

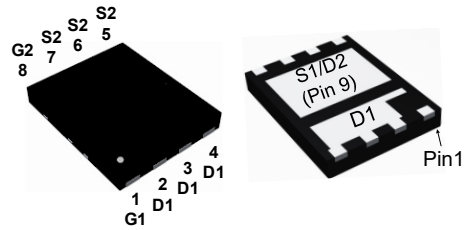
Features

- 40V/55A
 $R_{DS(ON)}=5.5m\Omega(\text{typ.})@V_{GS}=10V$
 $R_{DS(ON)}=8.5m\Omega(\text{typ.})@V_{GS}=4.5V$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)
- Moisture Sensitivity Level MSL1 (per JEDEC J-STD-020D)

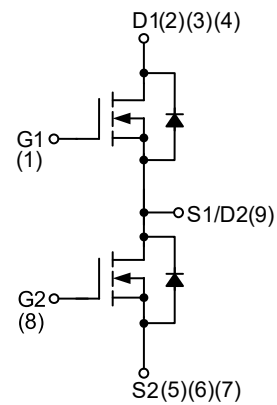
Applications

- 12V Automotive Systems
- Motor Control
- Transmission Control
- High Current,High Speed Switching

Pin Description



PDFN5*6-8L



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		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	
I _S	Diode Continuous Forward Current	T _C =25°C	55	A
I _D	Continuous Drain Current	T _C =25°C	55	A
		T _C =100°C	42	
I _{DM} ^b	Pulsed Drain Current	T _C =25°C	165	
P _D	Maximum Power Dissipation	T _C =25°C	25	W
		T _C =100°C	10	
R _{θJC}	Thermal Resistance-Junction to Case	Steady state	5	°C/W
R _{θJA} ^c	Thermal Resistance-Junction to Ambient	t ≤ 10s	45	°C/W
		Steady state	90	
I _{AS} ^d	Avalanche Current, Single pulse	L=0.1mH	40	A
E _{AS} ^d	Avalanche Energy, Single pulse	L=0.1mH	80	mJ

Note a : Max. continuous current is limited by bonding wire.

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

Note c : Surface mounted on 1in^2 pad area, steady state $t = 999\text{s}$.

Note d : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_J=25^{\circ}\text{C}$).

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

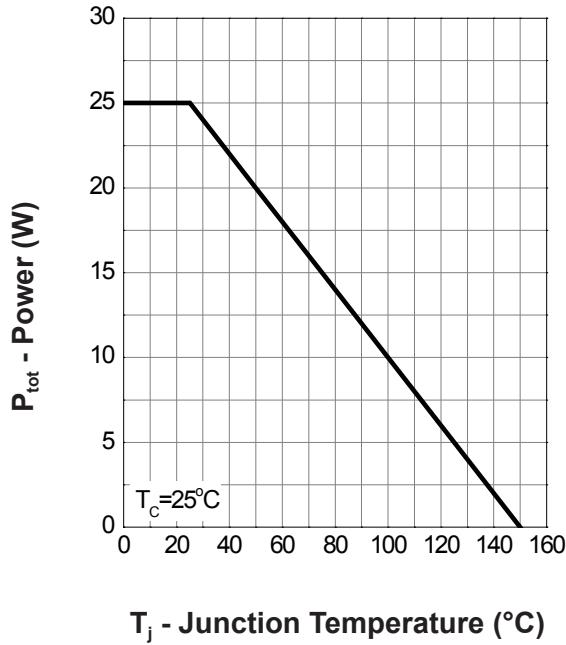
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =32V, V _{GS} =0V T _J =85°C	-	-	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.4	1.8	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^e	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =20A T _J =125°C	-	5.5 8.9	6.9 -	mΩ
		V _{GS} =4.5V, I _{DS} =15A	-	8.5	9.5	
Gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =15A	-	26	-	S
Diode Characteristics						
V _{SD} ^e	Diode Forward Voltage	I _{SD} =1A, V _{GS} =0V	-	0.75	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =20A, dI _{SD} /dt=100A/μs	-	23	-	ns
t _a	Charge Time		-	13	-	
t _b	Discharge Time		-	10	-	
Q _{rr}	Reverse Recovery Charge		-	13	-	nC
Dynamic Characteristics ^f						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz	-	1	2	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz	-	1370	1781	pF
C _{oss}	Output Capacitance		-	317	-	
C _{rss}	Reverse Transfer Capacitance		-	46	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, R _L =20Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	13.8	25	ns
t _r	Turn-on Rise Time		-	8	15	
t _{d(OFF)}	Turn-off Delay Time		-	30	54	
t _f	Turn-off Fall Time		-	21	38	
Gate Charge Characteristics ^f						
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V, I _{DS} =20A	-	22	-	nC
Q _{gth}	Threshold Gate Charge		-	2.6	-	
Q _{gs}	Gate-Source Charge		-	4.7	-	
Q _{gd}	Gate-Drain Charge		-	3	-	

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

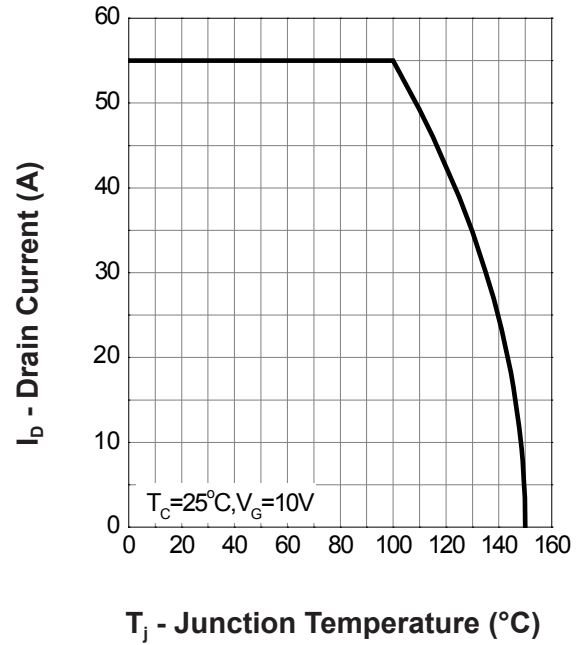
Note f : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

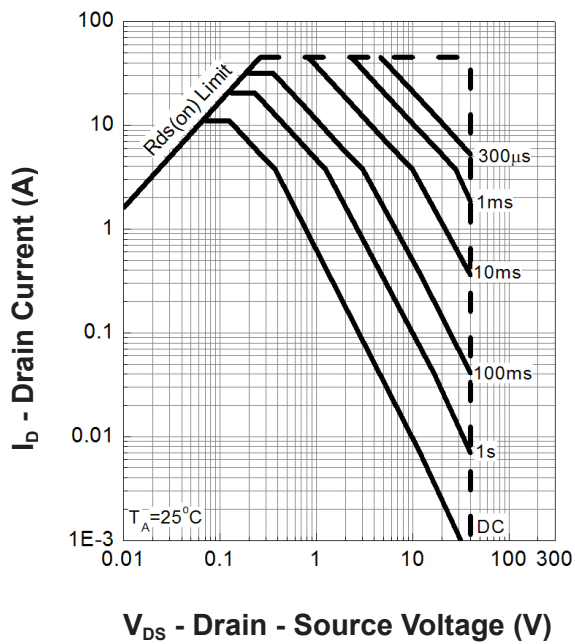
Power Dissipation



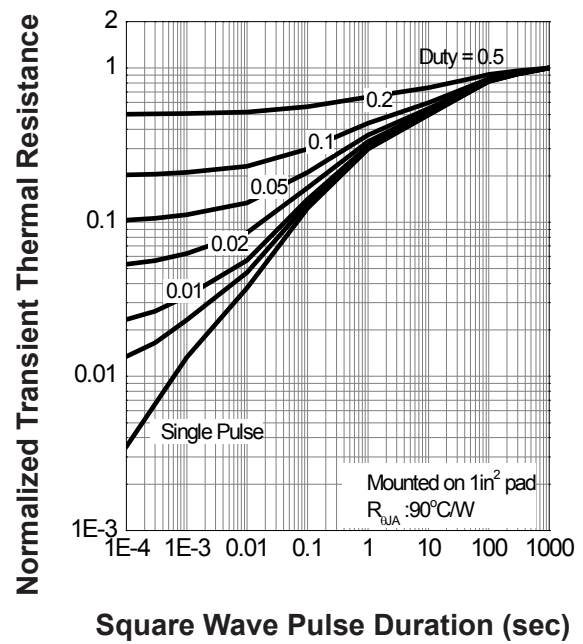
Drain Current



Safe Operation Area

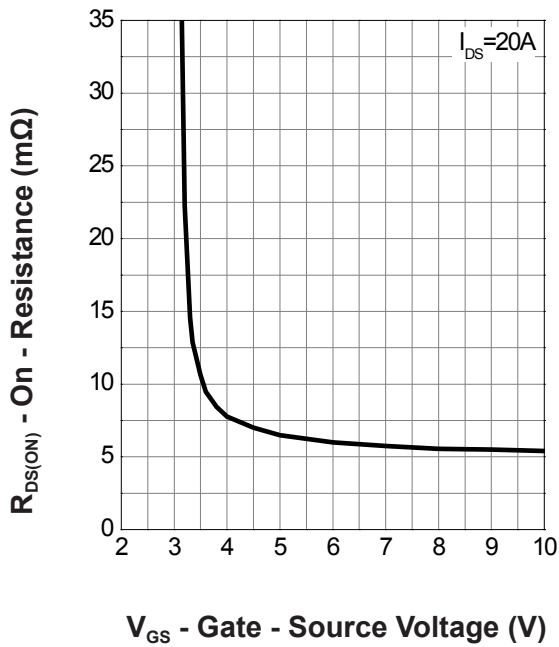


Thermal Transient Impedance

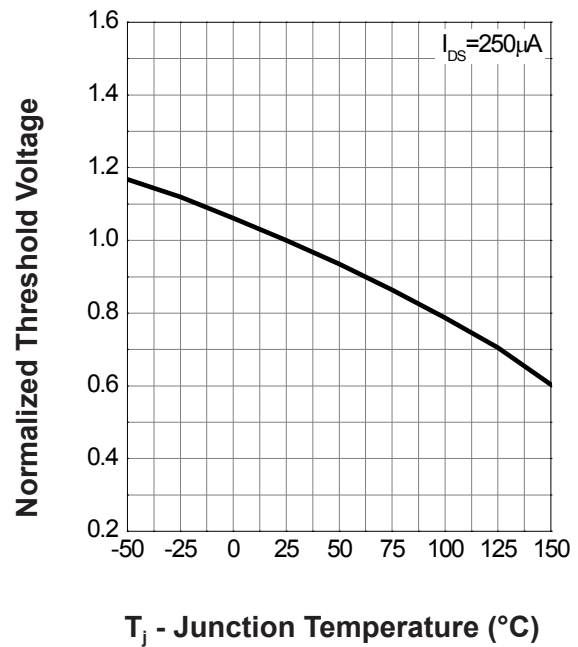


Typical Operating Characteristics(Cont.)

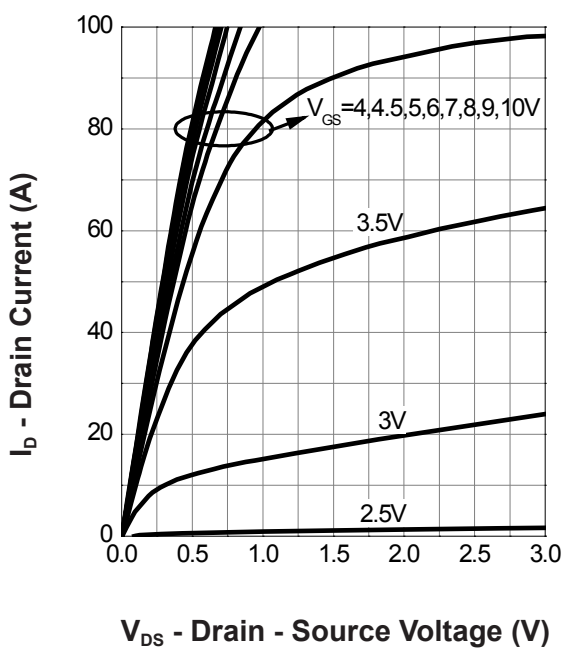
Gate-Source On Resistance



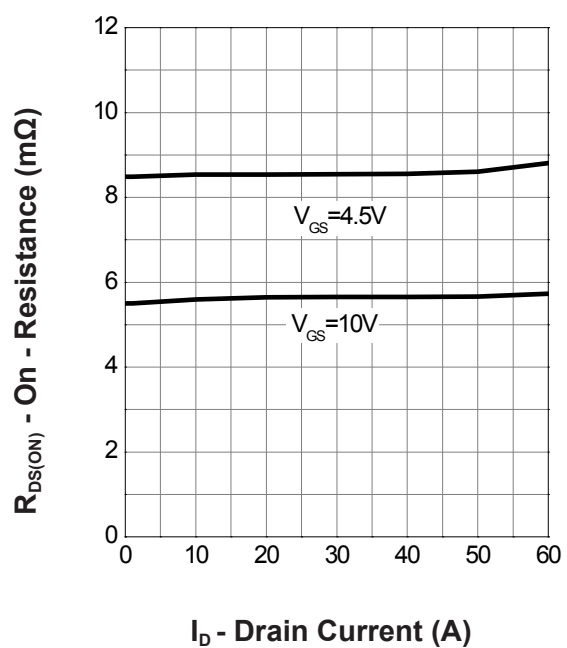
Gate Threshold Voltage



Output Characteristics

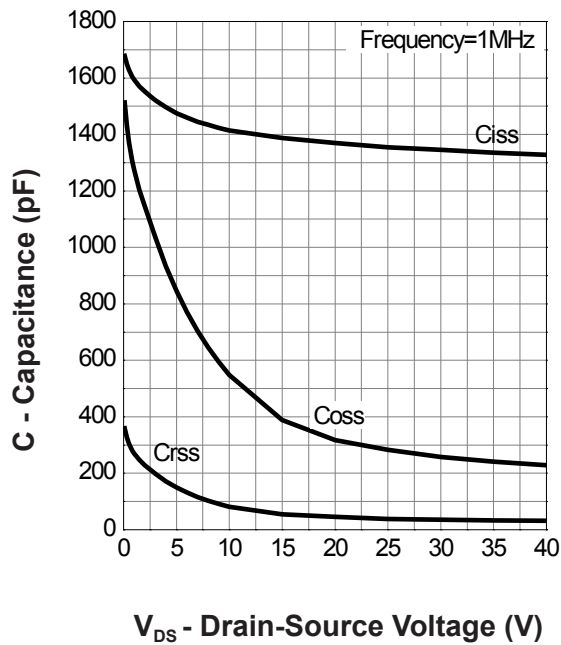


Drain-Source On Resistance

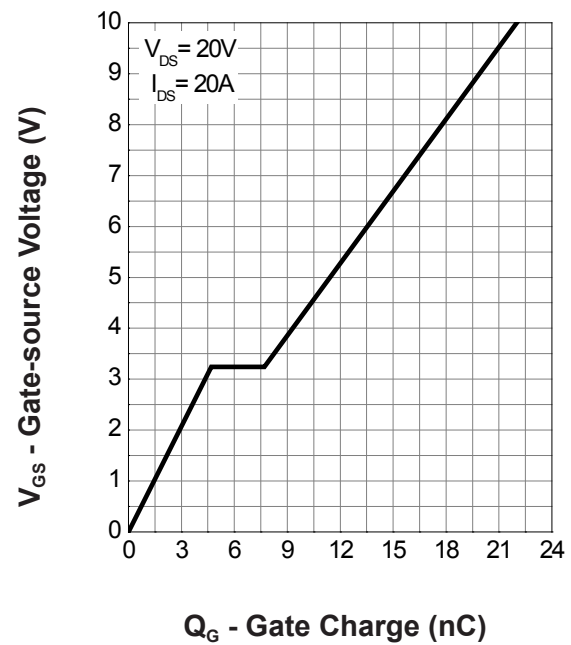


Typical Operating Characteristics(Cont.)

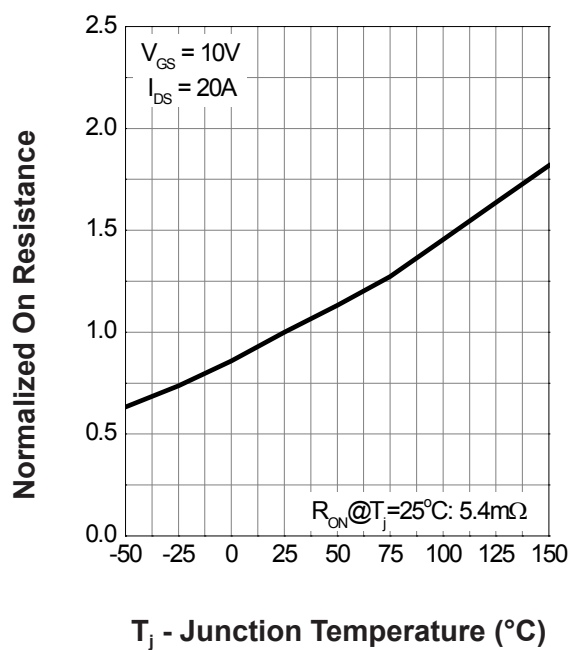
Capacitance



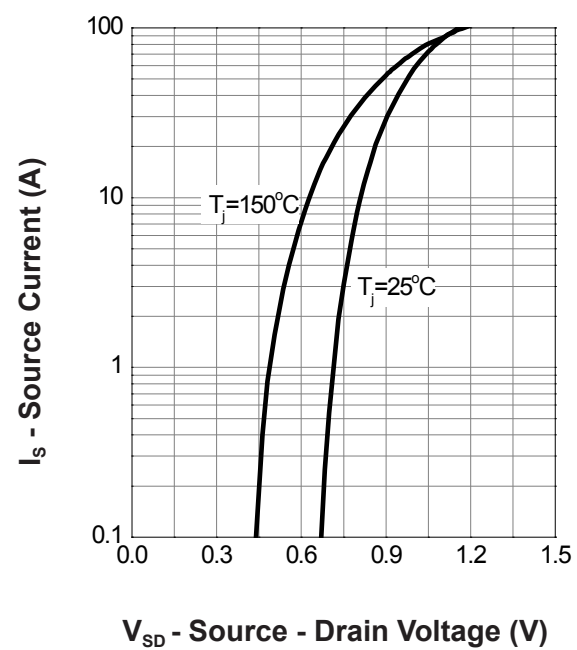
Gate Charge



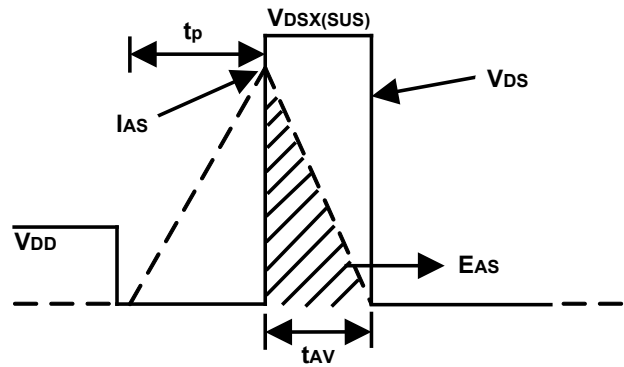
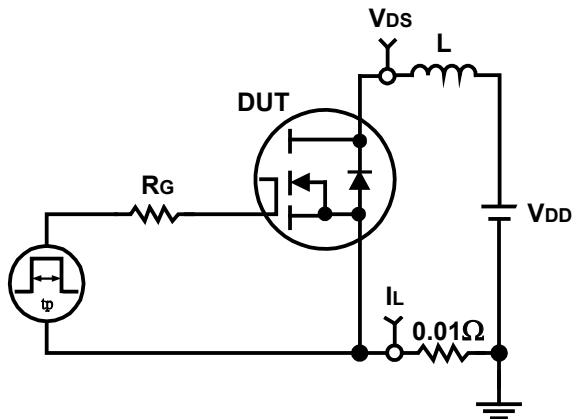
Drain-Source On Resistance



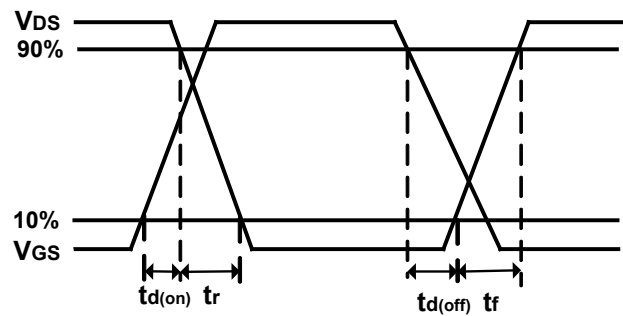
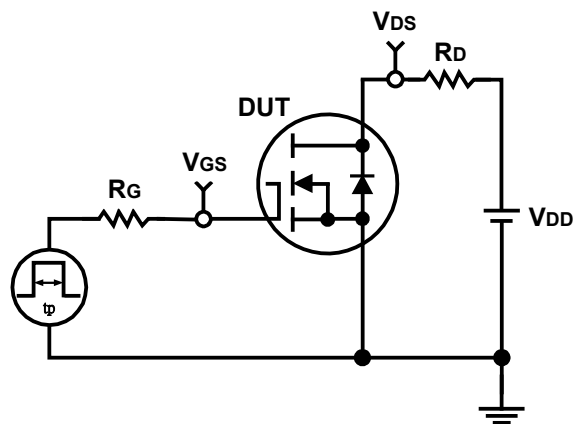
Source-Drain Diode Forward

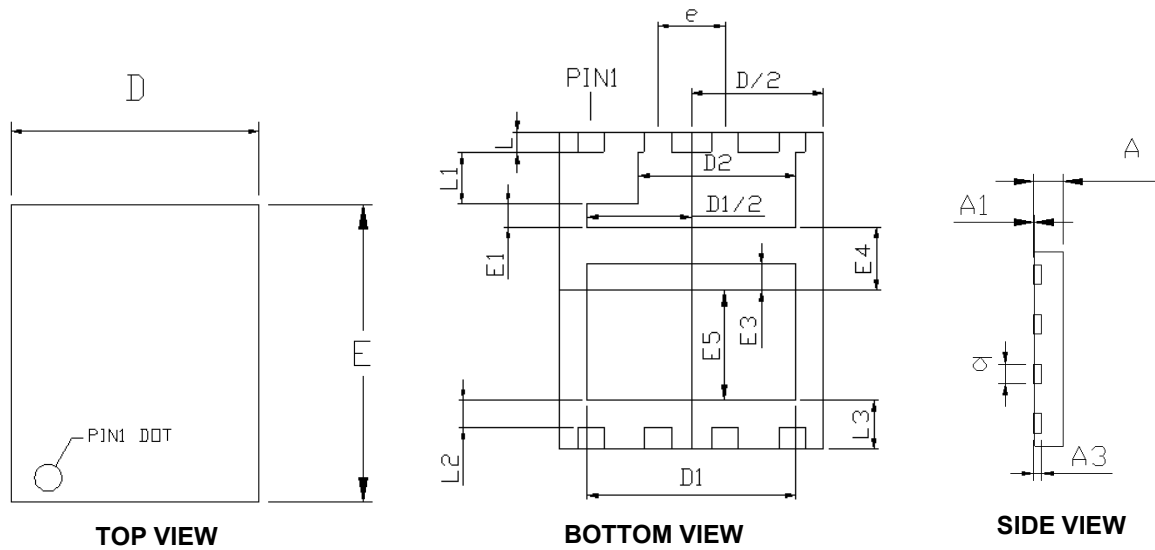


Avalanche Test Circuit and Waveforms



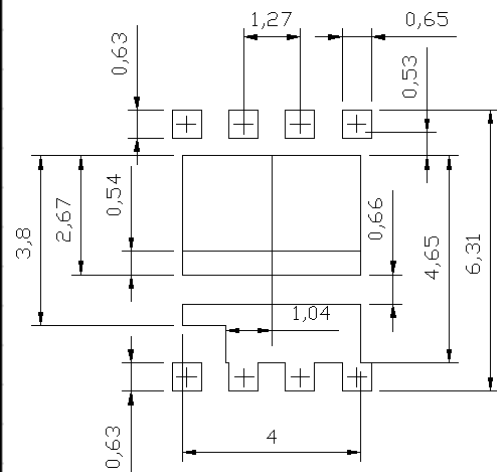
Switching Time Test Circuit and Waveforms





SYMBOLS	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	0.90	0.0276	0.0354
A1	0.00	0.05	0.000	0.002
A3	0.15	0.25	0.006	0.010
b	0.45	0.55	0.018	0.022
D	4.90	5.10	0.193	0.201
D1	3.80	4.05	0.078	0.088
D2	2.85	3.13	0.110	0.123
E	5.90	6.10	0.232	0.240
E1	0.28	0.58	0.011	0.023
E2	2.53	2.63	0.100	0.104
E3	0.35	0.60	0.014	0.024
E4	1.05	1.30	0.041	0.051
E5	1.93	2.18	0.076	0.086
e	1.27 BSC		0.050 BSC	
L	0.30	0.50	0.012	0.020
L1	0.92	1.02	0.036	0.040
L2	0.47	0.57	0.018	0.022
L3	0.87	0.97	0.034	0.038

RECOMMENDED LAND PATTERN



UNIT: mm