

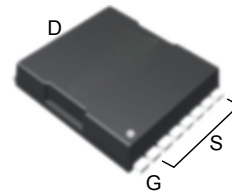
Features

- -60V/-120A
 $R_{DS(ON)} = 6\text{m}\Omega(\text{typ.}) @ V_{GS} = -10\text{V}$
 $R_{DS(ON)} = 7\text{m}\Omega(\text{typ.}) @ V_{GS} = -4.5\text{V}$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

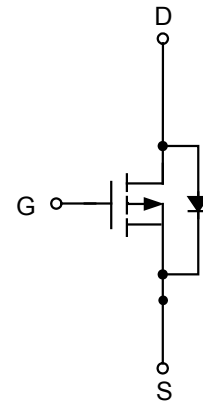
Applications

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

Pin Description



TO-LL



P-Channel MOSFET

Absolute Maximum Ratings (T_A=25°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	150	°C
T _{STG}	Storage Temperature Range	-55 to 150	
I _S	Diode Continuous Forward Current	T _C =25°C	A
I _D	Continuous Drain Current	T _C =25°C	A
		T _C =100°C	
I _{DM} ^a	Pulsed Drain Current	T _C =25°C	-360
P _D	Maximum Power Dissipation	T _C =25°C	375
		T _C =100°C	187
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	0.4
I _D	Continuous Drain Current	T _A =25°C	-12
		T _A =70°C	-9
P _D	Maximum Power Dissipation	T _A =25°C	3
		T _A =70°C	2.1
R _{θJA}	Thermal Resistance-Junction to Ambient	Steady State	50
I _{AS} ^b	Avalanche Current, Single pulse	L=0.5mH	-55
E _{AS} ^b	Avalanche Energy, Single pulse	L=0.5mH	756

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

Note b : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_J=25°C).

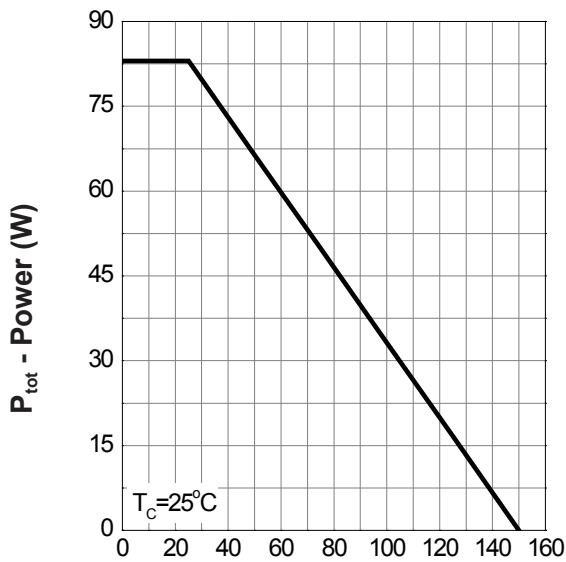
Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

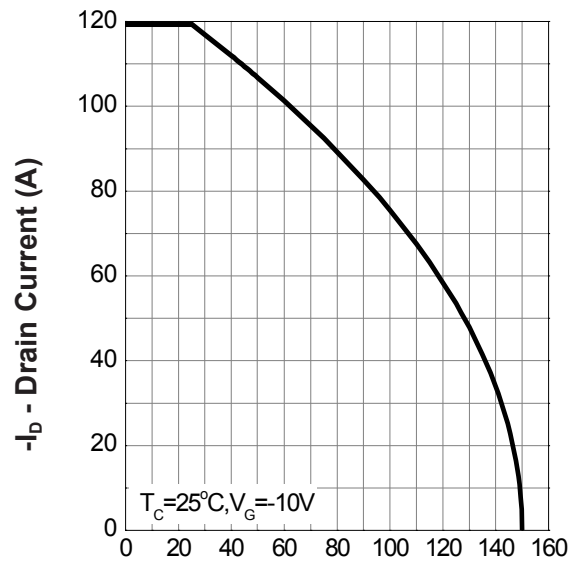
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250μA	-60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-48V, V _{GS} =0V T _J =85°C	-	-	-1 -30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250μA	-1.0	-1.7	-2.5	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} =-25A	-	6	7	mΩ
		V _{GS} =-4.5V, I _{DS} =-15A	-	7	9	mΩ
Diode Characteristics						
V _{SD} ^c	Diode Forward Voltage	I _{SD} =-1A, V _{GS} =0V	-	-0.7	-1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =-25A, dI _{SD} /dt=100A/μs	-	29	-	ns
Q _{rr}	Reverse Recovery Charge		-	18	-	nC
Dynamic Characteristics ^d						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,f=1MHz	-	3.2	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-20V, Frequency=1.0MHz	-	2780	3614	pF
C _{oss}	Output Capacitance		-	426	-	
C _{rss}	Reverse Transfer Capacitance		-	331	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-20V, R _L =20Ω, I _{DS} =-1A, V _{GEN} =-10V, R _G =6Ω	-	13	24	ns
t _r	Turn-on Rise Time		-	11	20	
t _{d(OFF)}	Turn-off Delay Time		-	94	170	
t _f	Turn-off Fall Time		-	48	87	
Gate Charge Characteristics ^d						
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-4.5V, I _{DS} =-25A	-	32	-	nC
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-10V, I _{DS} =-25A	-	63	88	
Q _{gs}	Gate-Source Charge		-	10.2	-	
Q _{gd}	Gate-Drain Charge		-	17.3	-	

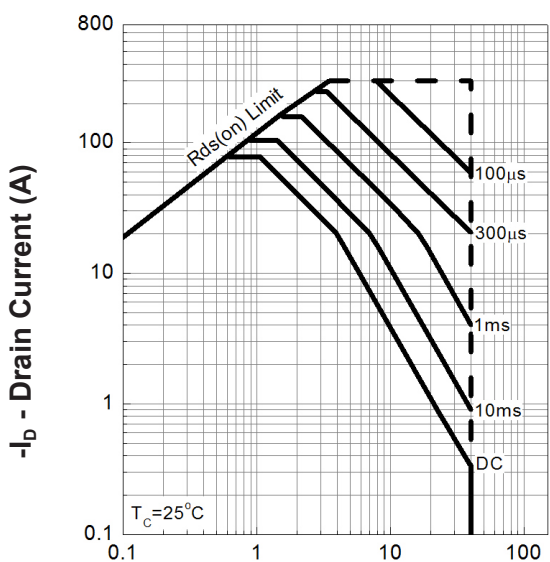
Note c : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

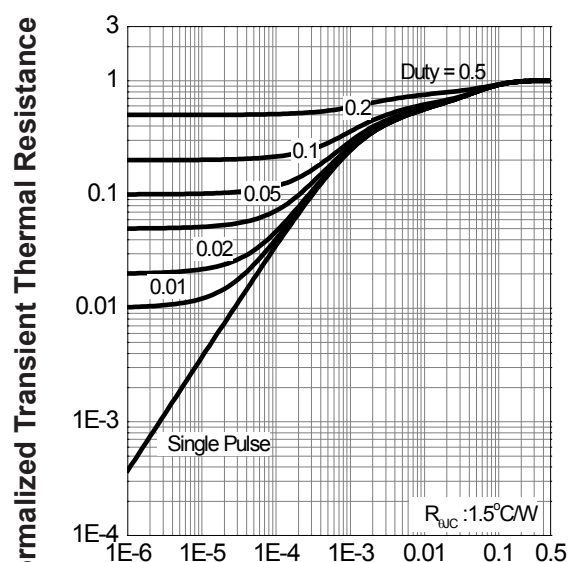
Note d : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

Power Dissipation

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

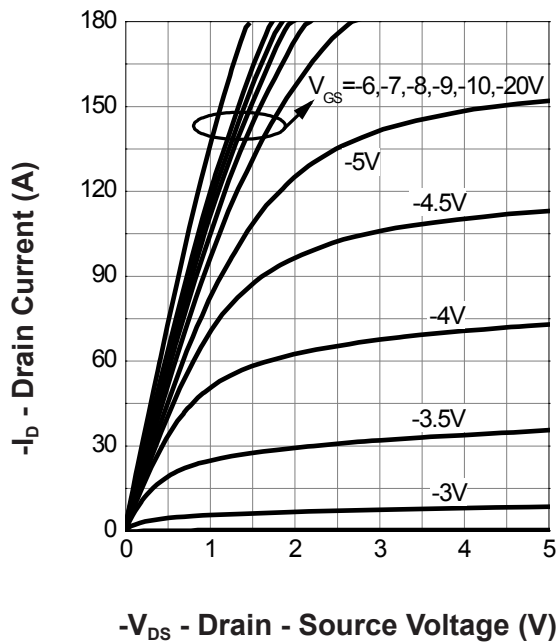
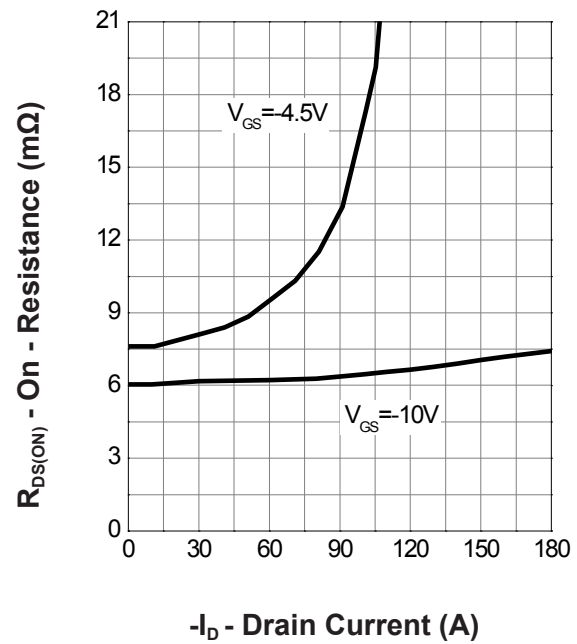
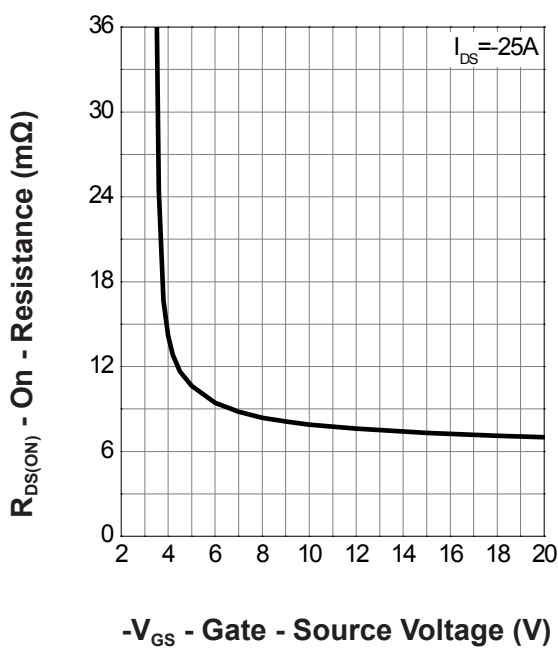
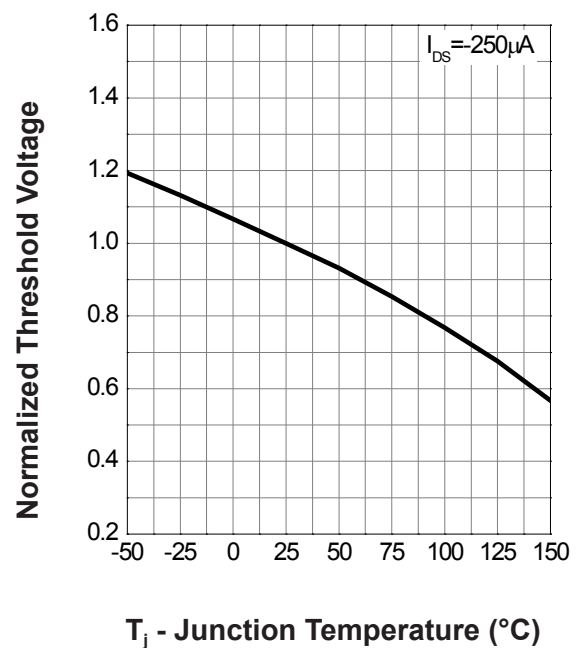
Drain Current

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

Safe Operation Area

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

Thermal Transient Impedance


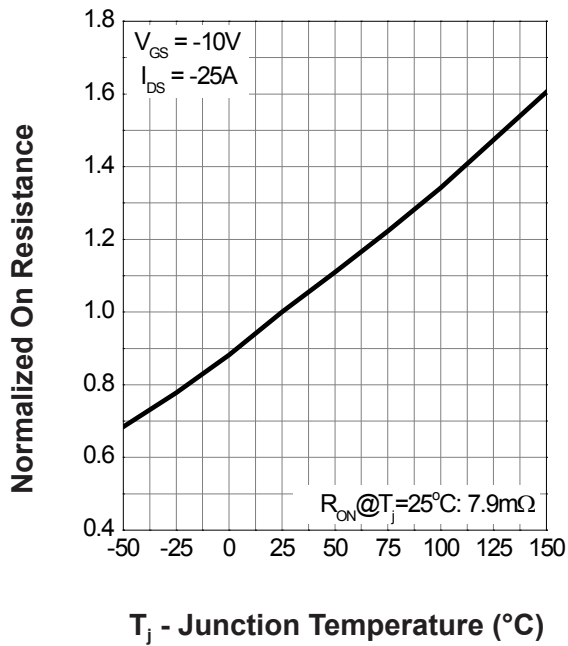
Square Wave Pulse Duration (sec)

Typical Operating Characteristics(Cont.)

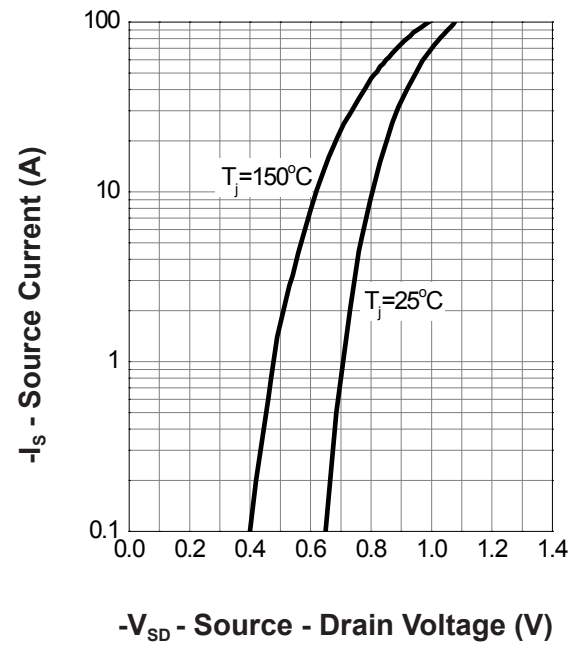
Output Characteristics

Drain-Source On Resistance

Gate-Source On Resistance

Gate Threshold Voltage


Typical Operating Characteristics(Cont.)

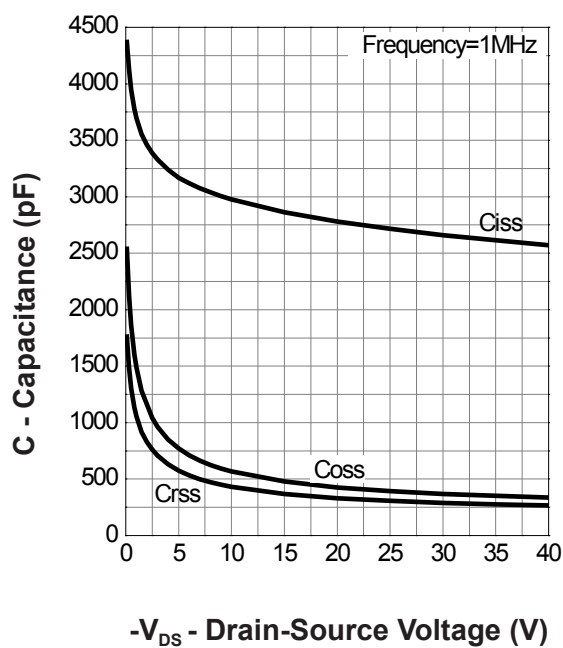
Drain-Source On Resistance



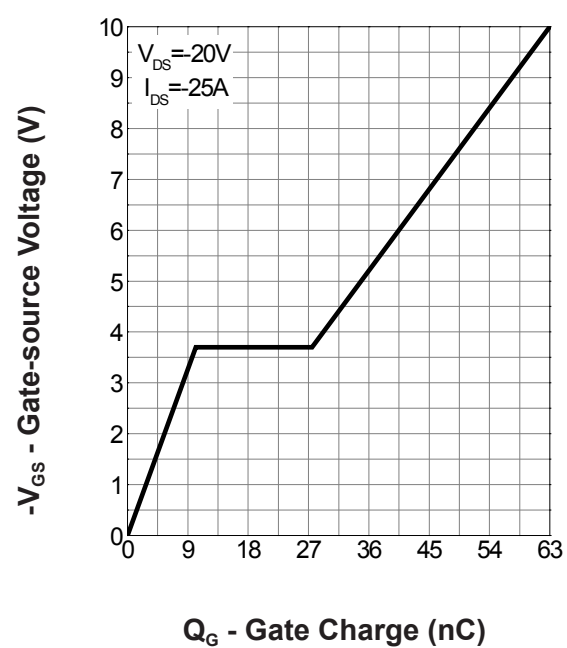
Source-Drain Diode Forward



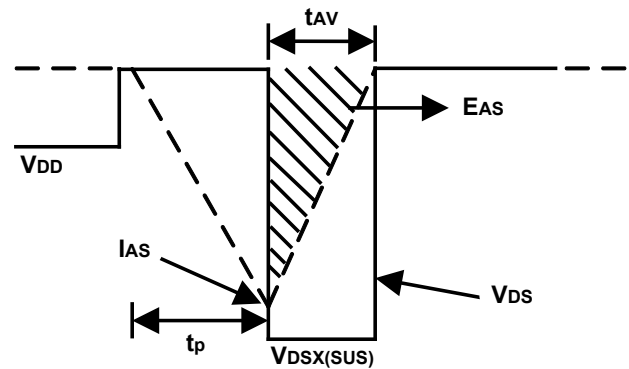
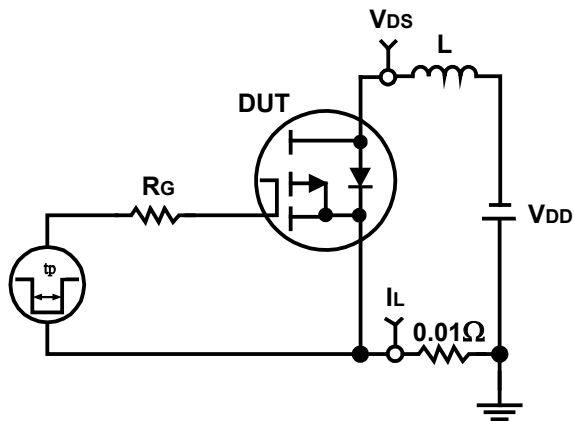
Capacitance



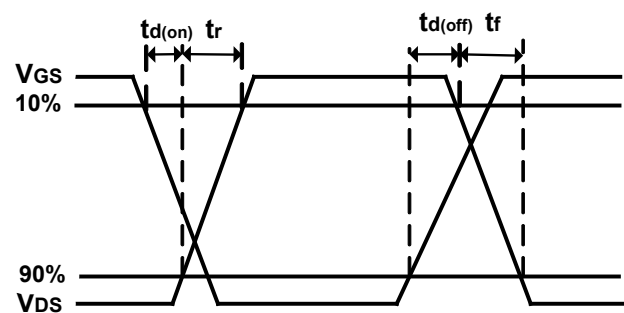
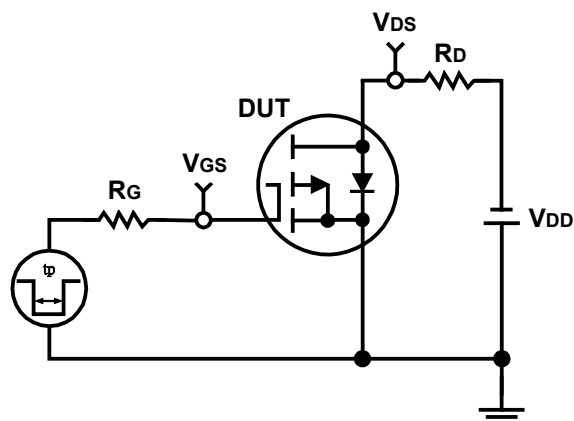
Gate Charge



Avalanche Test Circuit and Waveforms

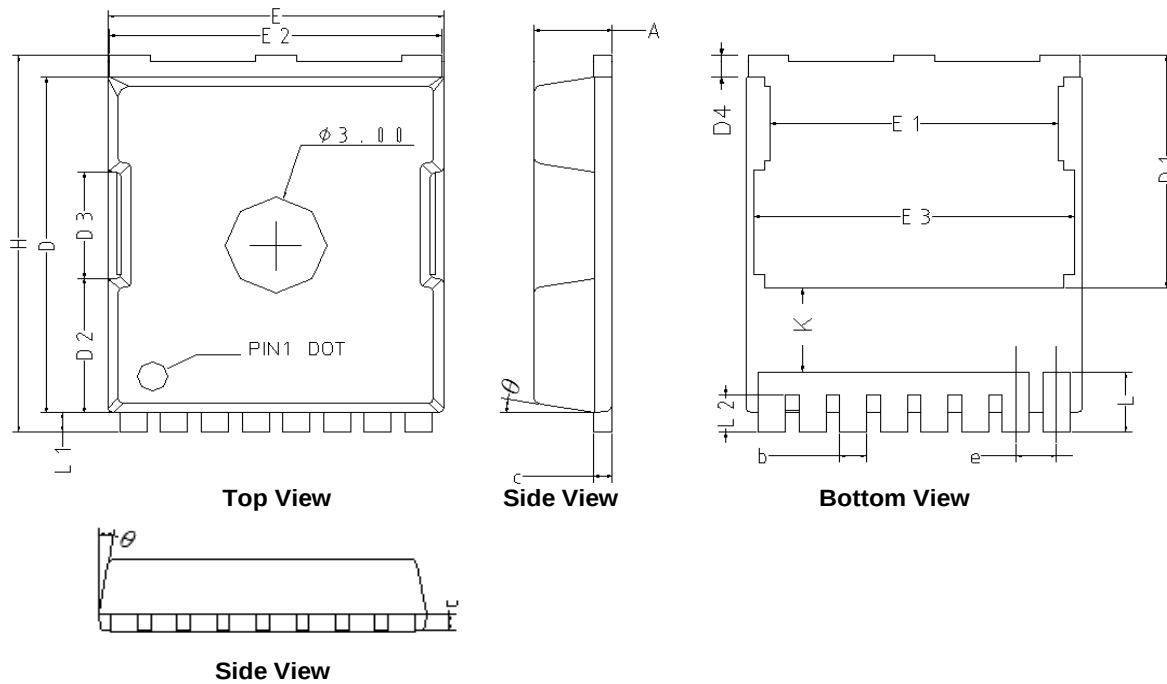


Switching Time Test Circuit and Waveforms



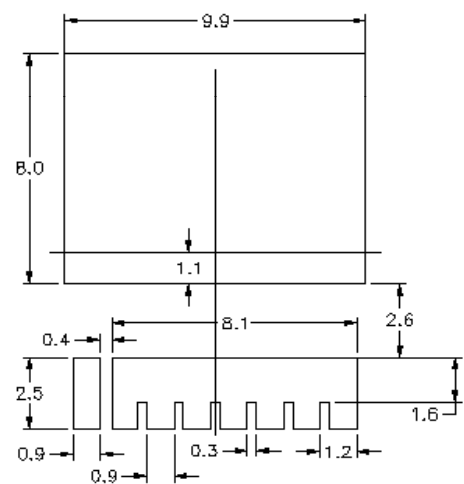
Package Information

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