

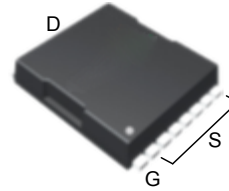
Features

- 40V/200A,
 $R_{DS(ON)} = 1 \text{ m}\Omega$ (typ.) @ $V_{GS} = 10\text{V}$
 $R_{DS(ON)} = 1.6 \text{ m}\Omega$ (typ.) @ $V_{GS} = 4.5\text{V}$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lower $R_{DS(ON)}$ to Minimize Conduction Losses
- Lead Free and Green Devices Available (RoHS Compliant)

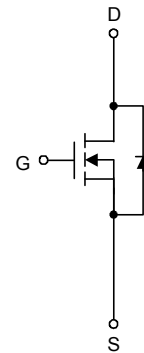
Applications

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

Pin Description



TO-LL



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	40	V
V_{GSS}	Gate-Source Voltage	± 20	
T_J	Maximum Junction Temperature	175	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 175	
I_S^a	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$ 200	A
I_D^a	Continuous Drain Current	$T_C=25^\circ\text{C}$ 200	
		$T_C=100^\circ\text{C}$ 120	
I_{DM}^b	Pulsed Drain Current	$T_C=25^\circ\text{C}$ 600	
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ 375	W
		$T_C=100^\circ\text{C}$ 187	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State 0.85	$^\circ\text{C/W}$
$R_{\theta JA}^c$	Thermal Resistance-Junction to Ambient	50	$^\circ\text{C/W}$
I_{AS}^d	Avalanche Current, Single pulse	$L=0.5\text{mH}$ 90	A
E_{AS}^d	Avalanche Energy, Single pulse	$L=0.5\text{mH}$ 2000	mJ

Note a : Maximum continue current is limited by bonding wire.

Note b : Pulse width is limited by maximum junction temperature 175°C .

Note c : $R_{\theta JA}$ steady state $t=999\text{s}$.

Note d : UIS tested and pulse width limited by maximum junction temperature 175°C (Initial temperature $T_J=25^\circ\text{C}$).

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

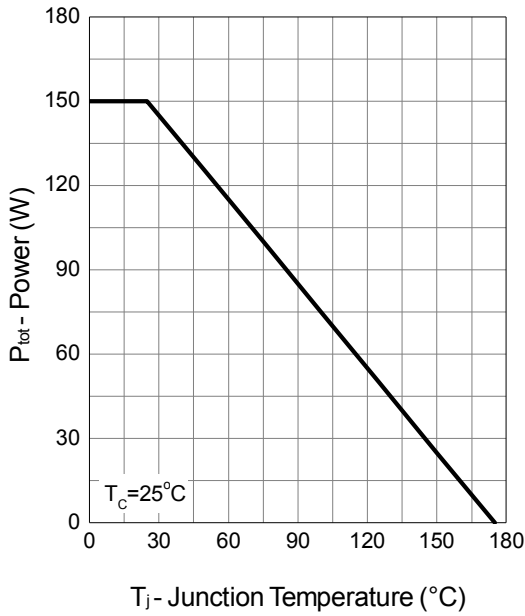
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=32V, V_{GS}=0V$ $T_J=85^\circ\text{C}$	-	-	1	μA
			-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1.5	2	2.5	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$		-	± 100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=25A$ $T_J=125^\circ\text{C}$	-	1	1.3	m Ω
			-	2.4	-	
		$V_{GS}=4.5V, I_{DS}=25A$	-	1.6	1.9	
G_{fs}	Forward Transconductance	$V_{DS}=5V, I_{DS}=20A$	-	3.5	-	S
Diode Characteristics						
V_{SD}^e	Diode Forward Voltage	$I_{SD}=20A, V_{GS}=0V$	-	0.78	1.1	V
t_{rr}	Reverse Recovery Time	$I_{SD}=25A, dI_{SD}/dt=100A/\mu s$ $V_{dd}=20V$	-	61	-	ns
t_a	Charge Time		-	31	-	
t_b	Discharge Time		-	30	-	
Q_{rr}	Reverse Recovery Charge		-	67	-	
Dynamic Characteristics^f						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	0.6	0.9	2	Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=20V,$ Frequency=1.0MHz	-	5230	-	pF
C_{oss}	Output Capacitance		-	2000	-	
C_{rss}	Reverse Transfer Capacitance		-	175	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=20V, R_L=20\Omega,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=1\Omega$	-	18.8	-	ns
t_r	Turn-on Rise Time		-	9.8	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	50	-	
t_f	Turn-off Fall Time		-	90.8	-	
Gate Charge Characteristics^f						
Q_g	Total Gate Charge	$V_{DS}=20V, V_{GS}=10V,$ $I_{DS}=25A$	-	88.98	-	nC
Q_{gth}	Threshold Gate Charge		-	15.84	-	
Q_{gs}	Gate-Source Charge		-	24.75	-	
Q_{gd}	Gate-Drain Charge		-	15.63	-	

 Note e¹: Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

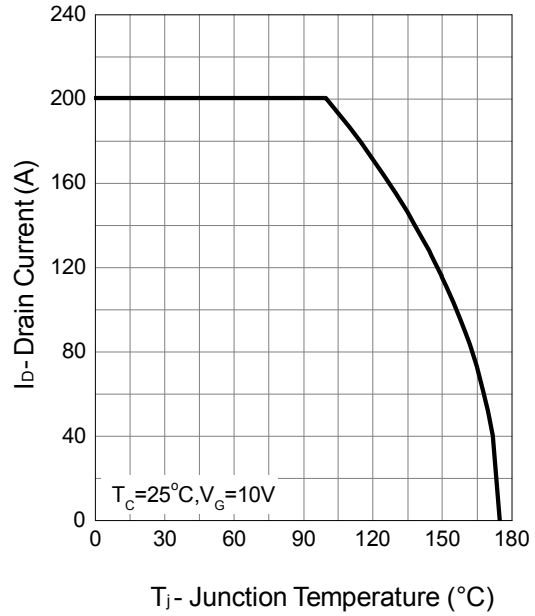
 Note f¹: Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

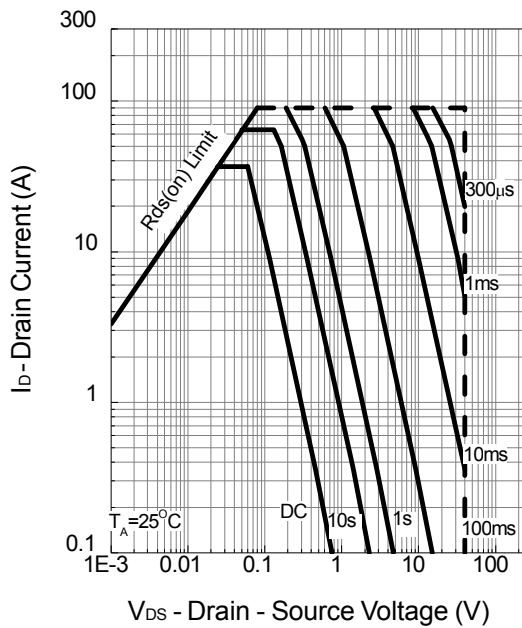
Power Dissipation



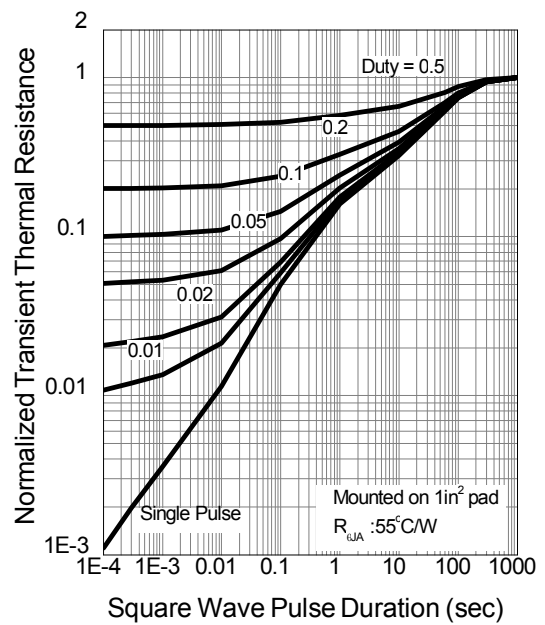
Drain Current



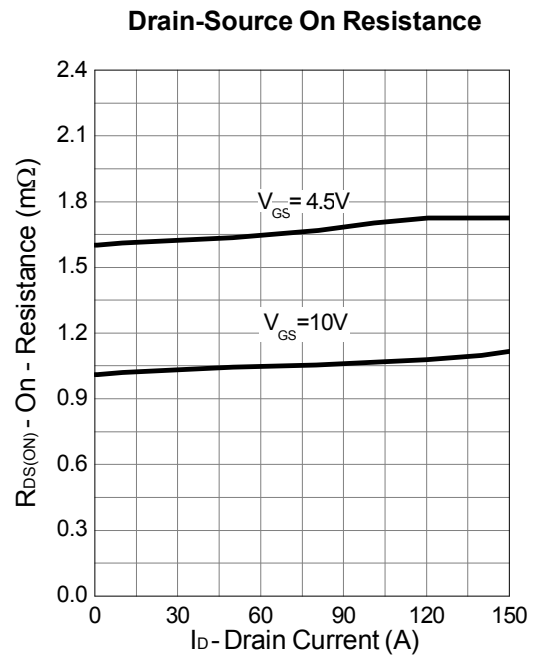
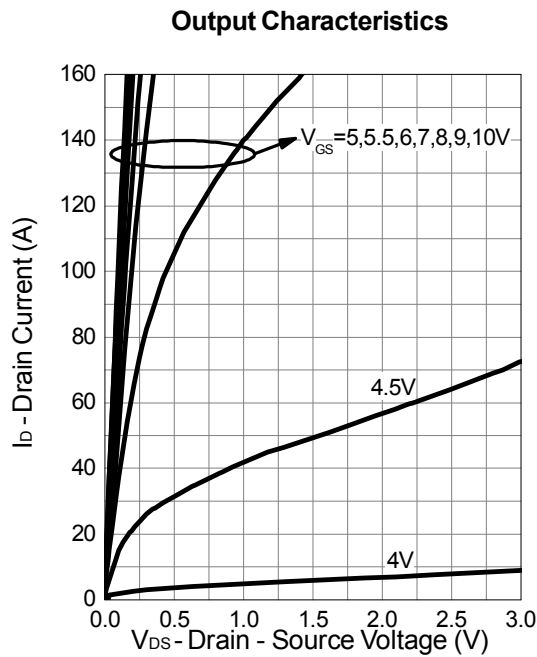
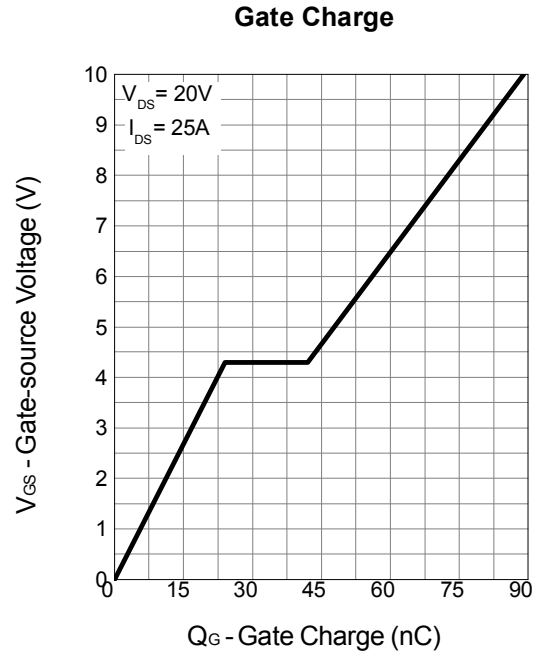
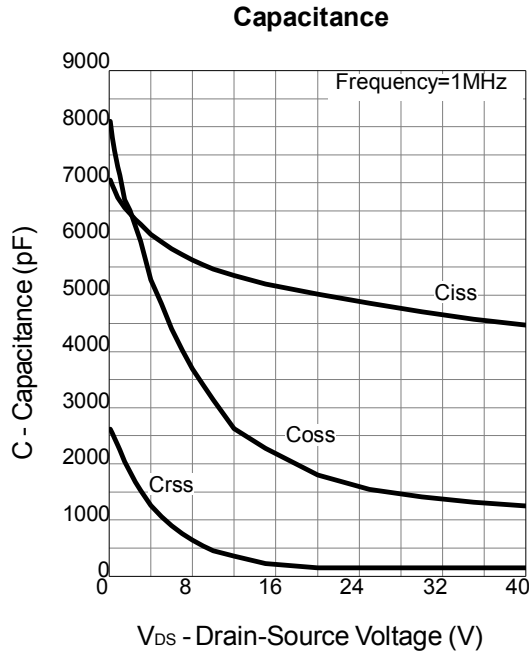
Safe Operation Area



Thermal Transient Impedance

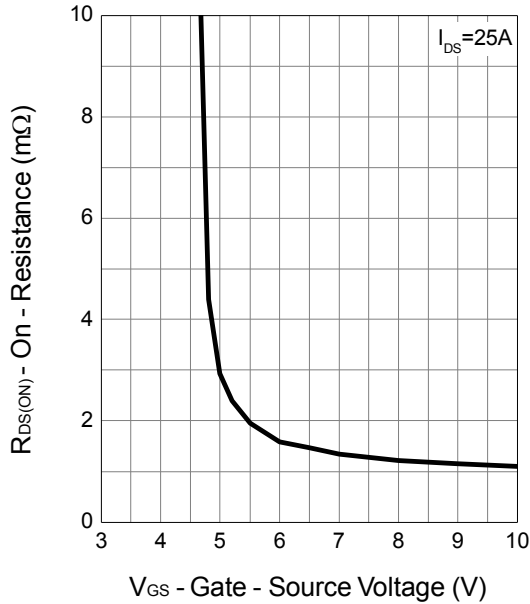


Typical Operating Characteristics (Cont.)

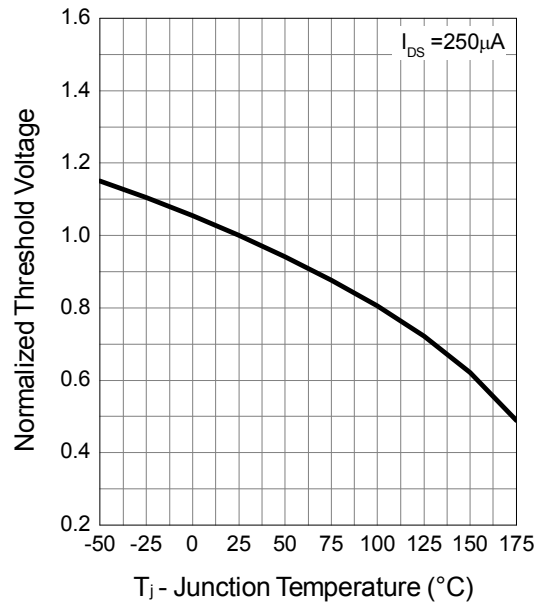


Typical Operating Characteristics (Cont.)

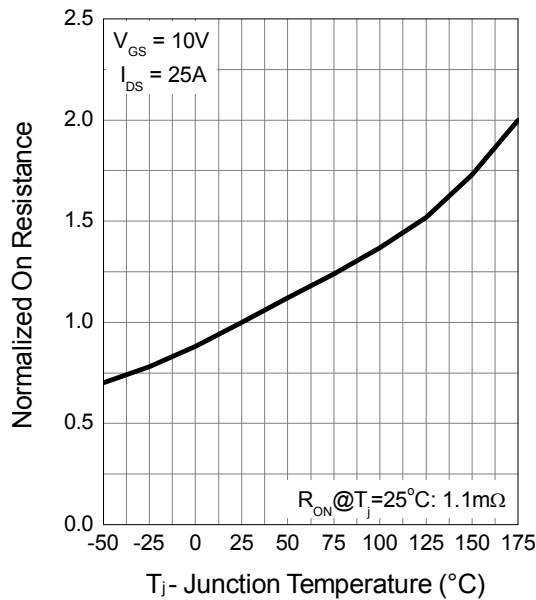
Gate-Source On Resistance



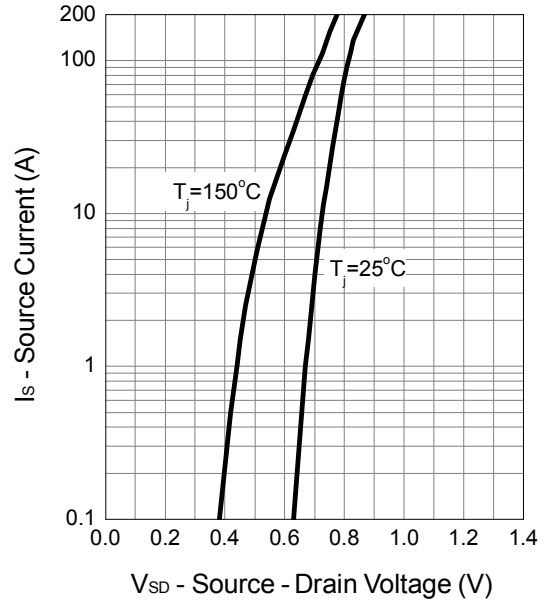
Gate Threshold Voltage



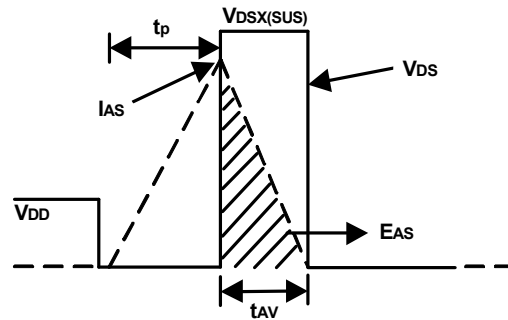
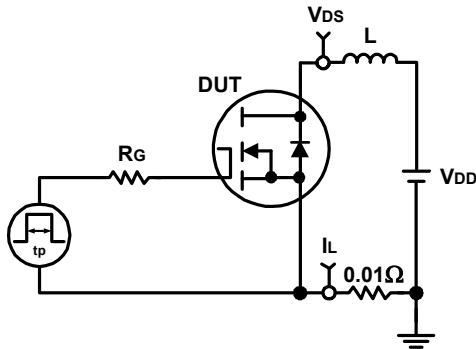
Drain-Source On Resistance



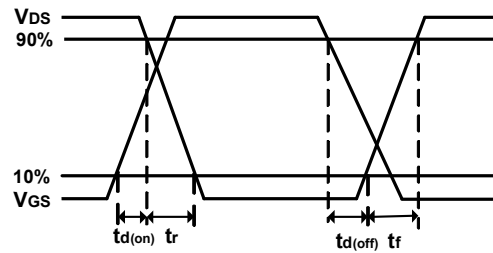
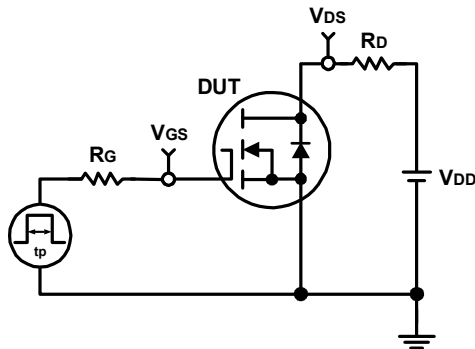
Source-Drain Diode Forward



Avalanche Test Circuit and Waveforms

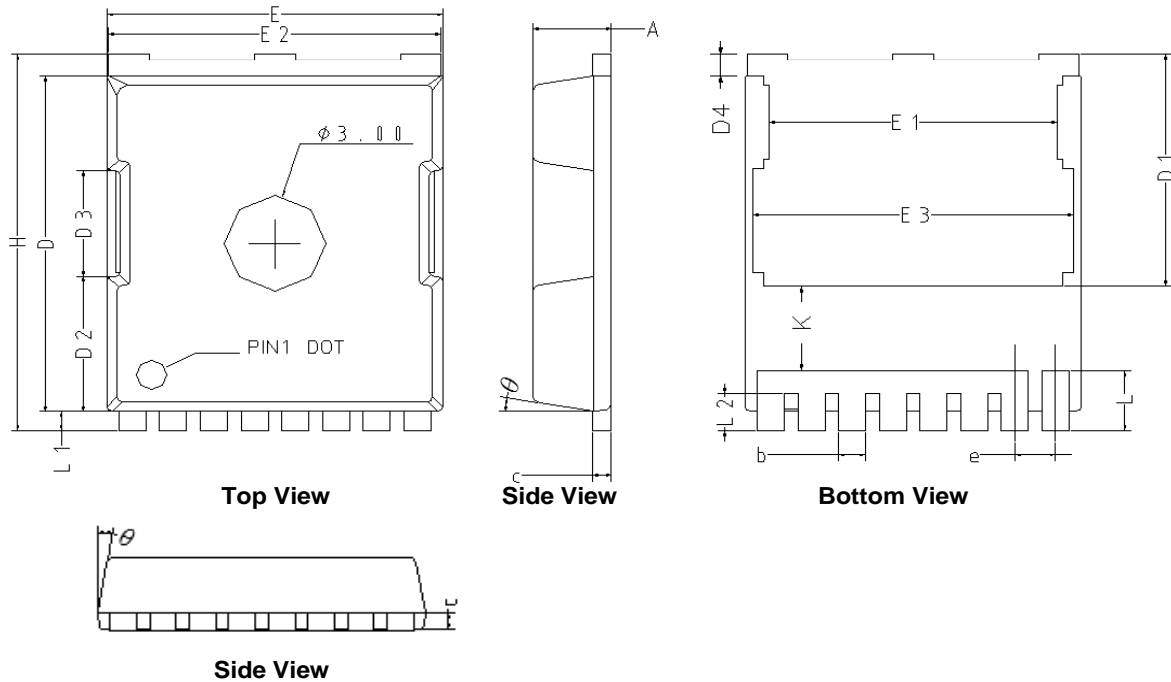


Switching Time Test Circuit and Waveforms



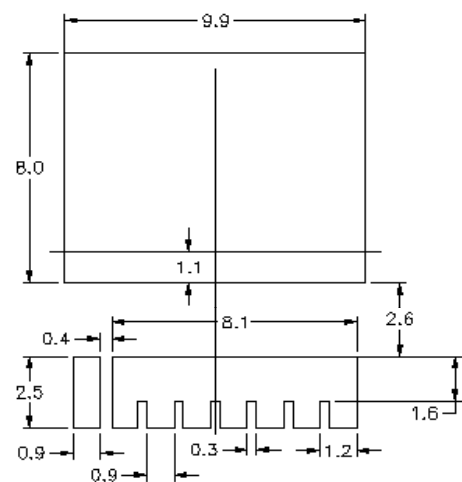
Package Information

TOLL



SYMBOLS	TO-LL			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.20	2.40	0.087	0.094
b	0.70	0.90	0.028	0.035
c	0.40	0.60	0.016	0.024
D	10.23	10.63	0.403	0.419
D1	7.05	7.45	0.278	0.293
D2	3.98	4.38	0.157	0.172
D3	3.10	3.50	0.122	0.138
D4	0.50	0.90	0.020	0.035
E	9.70	10.10	0.382	0.398
E1	8.30	8.70	0.327	0.343
E2	9.60	10.00	0.378	0.394
E3	9.26	9.66	0.365	0.380
H	11.53	11.93	0.454	0.470
e	1.2 BSC		0.0472 BSC	
K	2.43	2.83	0.096	0.111
L	1.65	2.05	0.065	0.081
L1	0.40	0.80	0.016	0.031
L2	0.95	1.35	0.037	0.053
θ	6°	10°	6°	10°

RECOMMENDED LAND PATTERN



UNIT: mm