

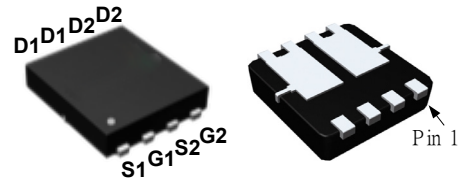
Features

- N Channel : 100V/12A,
 $R_{DS(ON)}=100m\Omega(typ.)@V_{GS}=10V$
 $R_{DS(ON)}=110m\Omega(typ.)@V_{GS}=4.5V$
- P Channel : -100V/-12A,
 $R_{DS(ON)}=150m\Omega(typ.)@V_{GS}=-10V$
 $R_{DS(ON)}=170m\Omega(typ.)@V_{GS}=-4.5V$
- 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)

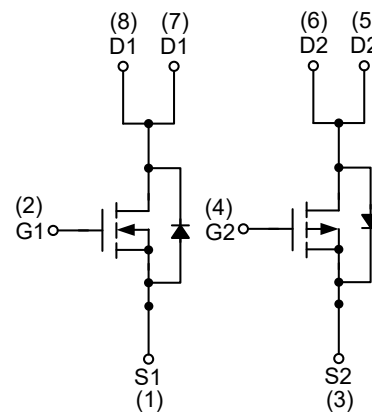
Applications

- DC Motor Control.

Pin Description



DFN3.3x3.3G-8_EP2



N-Channel MOSFET

P-Channel MOSFET

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter		N Channel	P Channel	Unit
Common Ratings					
V _{DSS}	Drain-Source Voltage		100	-100	V
V _{GSS}	Gate-Source Voltage		±20	±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	12	-12	A
I _D	Continuous Drain Current	T _C =25°C	12	-12	A
		T _C =100°C	4.8	-4.8	
I _{DM} ^a	Pulse Drain Current Tested	T _C =25°C	36	-36	A
P _D	Maximum Power Dissipation	T _C =25°C	17.8		W
		T _C =100°C	7.1		
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	7		°C/W
I _D	Continuous Drain Current	T _A =25°C	2	-1.9	A
		T _A =70°C	1.6	-1.5	
P _D	Maximum Power Dissipation	T _A =25°C	1.47		W
		T _A =70°C	0.94		
R _{θJA} ^b	Thermal Resistance-Junction to Ambient	Steady State	85		°C/W
I _{AS} ^c	Avalanche Current, Single pulse	L=0.5mH	5	-9	A
E _{AS} ^c	Avalanche Energy, Single pulse	L=0.5mH	6.25	20	mJ

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

Note b : Surface Mounted on 1in^2 pad area.

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

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

Symbol	Parameter	Test Conditions	N Channel			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	100	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =80V, V _{GS} =0V	-	-	1	μA
		T _J =85°C	-	-	30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1	1.8	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^d	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =4A	-	100	110	mΩ
		V _{GS} =4.5V, I _{DS} =3A	-	110	138	
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =2A, V _{GS} =0V	-	0.8	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} =4A, dI _{SD} /dt=100A/μs	-	25	-	ns
Q _{rr}	Reverse Recovery Charge		-	32	-	nC
Dynamic Characteristics ^e						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,f=1MHz	-	2.5		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, Frequency=1.0MHz	-	440	570	pF
C _{oss}	Output Capacitance		-	30	-	
C _{rss}	Reverse Transfer Capacitance		-	16	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =30V, R _L =30Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	9	17	ns
t _r	Turn-on Rise Time		-	7	13	
t _{d(OFF)}	Turn-off Delay Time		-	18	33	
t _f	Turn-off Fall Time		-	4	8	
Gate Charge Characteristics ^e						
Q _g	Total Gate Charge	V _{DS} =50V, V _{GS} =4.5V, I _{DS} =4A	-	4.7	-	nC
Q _g	Total Gate Charge	V _{DS} =50V, V _{GS} =10V, I _{DS} =4A	-	10	14	
Q _{gs}	Gate-Source Charge		-	1.7	-	
Q _{gd}	Gate-Drain Charge		-	1.8	-	

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

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

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

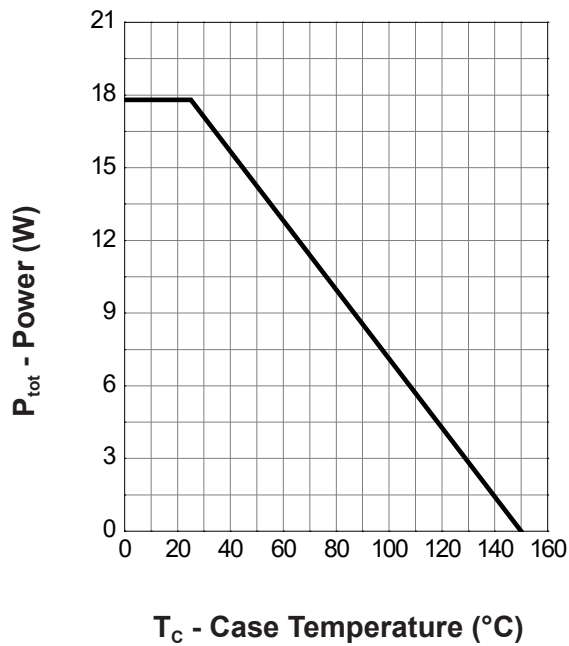
Symbol	Parameter	Test Conditions	P Channel			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250μA	-100	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-80V, V _{GS} =0V	-	-	-1	μA
		T _J =85°C	-	-	-30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	-1	-1.8	-2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^d	Drain-Source On-state Resistance	V _{GS} =-10V, I _{DS} =-3A	-	150	180	mΩ
		V _{GS} =-4.5V, I _{DS} =-2A	-	170	210	
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =-1.5A, V _{GS} =0V	-	-0.8	-1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} =-3A, dI _{SD} /dt=100A/μs	-	29	-	ns
Q _{rr}	Reverse Recovery Charge		-	39	-	nC
Dynamic Characteristics ^e						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	10	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-30V, Frequency=1.0MHz	-	700	910	pF
C _{oss}	Output Capacitance		-	45	-	
C _{rss}	Reverse Transfer Capacitance		-	27	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-30V, R _L =-30Ω, I _{DS} =-1A, V _{GEN} =-10V, R _G =6Ω	-	9	16.2	ns
t _r	Turn-on Rise Time		-	5	9	
t _{d(OFF)}	Turn-off Delay Time		-	54	97	
t _f	Turn-off Fall Time		-	32	58	
Gate Charge Characteristics ^e						
Q _g	Total Gate Charge	V _{DS} =-50V, V _{GS} =-4.5V, I _{DS} =-3A	-	7.8	-	nC
Q _g	Total Gate Charge	V _{DS} =-50V, V _{GS} =-10V, I _{DS} =-3A	-	16	22.4	
Q _{gs}	Gate-Source Charge		-	2.5	-	
Q _{gd}	Gate-Drain Charge		-	3.1	-	

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

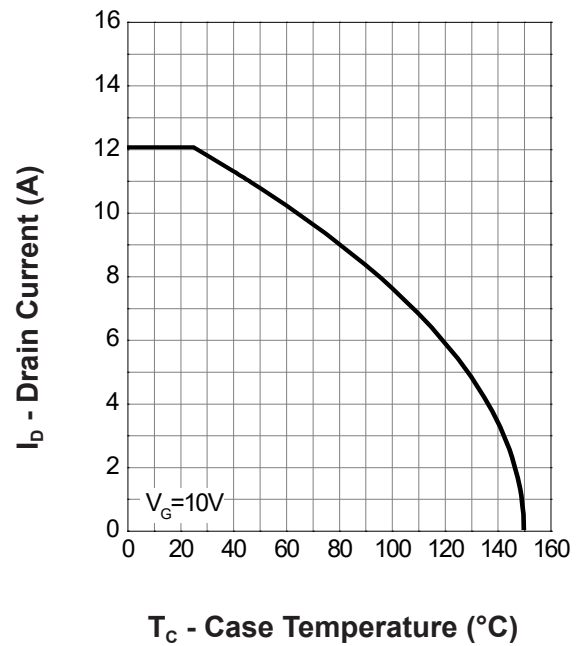
Note e : Guaranteed by design, not subject to production testing.

N Channel Typical Operating Characteristics

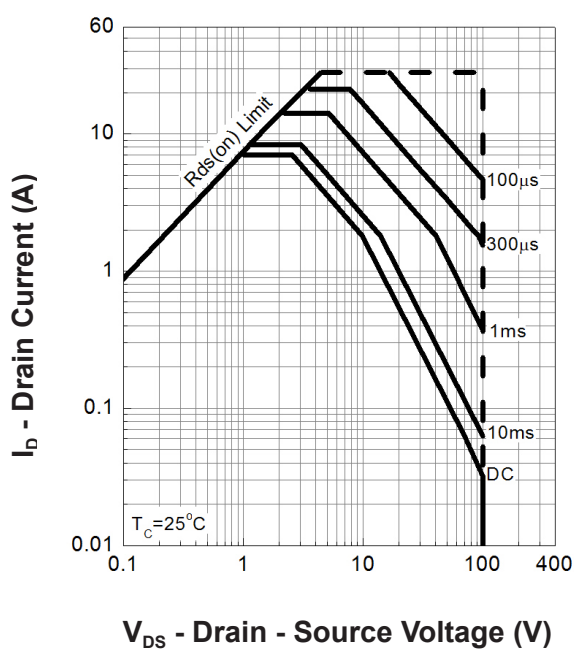
Power Dissipation



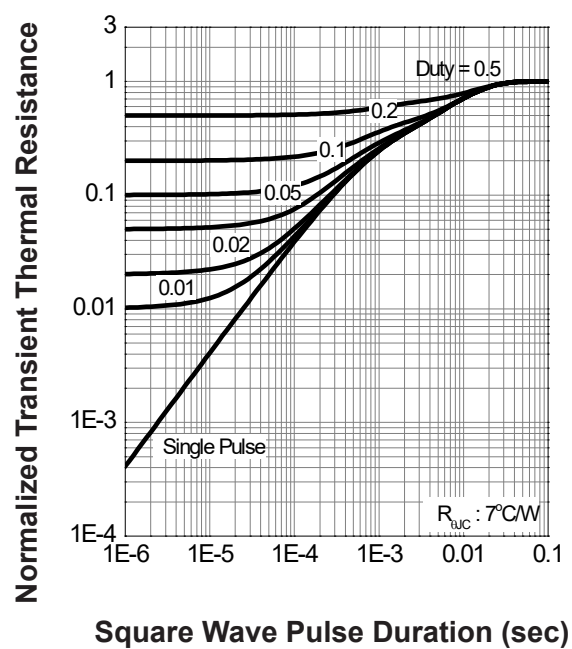
Drain Current



Safe Operation Area

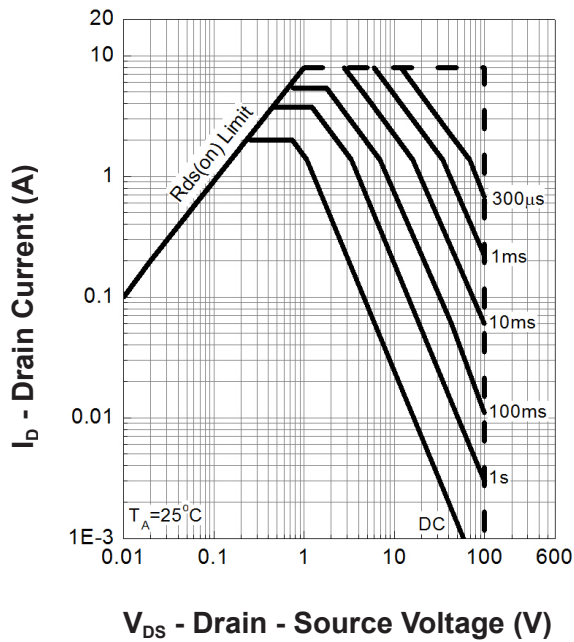


Thermal Transient Impedance

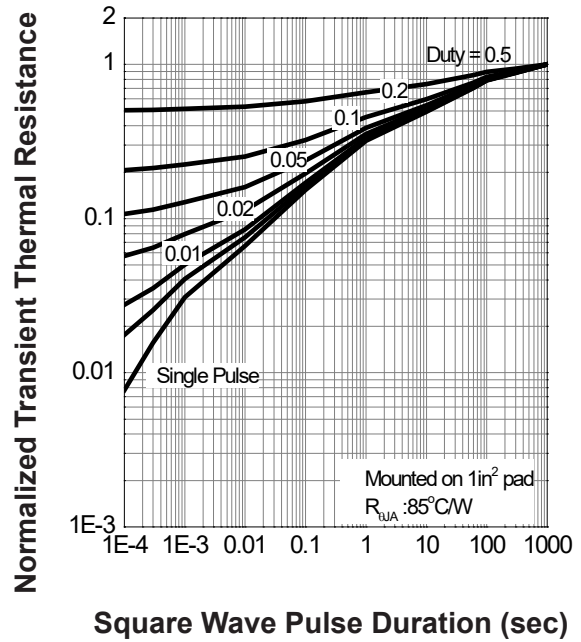


N Channel Typical Operating Characteristics(Cont.)

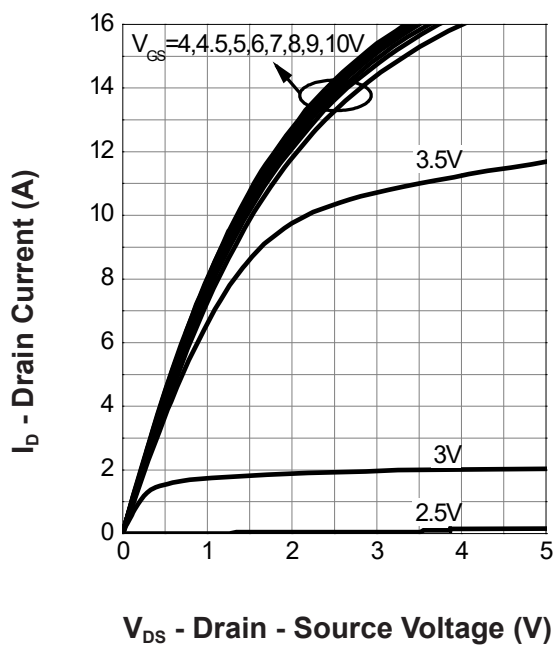
Safe Operation Area



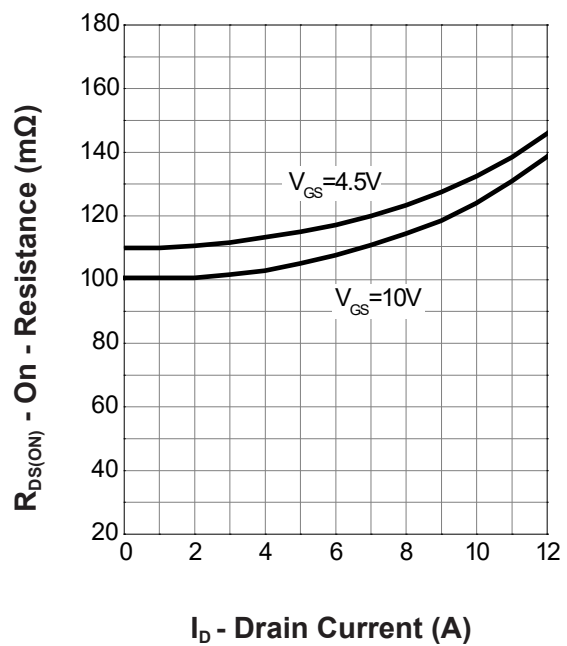
Thermal Transient Impedance



Output Characteristics

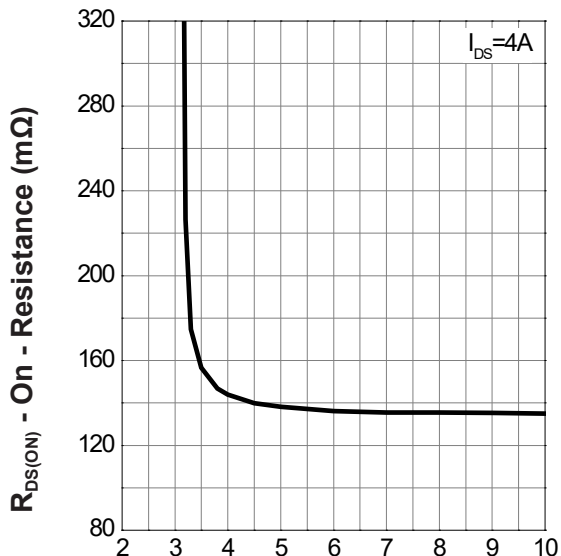


Drain-Source On Resistance



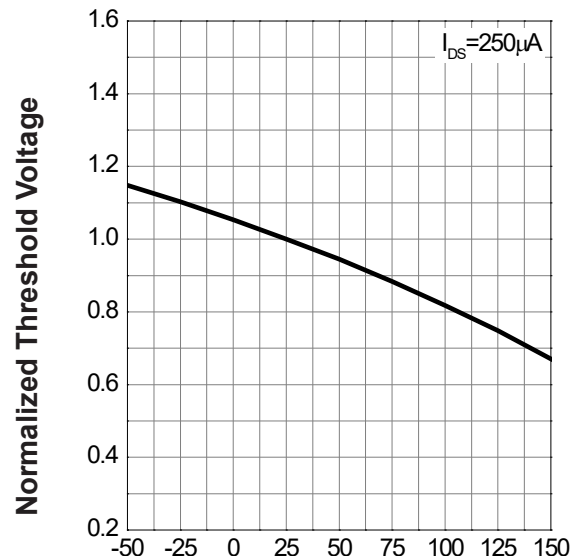
N Channel Typical Operating Characteristics(Cont.)

Gate-Source On Resistance



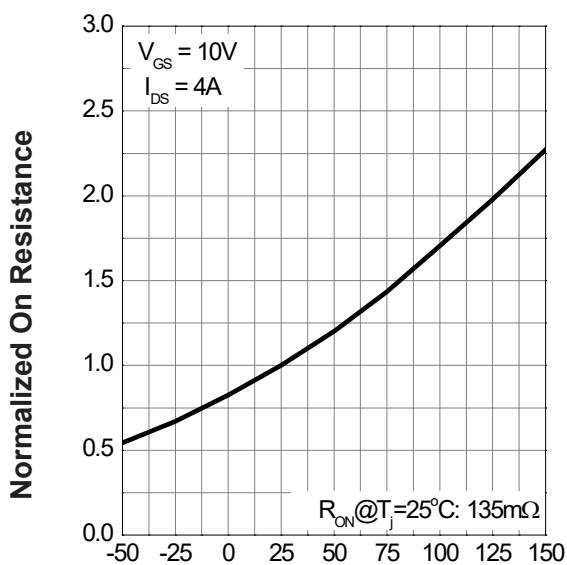
V_{GS} - Gate - Source Voltage (V)

Gate Threshold Voltage



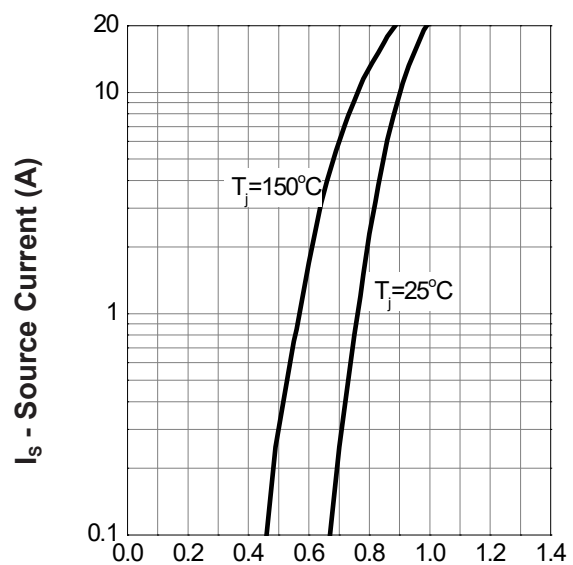
T_j - Junction Temperature ($^{\circ}C$)

Drain-Source On Resistance



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

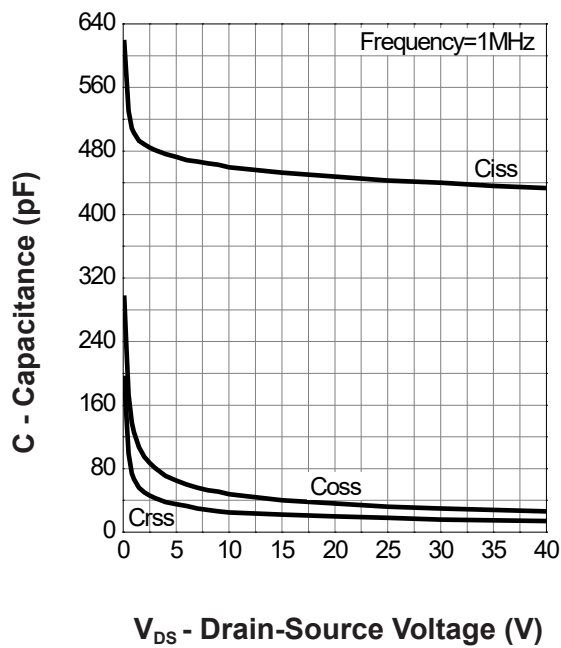
Source-Drain Diode Forward



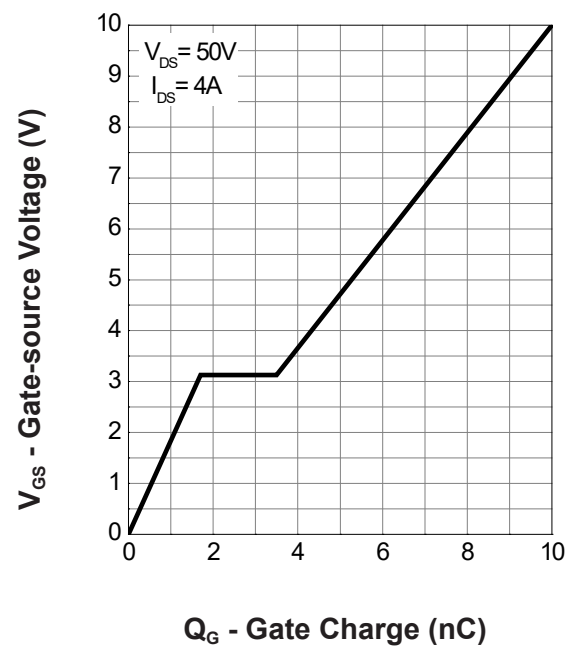
V_{SD} - Source - Drain Voltage (V)

N Channel Typical Operating Characteristics(Cont.)

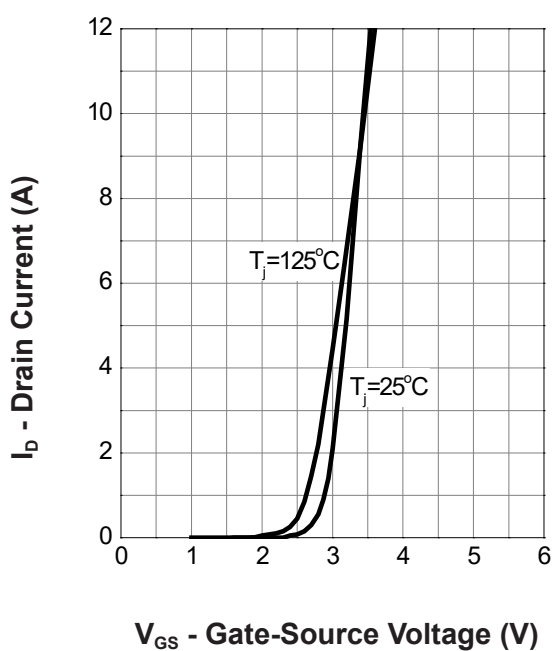
Capacitance



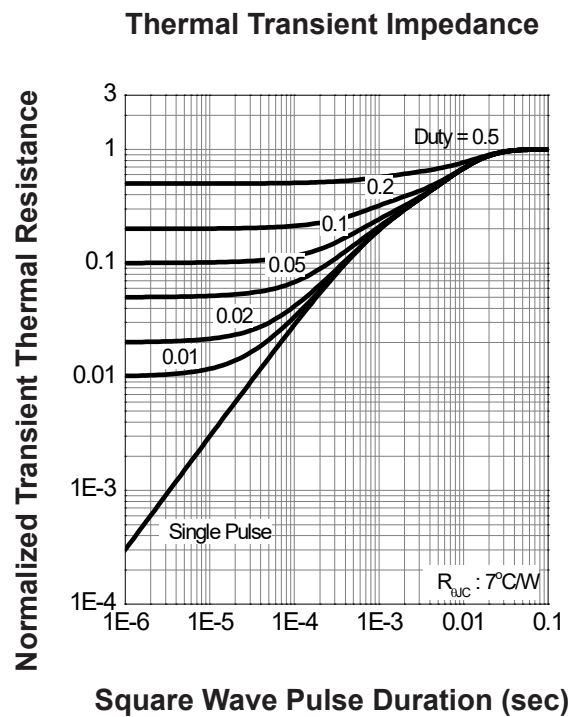
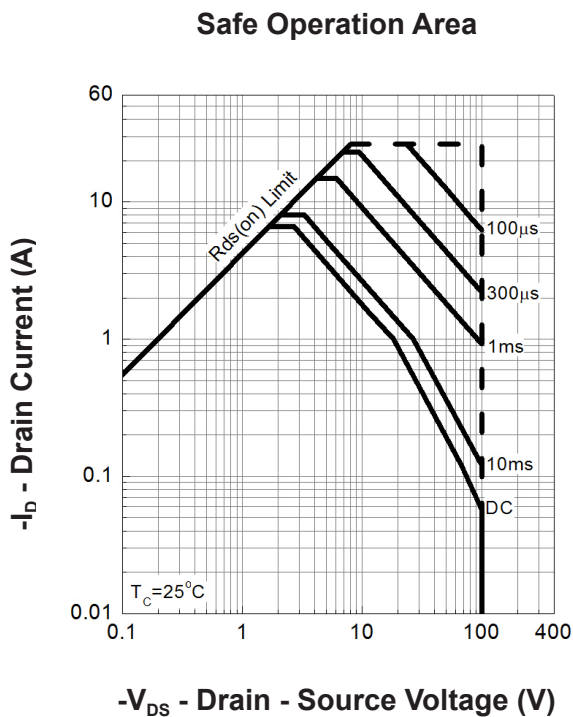
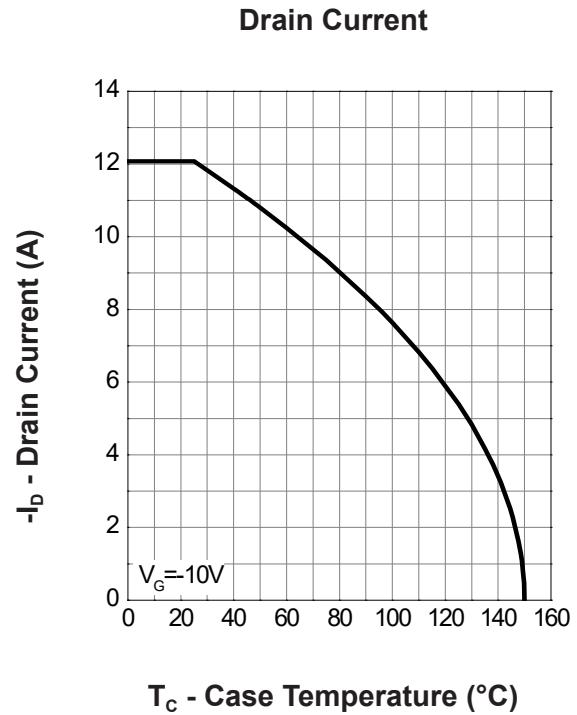
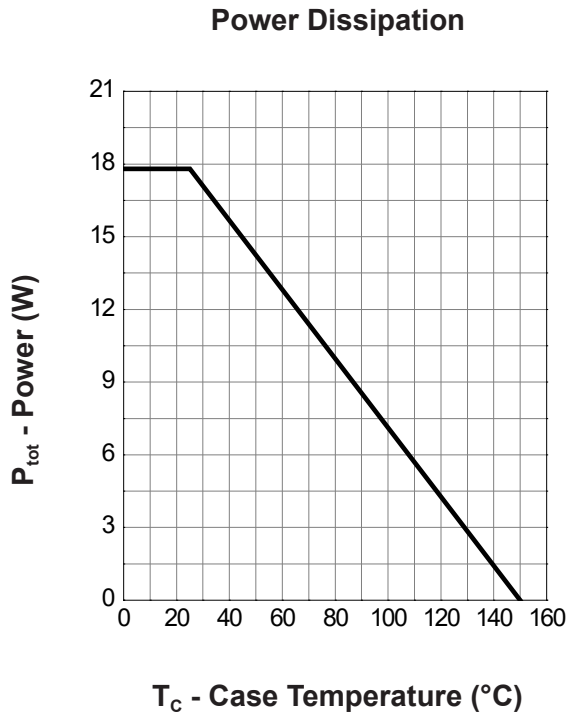
Gate Charge



Transfer Characteristics

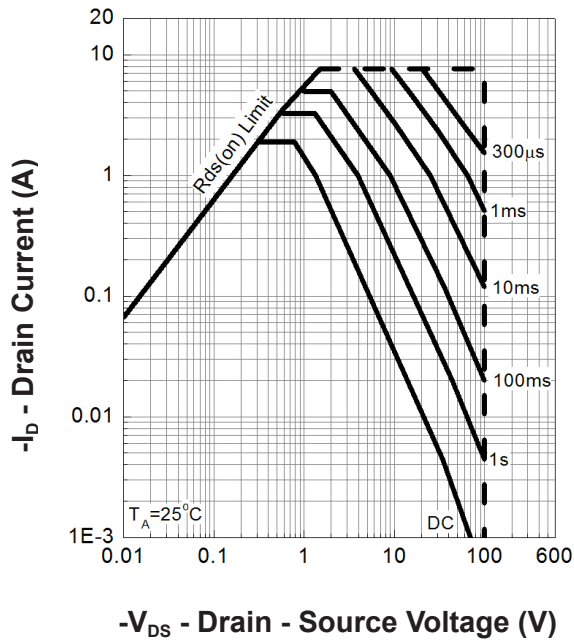


P Channel Typical Operating Characteristics

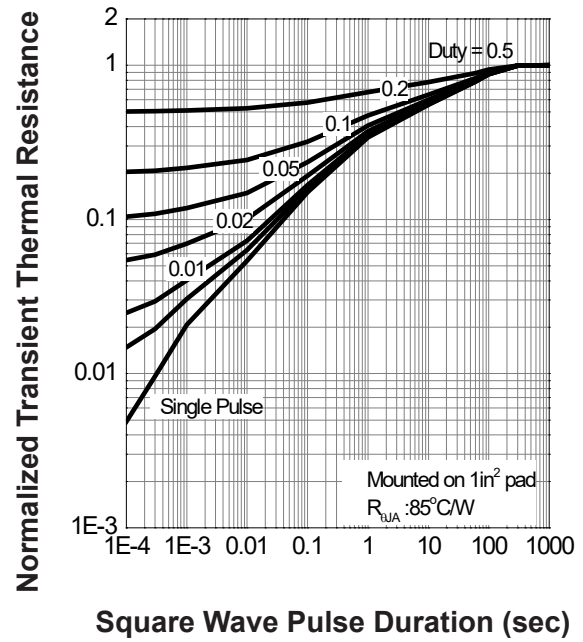


P Channel Typical Operating Characteristics(Cont.)

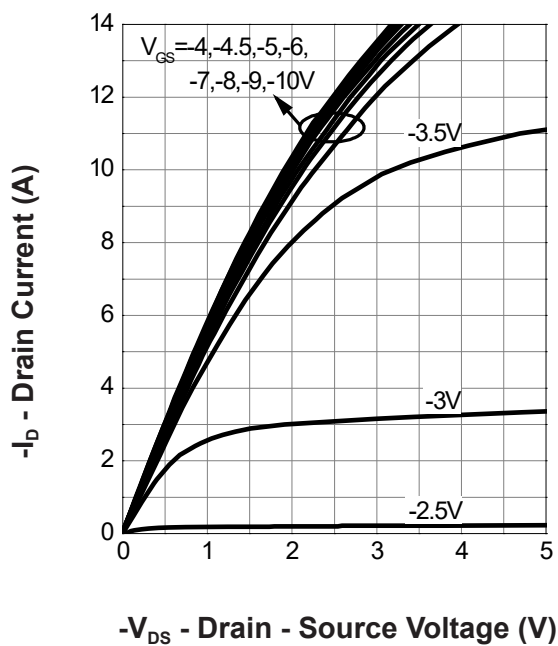
Safe Operation Area



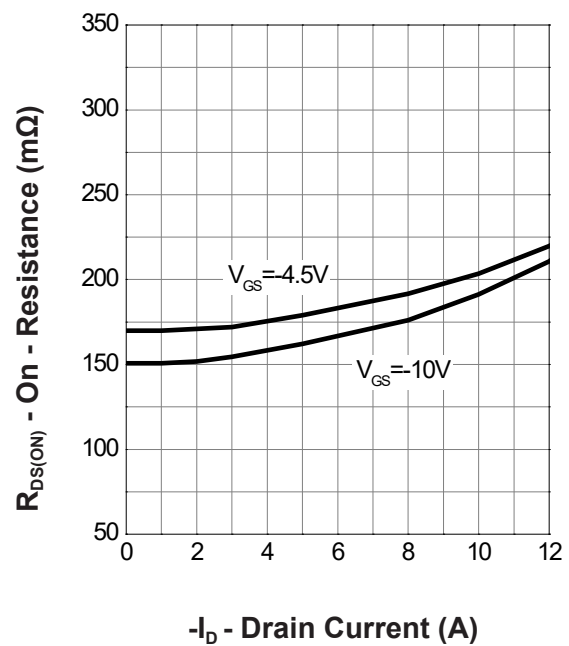
Thermal Transient Impedance



Output Characteristics

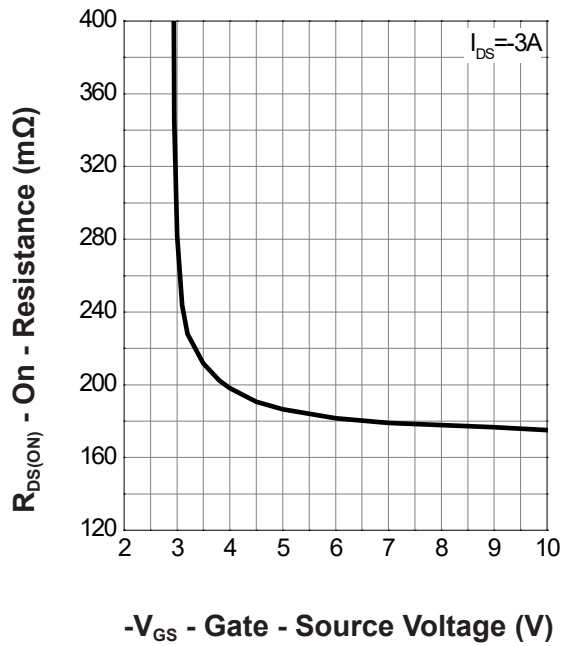


Drain-Source On Resistance

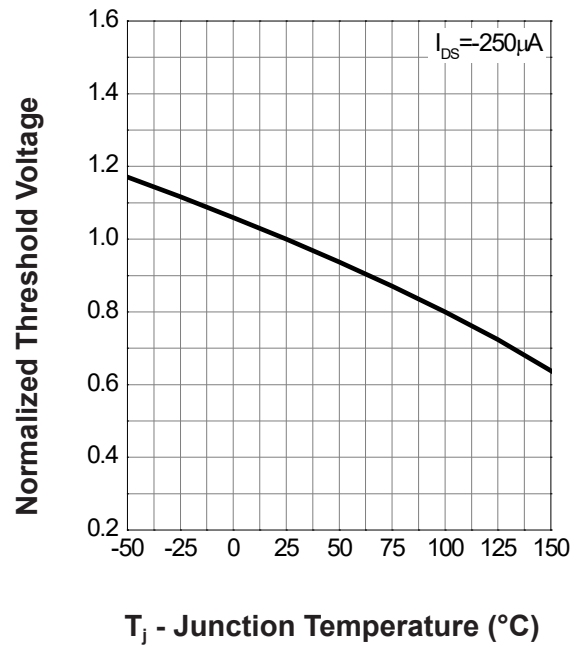


P Channel Typical Operating Characteristics(Cont.)

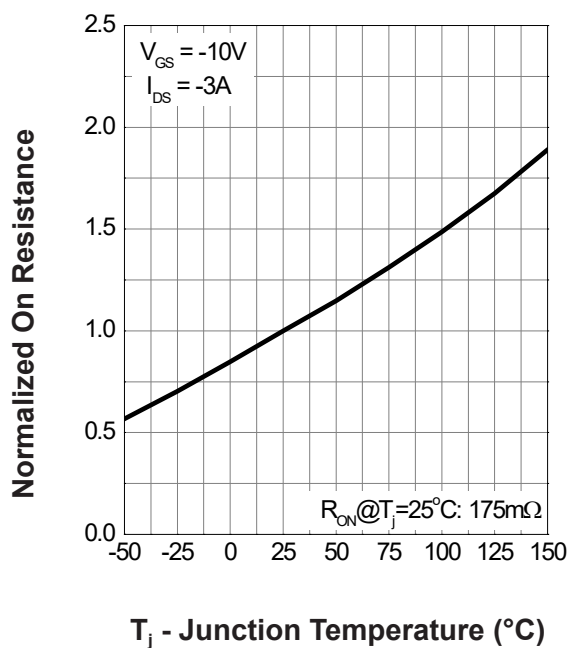
Gate-Source On Resistance



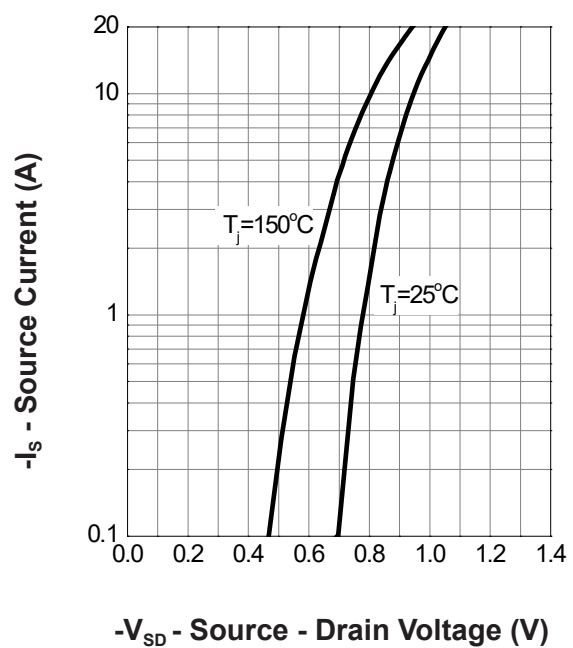
Gate Threshold Voltage



Drain-Source On Resistance

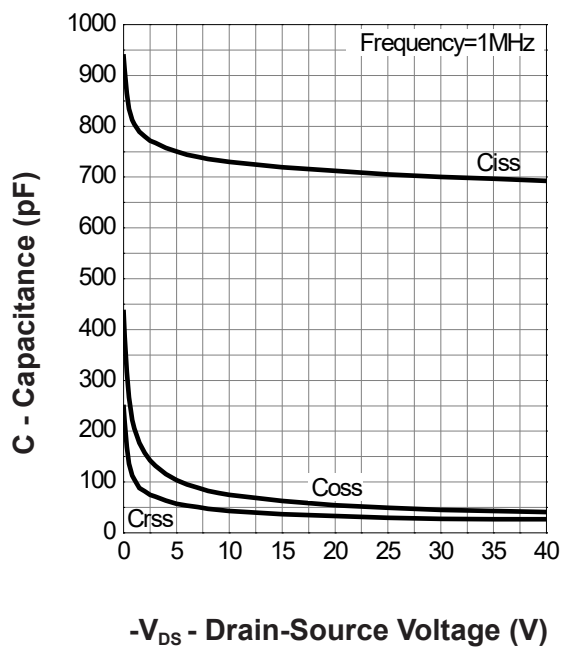


Source-Drain Diode Forward

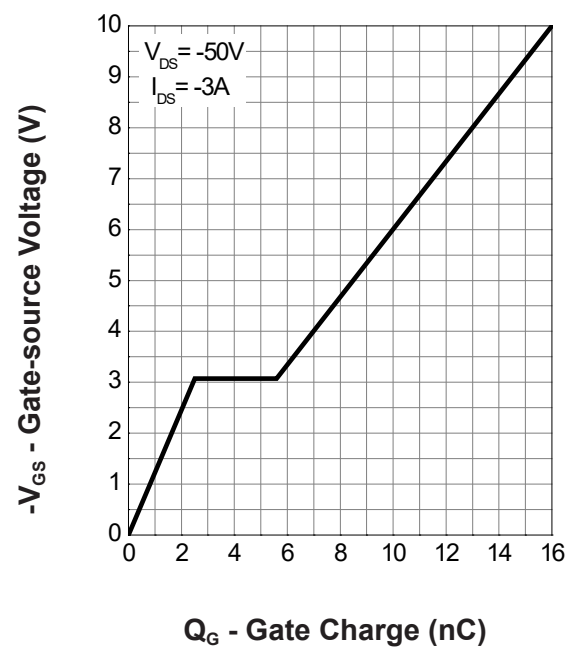


P Channel Typical Operating Characteristics(Cont.)

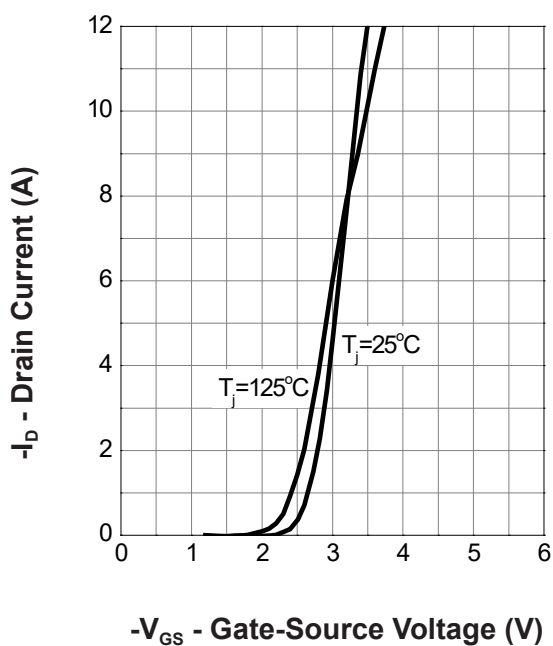
Capacitance



Gate Charge

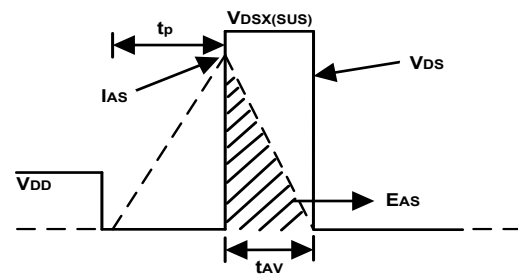
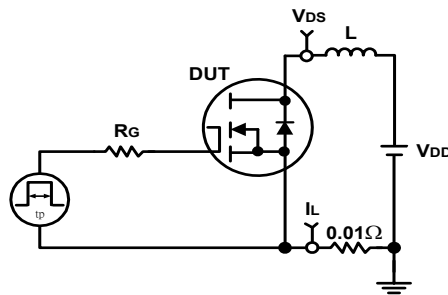


Transfer Characteristics

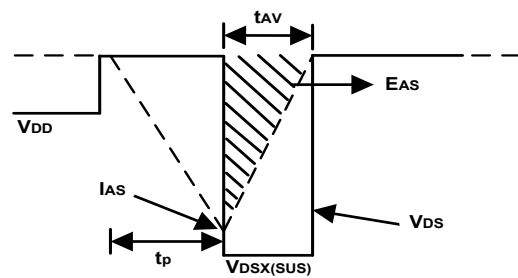
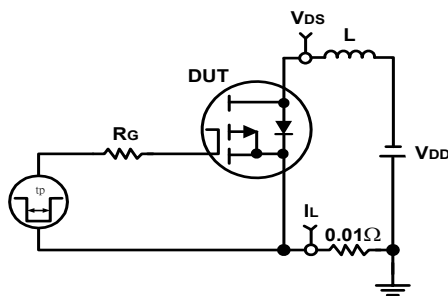


Avalanche Test Circuit and Waveforms

N Channel

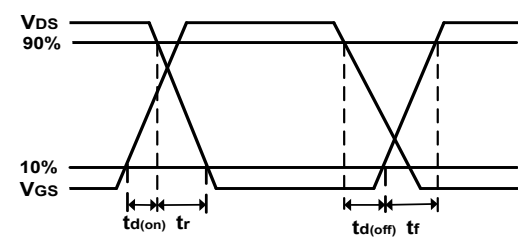
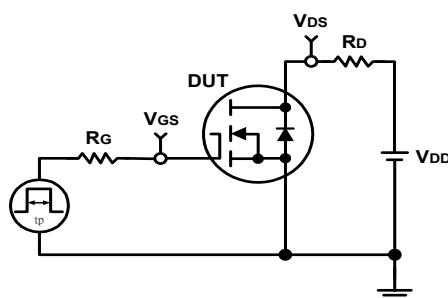


P Channel

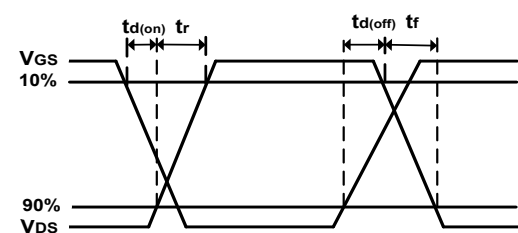
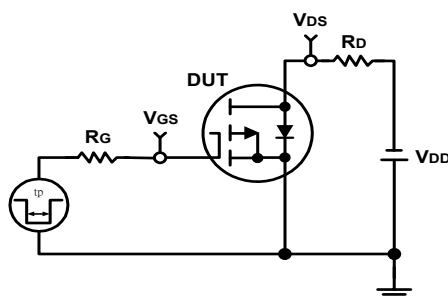


Switching Time Test Circuit and Waveforms

N Channel

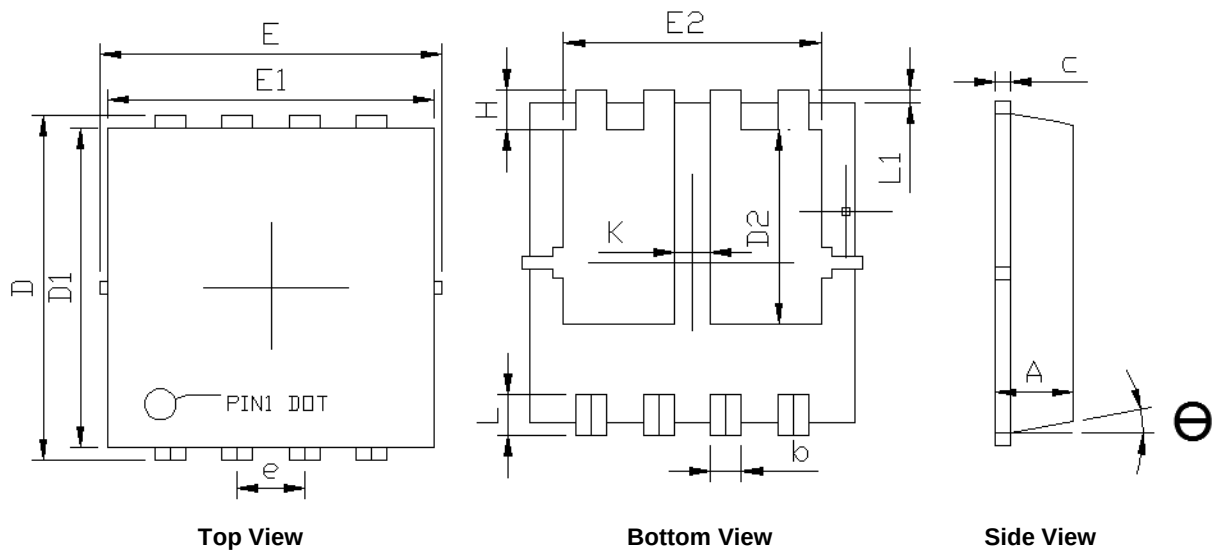


P Channel



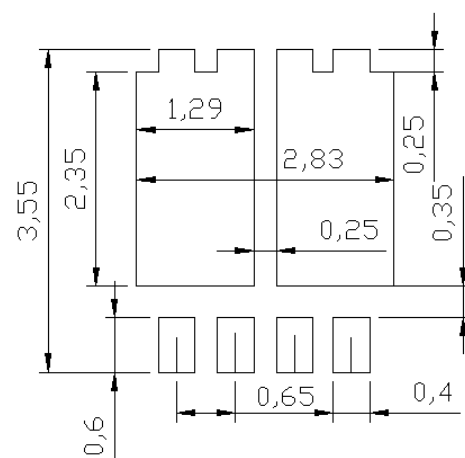
Package Information

DFN3.3x3.3G-8_EP2



SYMBOLS	DFN3.3x3.3G-8_EP2_P			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	0.80	0.028	0.031
b	0.25	0.35	0.010	0.014
c	0.10	0.25	0.004	0.010
D	3.25	3.45	0.128	0.136
D1	3.00	3.20	0.118	0.126
D2	1.78	1.98	0.070	0.078
E	3.00	3.40	0.118	0.134
E1	3.00	3.20	0.118	0.126
E2	2.39	2.59	0.094	0.102
e	0.65BSC		0.026 BSC	
H	0.30	0.50	0.012	0.020
L	0.30	0.50	0.012	0.020
L1	0.13 REF		0.005 REF	
K	0.30	-	0.012	-
θ	-	12°	-	12°

RECOMMENDED LAND PATTERN



UNIT: mm