

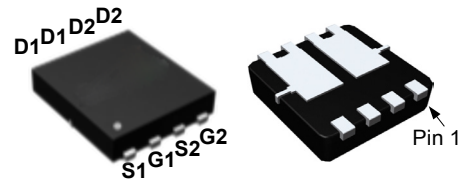
Features

- 40V/45A
 $R_{DS(ON)} = 7\text{m}\Omega(\text{typ.}) @ V_{GS} = 10\text{V}$
 $R_{DS(ON)} = 9\text{m}\Omega(\text{typ.}) @ V_{GS} = 4.5\text{V}$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)
- Moisture Sensitivity Level MSL1 (per JEDEC J-STD-020D)

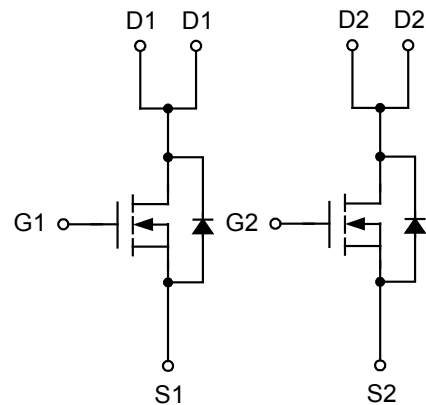
Applications

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

Pin Description



DFN5x6C-8_EP2



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	45	A
I _D	Continuous Drain Current	T _C =25°C	45	A
		T _C =100°C	18	
I _{DM} ^b	Pulsed Drain Current	T _C =25°C	135	
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
I _D	Continuous Drain Current	T _A =25°C	10.7	A
		T _A =70°C	8.5	
I _{DM} ^b	Pulsed Drain Current	T _C =25°C	43	
P _D	Maximum Power Dissipation	T _A =25°C	1.4	W
		T _A =70°C	0.9	
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	28	A
E _{AS} ^d	Avalanche Energy, Single pulse	L=0.1mH	39.2	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 $T_J=25^{\circ}\text{C}$).

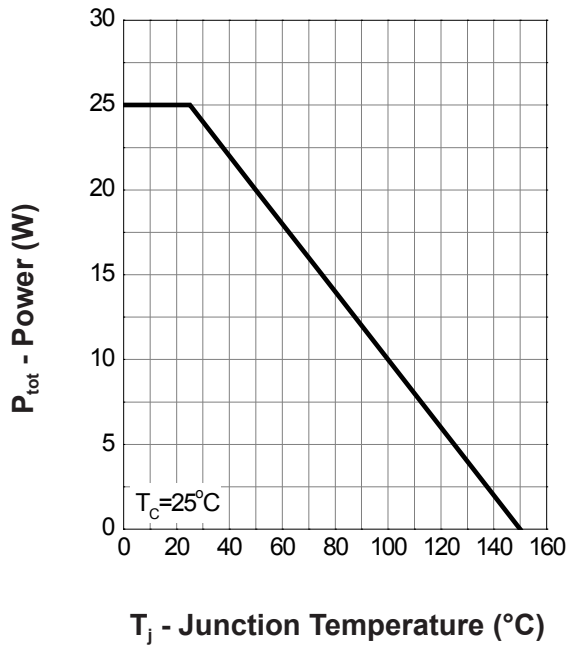
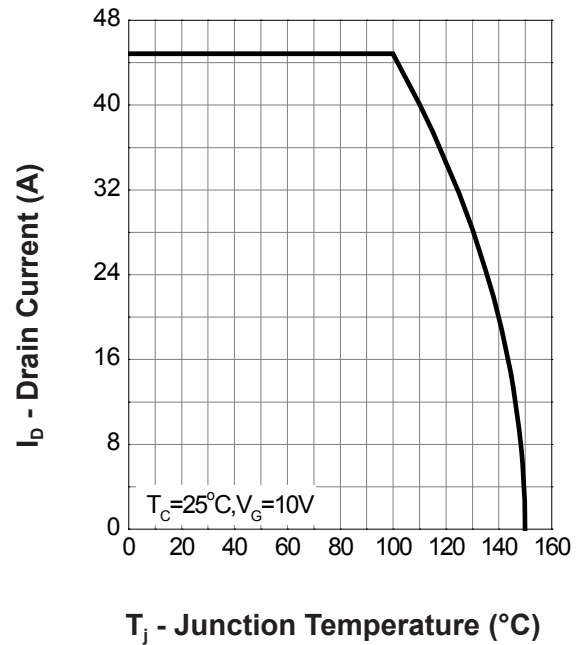
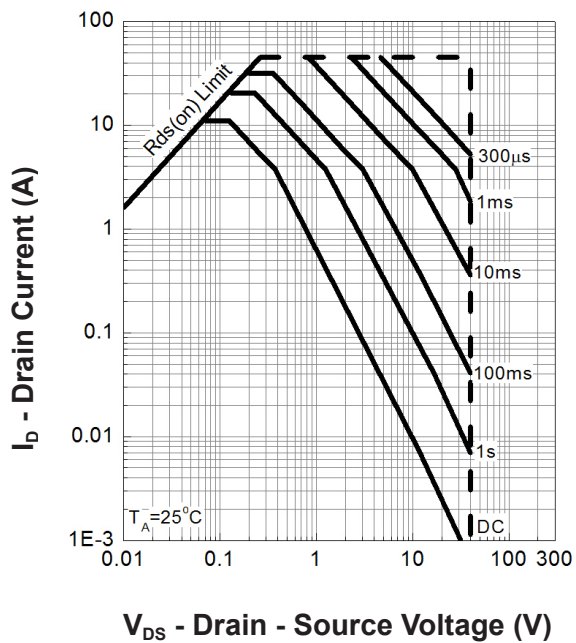
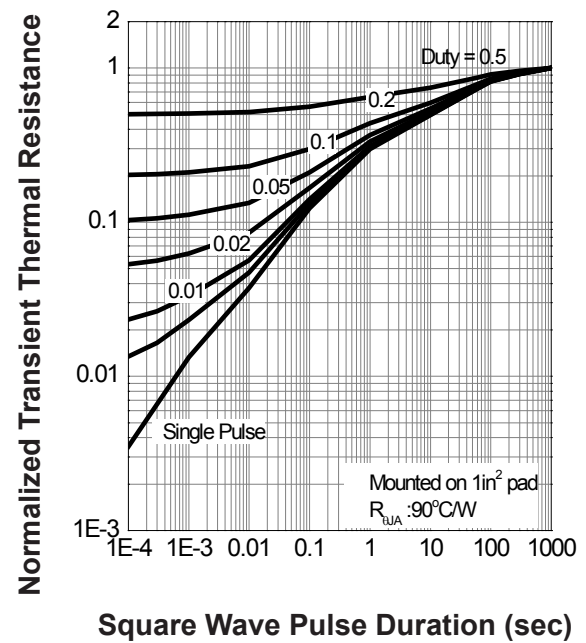
Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

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	1.0	1.5	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	-	7 9.2	9 -	mΩ
		V _{GS} =4.5V, I _{DS} =15A	-	9	13	
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	-	2370	2781	pF
C _{oss}	Output Capacitance		-	217	-	
C _{rss}	Reverse Transfer Capacitance		-	146	-	
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	-	

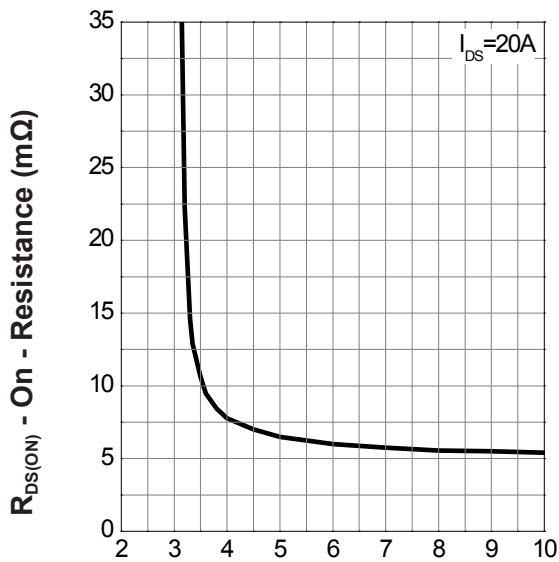
Note e : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

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

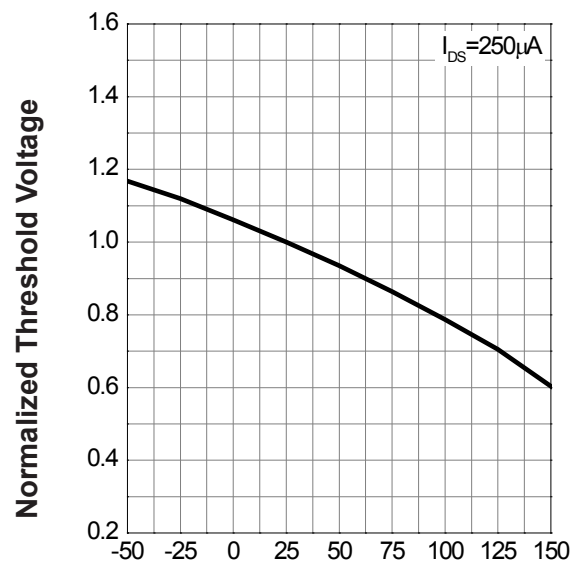
Typical Operating Characteristics

Power Dissipation

Drain Current

Safe Operation Area

Thermal Transient Impedance


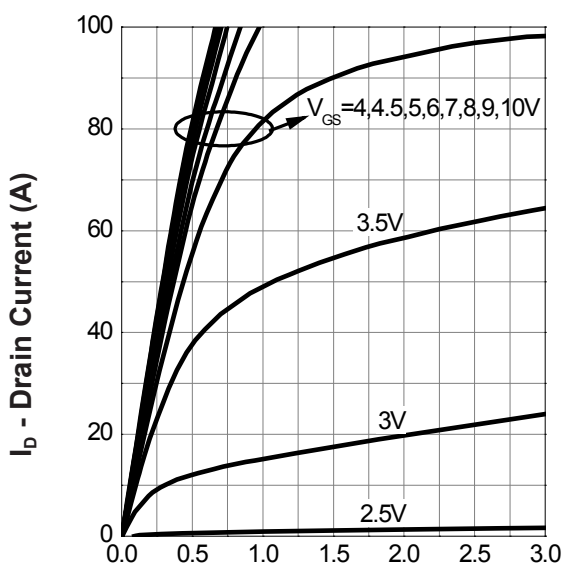
Typical Operating Characteristics(Cont.)

Gate-Source On Resistance


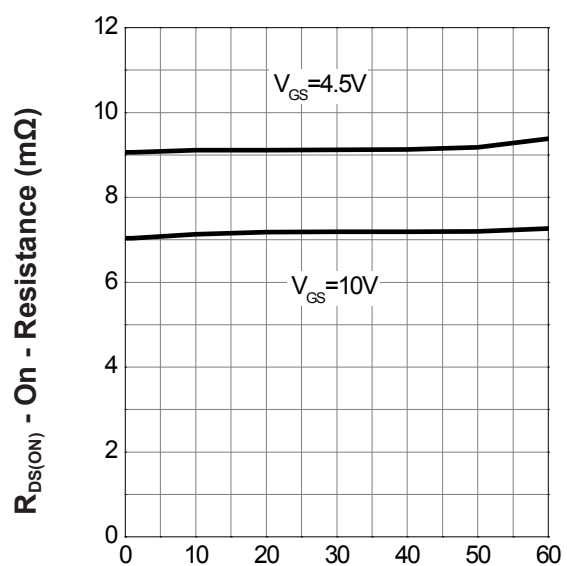
V_{GS} - Gate - Source Voltage (V)

Gate Threshold Voltage


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

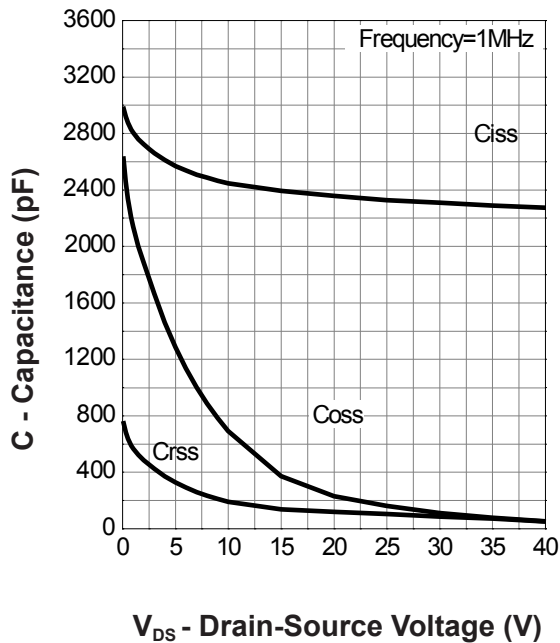
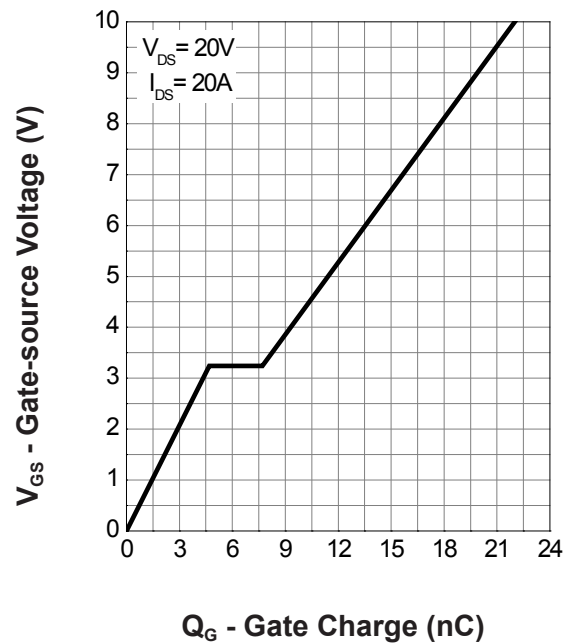
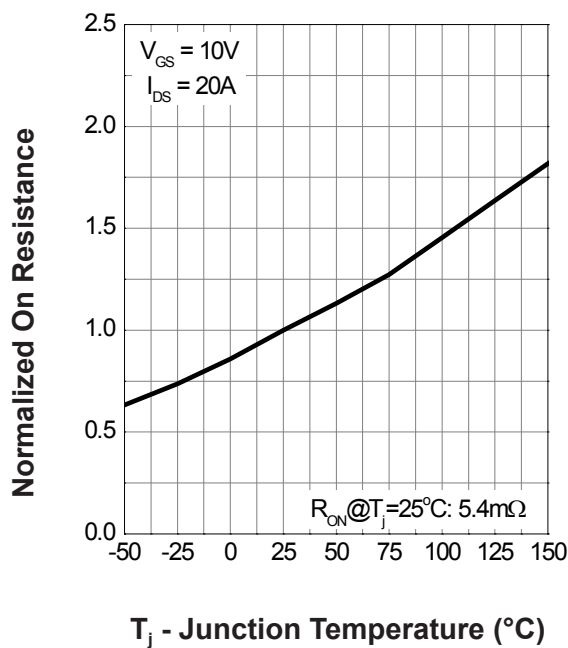
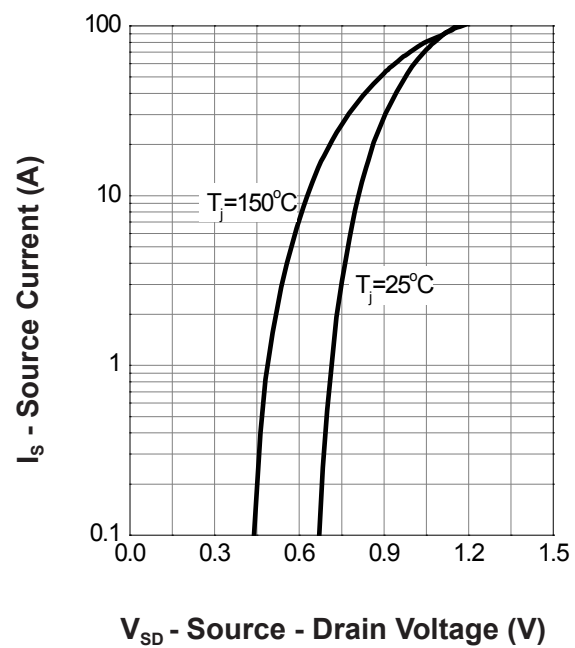
Output Characteristics


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

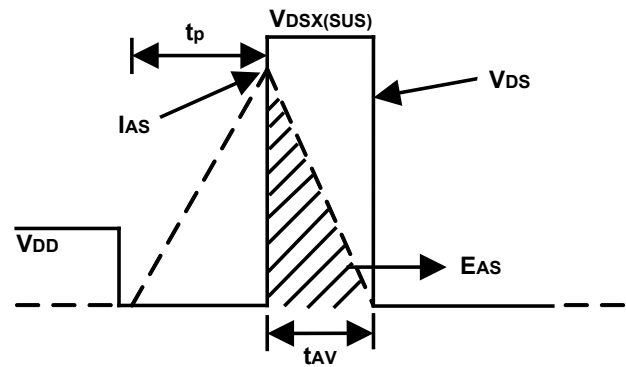
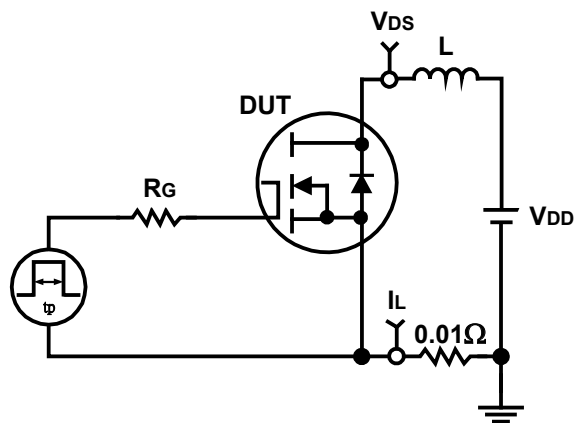
Drain-Source On Resistance


I_D - Drain Current (A)

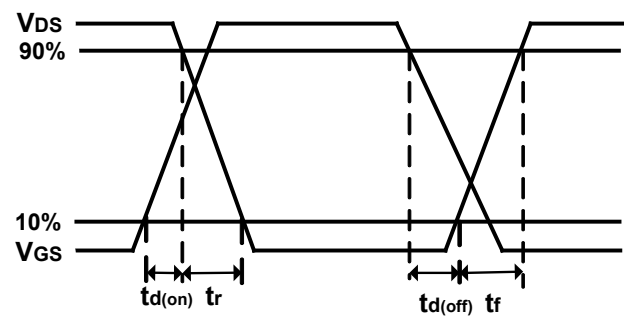
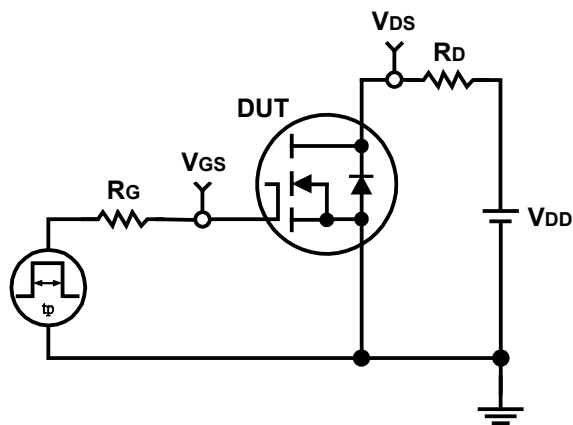
Typical Operating Characteristics(Cont.)

Capacitance

Gate Charge

Drain-Source On Resistance

Source-Drain Diode Forward


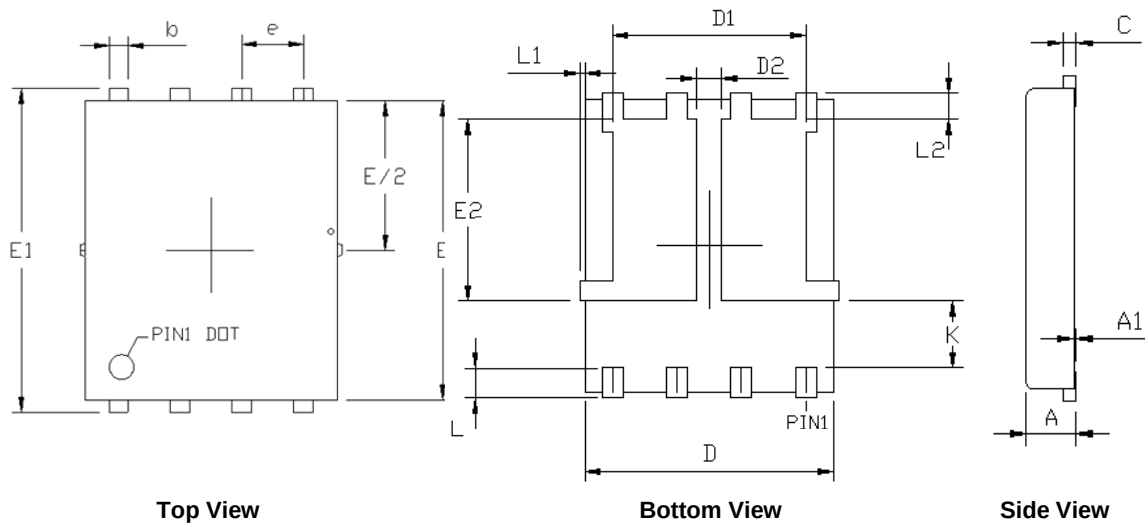
Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms

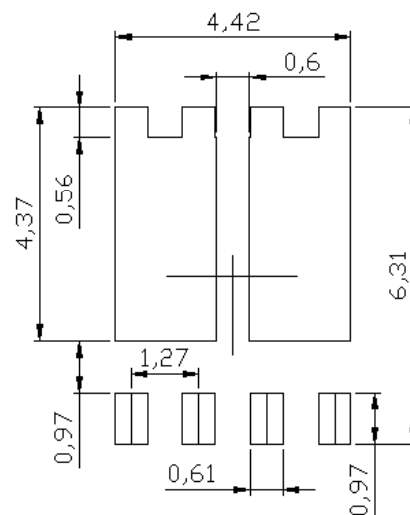


Package Information

DFN5x6C-8


SYMBOLS	DFN5x6C-8_EP2_P			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.900	1.200	0.035	0.047
A1	0.000	0.050	0.000	0.002
b	0.300	0.500	0.012	0.020
c	0.150	0.300	0.006	0.012
D	4.800	5.000	0.189	0.197
D1	3.550	4.550	0.140	0.179
D2	0.500	0.910	0.020	0.036
E	5.650	5.850	0.222	0.230
E1	5.900	6.200	0.232	0.244
E2	3.200	3.780	0.126	0.149
e	1.27 BSC		0.050 BSC	
K	1.100	-	0.043	-
L	0.500	0.800	0.020	0.031
L1	0.000	0.150	0.000	0.006
L2	0.325	0.610	0.013	0.024

RECOMMENDED LAND PATTERN



UNIT: mm