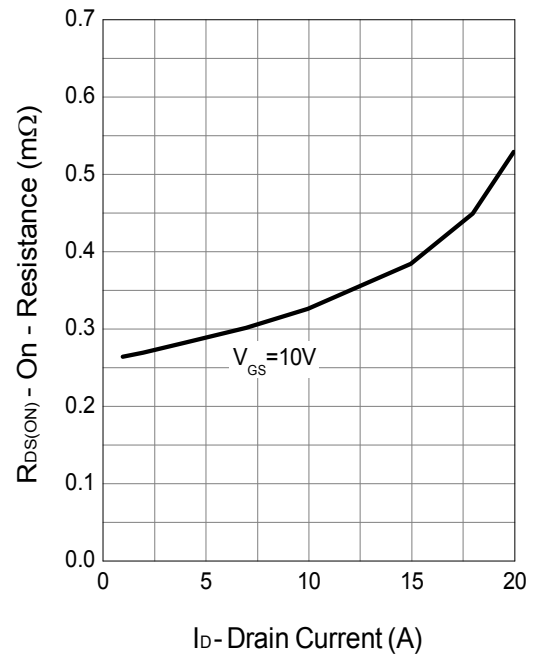
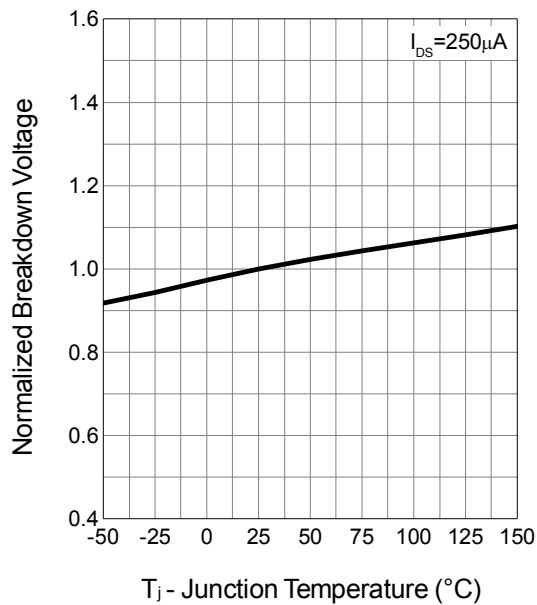
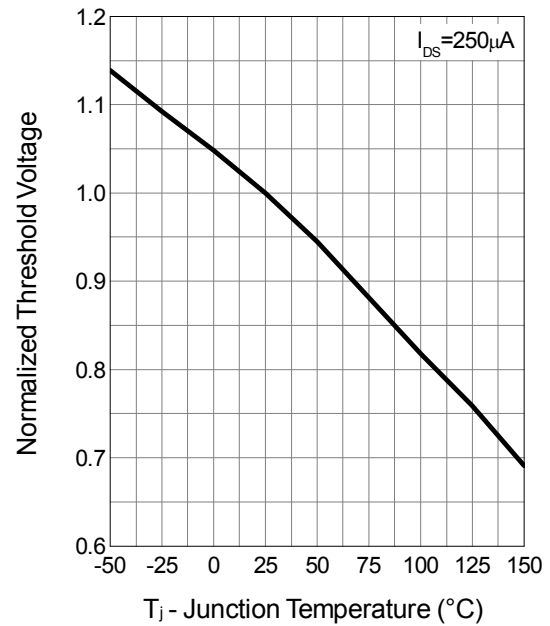
Note f : Pulse test ; pulse width≤300μs, duty cycle≤2%.

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

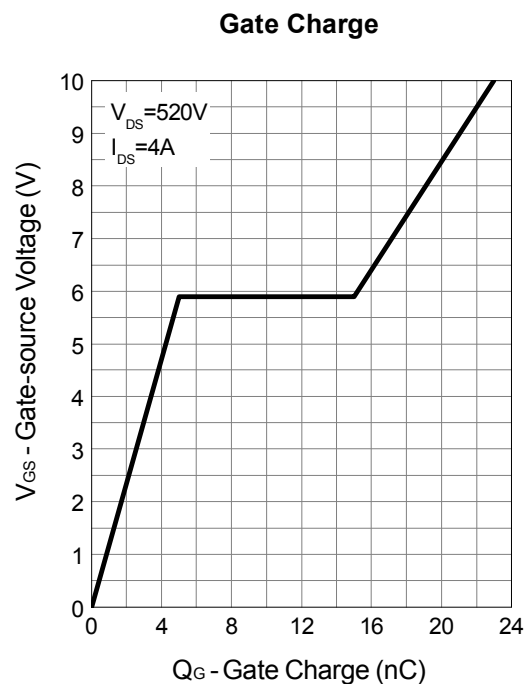
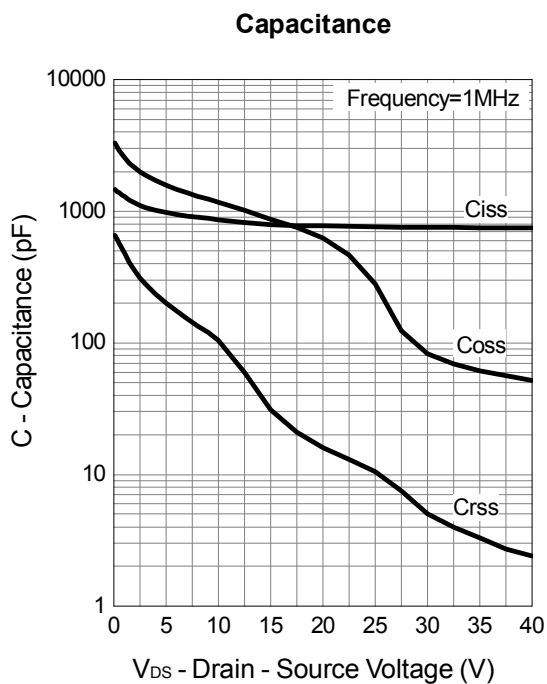
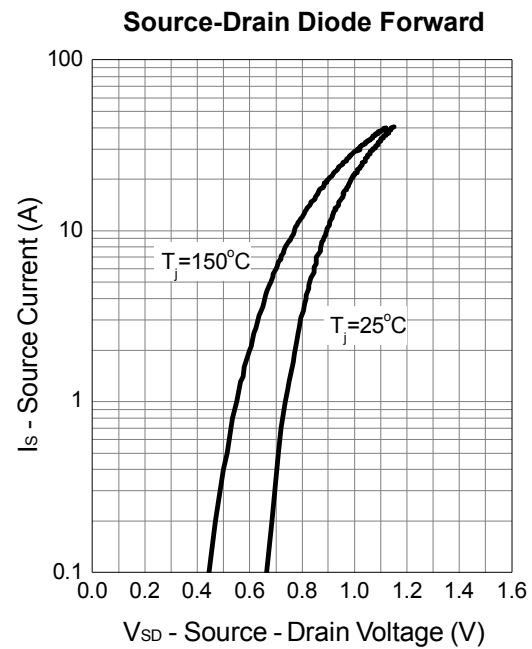
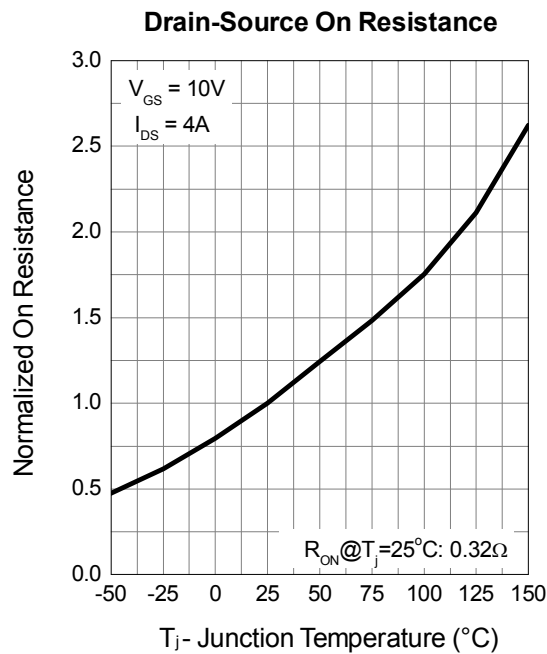
Typical Operating Characteristics

Power Dissipation

Drain Current

Safe Operation Area

Thermal Transient Impedance


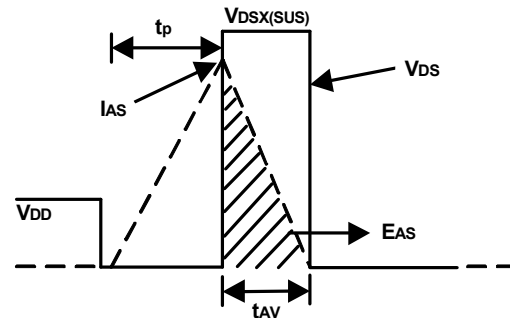
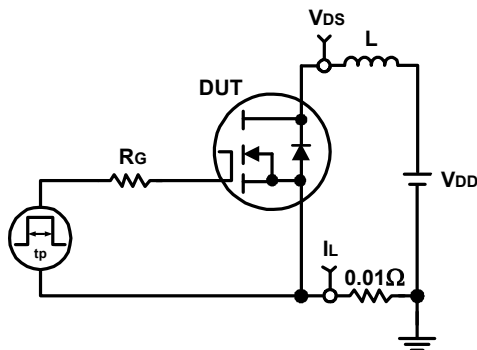
Typical Operating Characteristics (Cont.)

Output Characteristics

Drain-Source On Resistance

BVDSS vs Junction Temperature

Gate Threshold Voltage


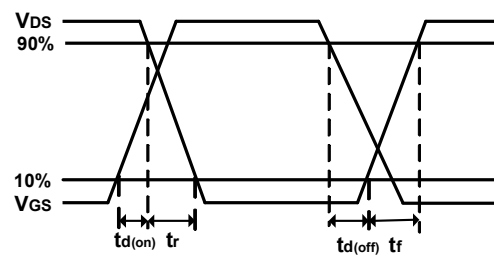
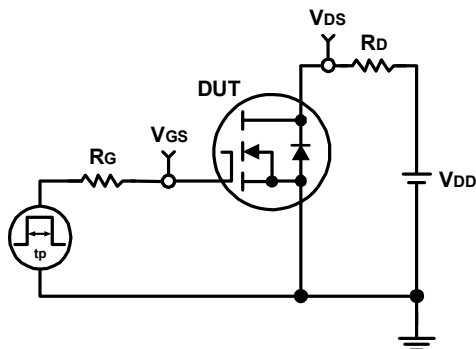
Typical Operating Characteristics (Cont.)



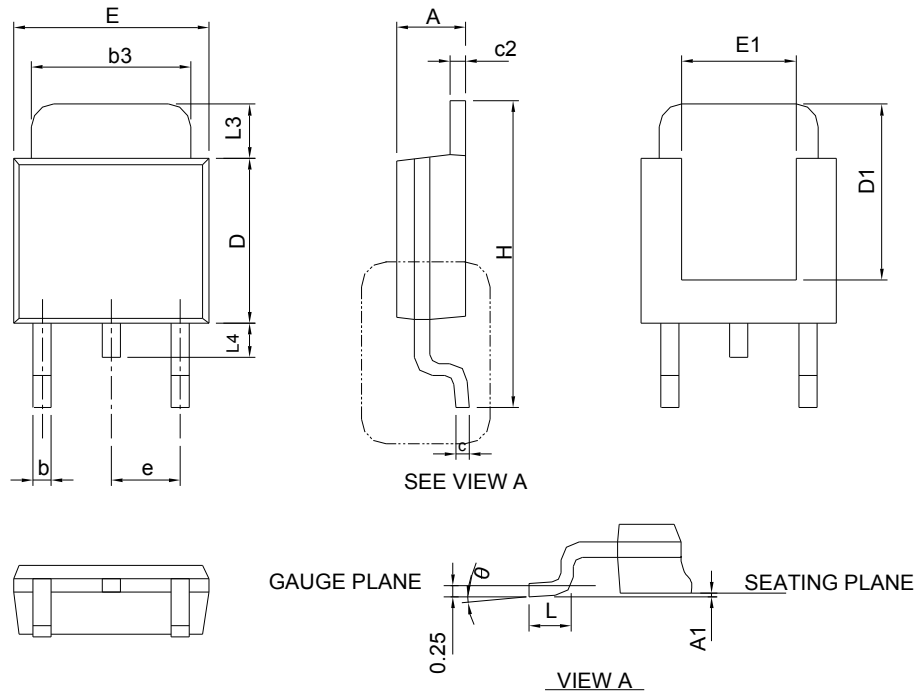
Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



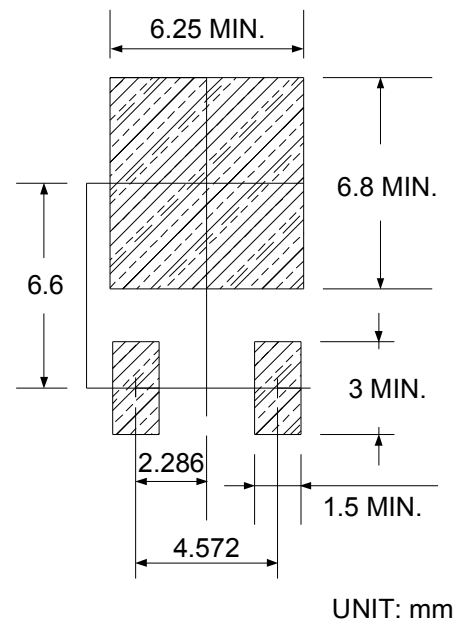
Package Information

TO-252-2


SYMBOL	TO-252-2			
	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-252-2

RECOMMENDED LAND PATTERN



UNIT: mm