

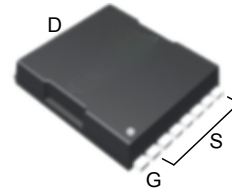
Features

- 60V/180A*
 $R_{DS(ON)}=1.1\text{m}\Omega(\text{typ.})@V_{GS}=10\text{V}$
 $R_{DS(ON)}=2.5\text{m}\Omega(\text{typ.})@V_{GS}=4.5\text{V}$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free and Green Devices Available
(RoHS Compliant)

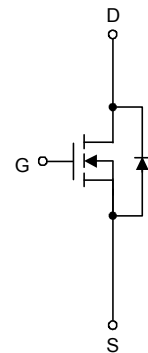
Applications

- Secondary Side Synchronous Rectification.
- DC-DC Converter.
- Motor Control.
- Load Switching.

Pin Description



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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		60	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		175	°C
T _{STG}	Storage Temperature Range		-55 to 175	
I _S	Diode Continuous Forward Current	T _C =25°C	90	A
I _D	Continuous Drain Current	T _C =25°C	180*	
	Continuous Drain Current	T _C =100°C	125*	
I _{DM}	Pulsed Drain Current	T _C =25°C	400 ^a	
P _D	Maximum Power Dissipation	T _C =25°C	176.5	W
		T _C =100°C	88.2	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	0.85	°C/W
I _D	Continuous Drain Current	T _A =25°C	21	A
		T _A =70°C	17.8	
P _D	Maximum Power Dissipation	T _A =25°C	2.4	W
		T _A =70°C	1.68	
R _{θJA}	Thermal Resistance-Junction to Ambient	Steady State	62.5	°C/W
I _{AS} ^b	Avalanche Current, Single pulse	L=0.5mH	42	A
E _{AS} ^b	Avalanche Energy, Single pulse	L=0.5mH	441	mJ

Note * : Bonding wire limitation current is 120A.

Note a : Pulse width limited by maximum junction temperature.

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

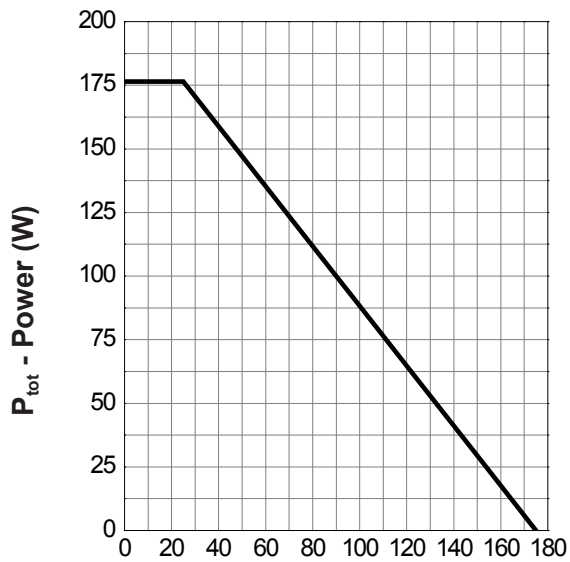
Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

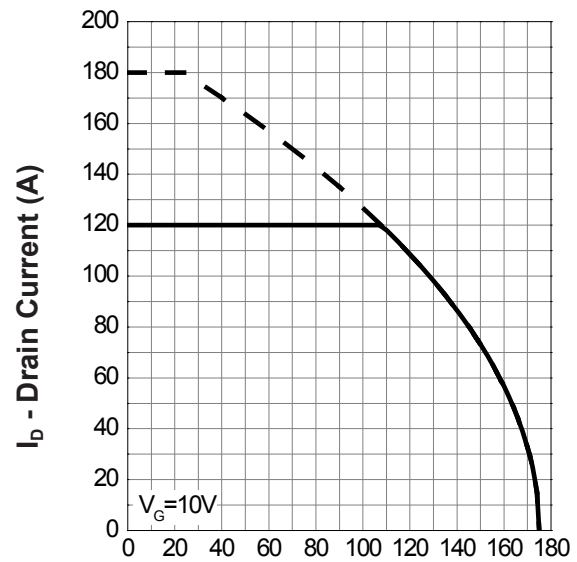
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =48V, V _{GS} =0V T _J =85°C	-	-	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1	2	3	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^c	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =40A V _{GS} =4.5V, I _{DS} =24A	-	1.1 1.5	1.5 2.2	mΩ
Diode Characteristics						
V _{SD} ^c	Diode Forward Voltage	I _{SD} =40A, V _{GS} =0V	-	0.8	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} =40A, dI _{SD} /dt=100A/μs	-	44	-	ns
Q _{rr}	Reverse Recovery Charge		-	50	-	nC
Dynamic Characteristics ^d						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	1	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, Frequency=1.0MHz	-	5850	7605	pF
C _{oss}	Output Capacitance		-	1190	-	
C _{rss}	Reverse Transfer Capacitance		-	155	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =30V, R _L =30Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	18	32	ns
t _r	Turn-on Rise Time		-	12	22	
t _{d(OFF)}	Turn-off Delay Time		-	106	191	
t _f	Turn-off Fall Time		-	137	247	
Gate Charge Characteristics ^d						
Q _g	Total Gate Charge	V _{DS} =30V, V _{GS} =4.5V, I _{DS} =40A	-	45	-	nC
Q _g	Total Gate Charge	V _{DS} =30V, V _{GS} =10V, I _{DS} =40A	-	93.5	131	
Q _{gs}	Gate-Source Charge		-	18.1	-	
Q _{gd}	Gate-Drain Charge		-	15.4	-	

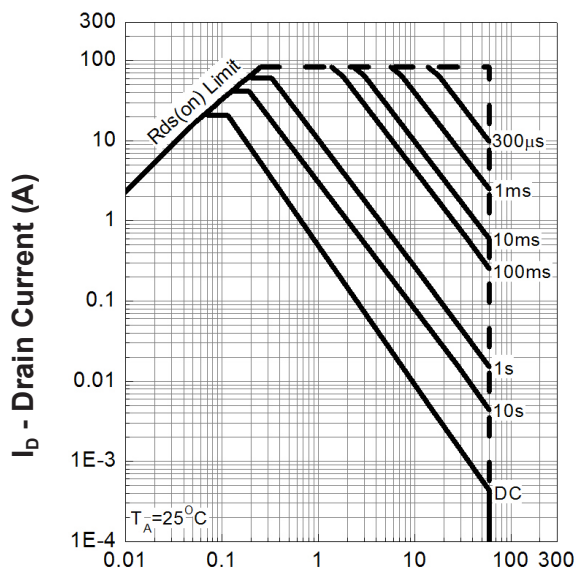
Note c : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

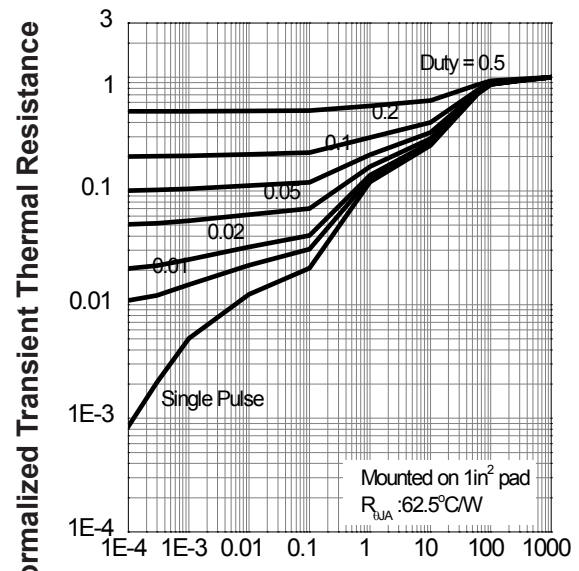
Note d : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

Power Dissipation

 T_C - Case Temperature (°C)

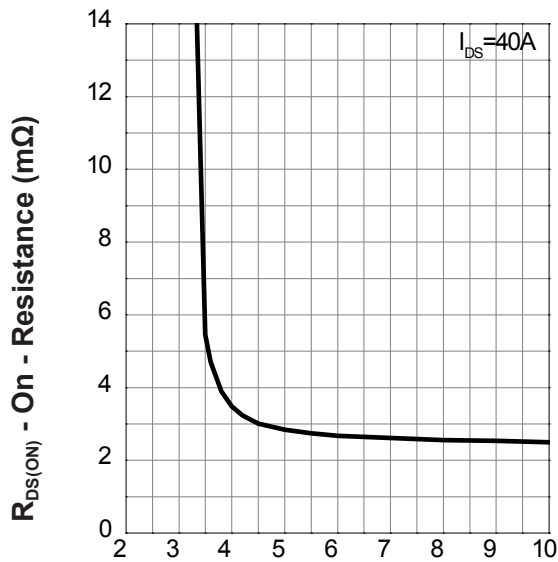
Drain Current

 T_C - Case Temperature (°C)

Safe Operation Area

 V_{DS} - Drain - Source Voltage (V)

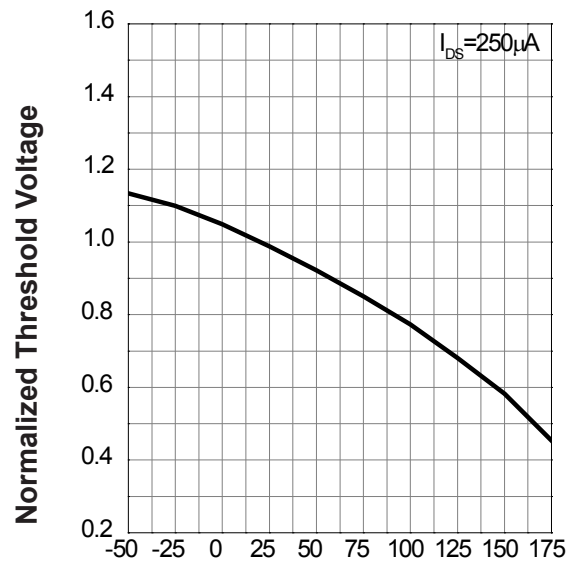
Thermal Transient Impedance


Square Wave Pulse Duration (sec)

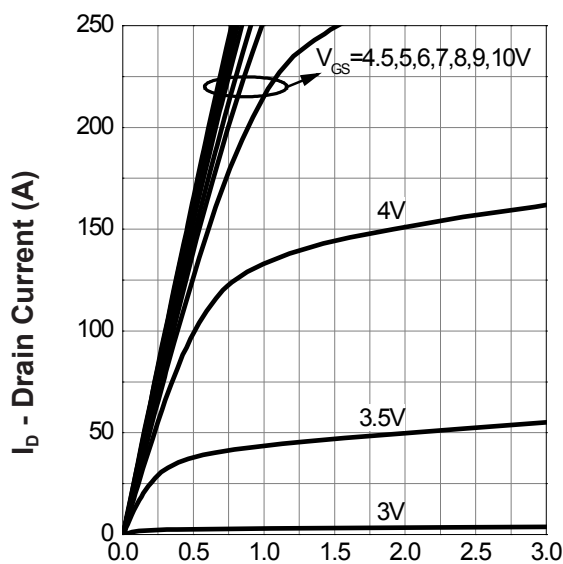
Typical Operating Characteristics(Cont.)

Gate-Source On Resistance


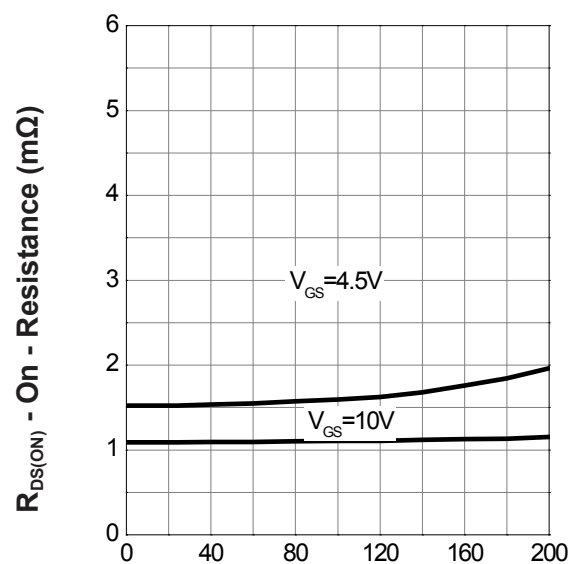
V_{GS} - Gate - Source Voltage (V)

Gate Threshold Voltage


T_J - Junction Temperature ($^{\circ}C$)

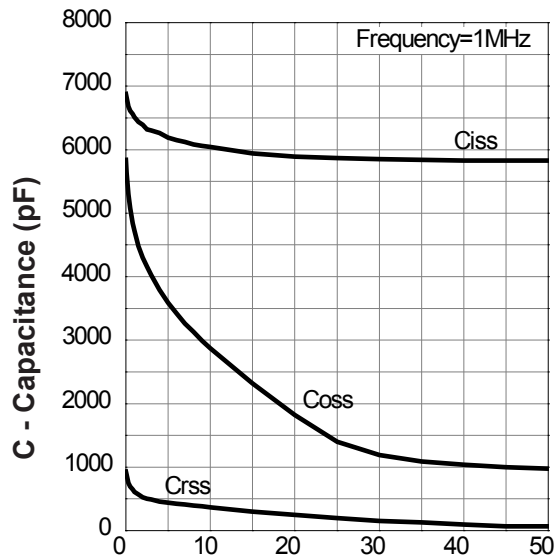
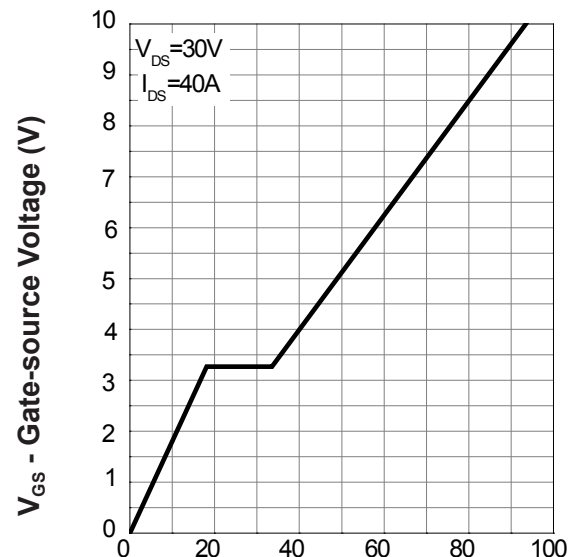
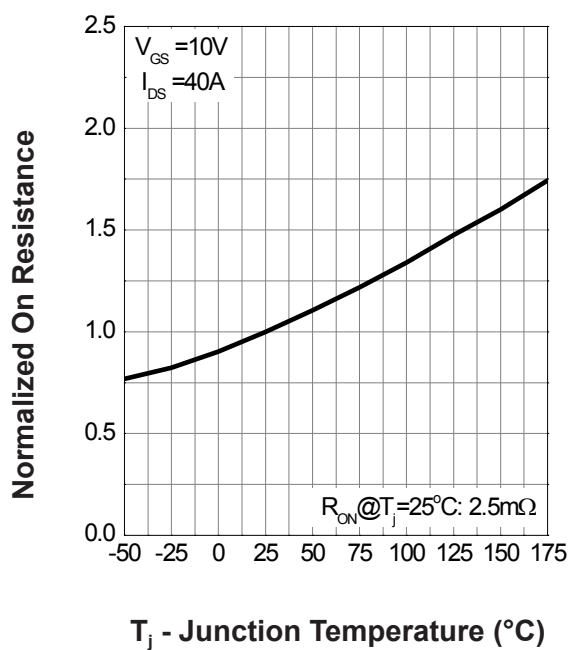
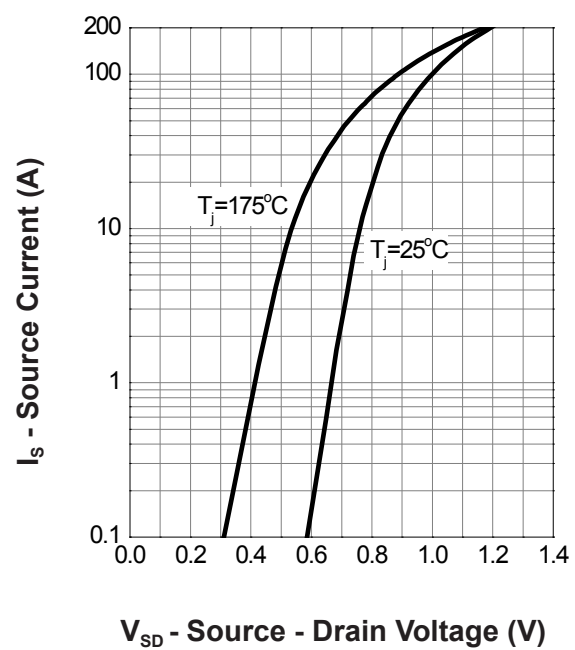
Output Characteristics


V_{DS} - Drain - Source Voltage (V)

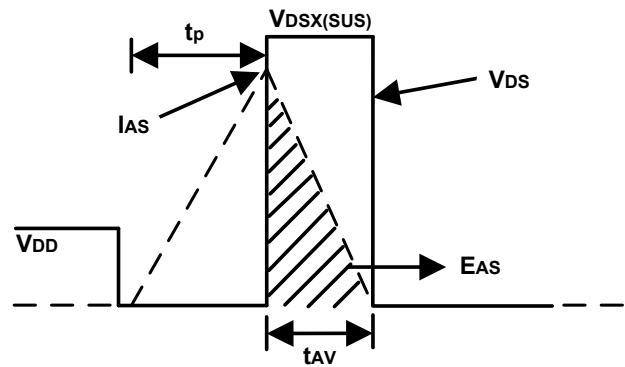
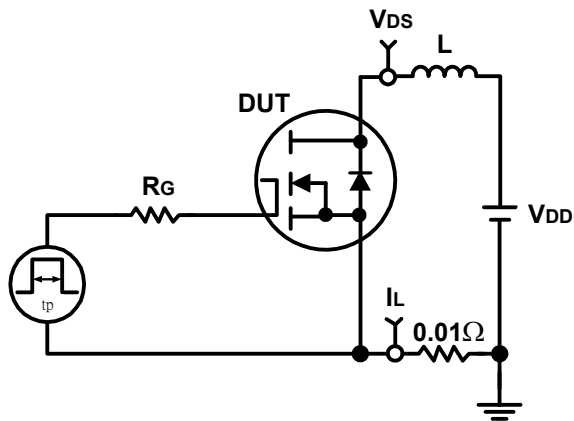
Drain-Source On Resistance


I_D - Drain Current (A)

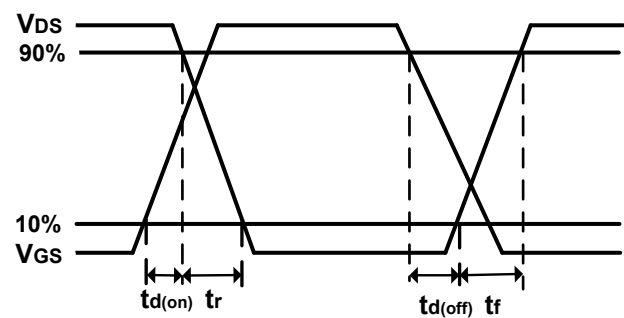
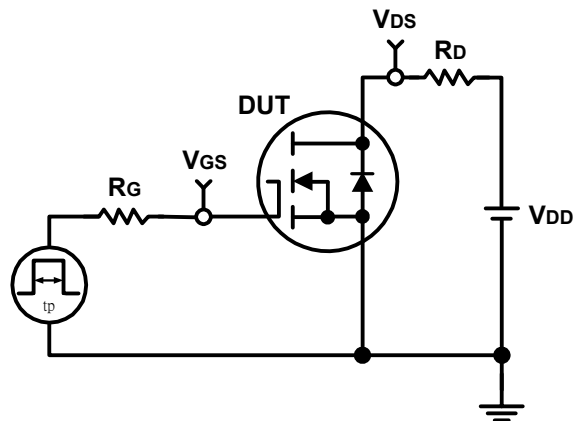
Typical Operating Characteristics(Cont.)

Capacitance

Gate Charge

Drain-Source On Resistance

Source-Drain Diode Forward


Avalanche Test Circuit and Waveforms

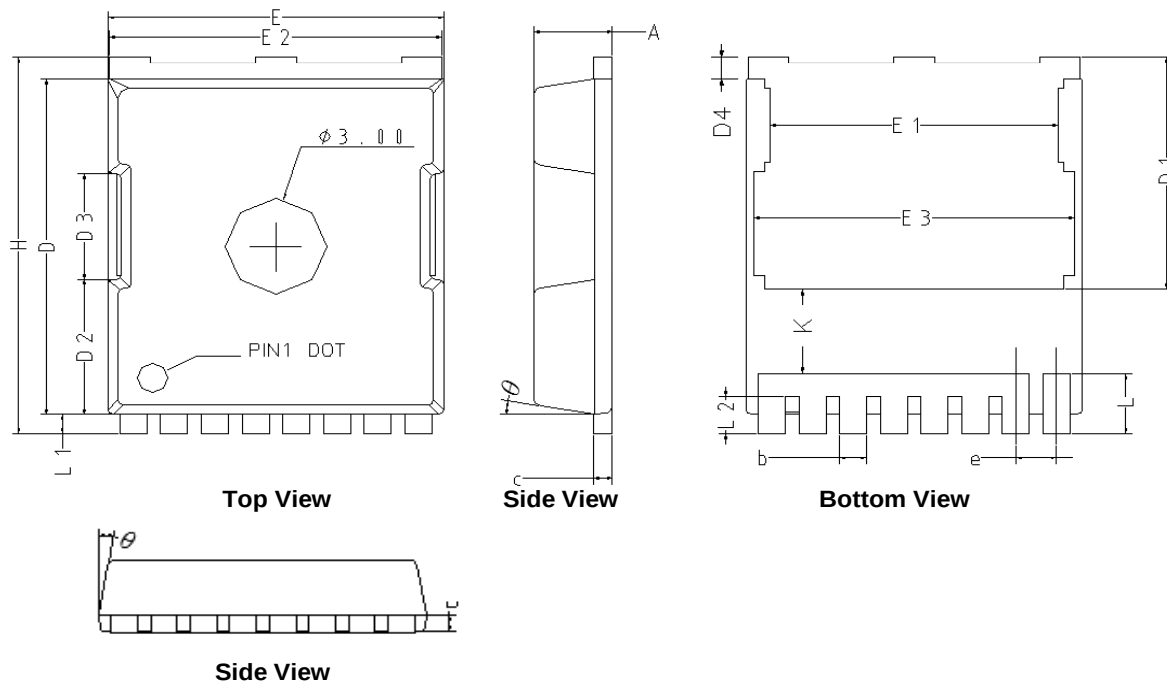


Switching Time Test Circuit and Waveforms



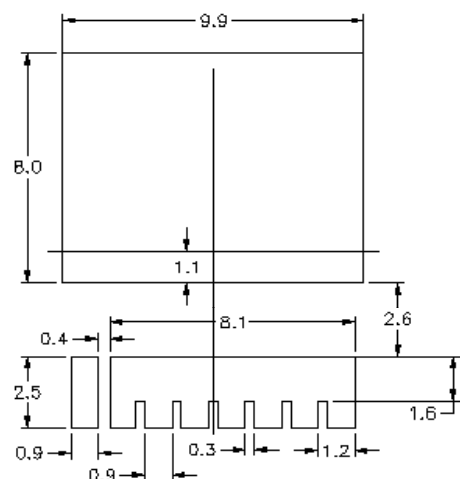
Package Information

TO-LL



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