RSTN30C17A2

Dual Enhancement Mode MOSFET (N-and P-Channel)

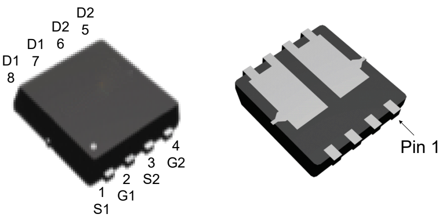
Features

- N Channel : 30V/40A,
  $R_{DS(ON)}$=7mΩ(typ.)@V_{GS}=10V
  $R_{DS(ON)}$=11mΩ(typ.)@V_{GS}=4.5V
- P Channel : -30V/-45A,
  $R_{DS(ON)}$=15mΩ(typ.)@V_{GS}=-10V
  $R_{DS(ON)}$=25mΩ(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)

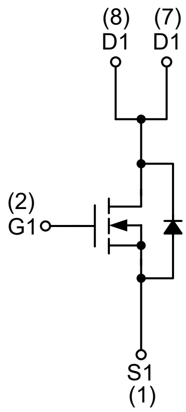
Applications

- Synchronous Rectification.
- Motor Control.
- High Current, High Speed Switching.
- Protable equipment application.

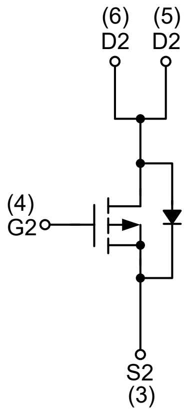
Pin Description



PDFN3.3*3.3-8L



N-Channel MOSFET



P-Channel MOSFET

Absolute Maximum Ratings (T_A=25°C Unless Otherwise Noted)

Symbol	Parameter		N Channel	P Channel	Unit
Common Ratings					
V_{DSS}	Drain-Source Voltage		30	-30	V
V_{GSS}	Gate-Source Voltage		±20	±25	
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	40	-45	A
I_D	Continuous Drain Current	T_C=25°C	40	-45	A
		T_C=100°C	30	-34	A
I_{DM}[a]	Pulse Drain Current Tested	T_C=25°C	120	-135	A
P_D	Maximum Power Dissipation	T_C=25°C	42	54	W
		T_C=100°C	17	21	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		3	2.3	°C/W
$R_{\theta JA}$[c]	Thermal Resistance-Junction to Ambient		80		°C/W
I_{AS}[b]	Avalanche Current, Single pulse	L=0.1mH	15	-24	A
E_{AS}[b]	Avalanche Energy, Single pulse	L=0.1mH	11.25	29	mJ

Note * : Calculated continuous current based on maximum allowable junction temperature. Bonding wire limitation current is 8A.
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°C).
Note c : Surface Mounted on $1in^2$ pad area.

N Channel Electrical Characteristics (T_A = 25°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	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1.2	1.7	2.2	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	-	7	10	mΩ
		V_{GS}=4.5V, I_{DS}=2.4A	-	11	15	
Diode Characteristics						
$V_{SD}{}^{d}$	Diode Forward Voltage	I_{SD}=4A, V_{GS}=0V	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I_{SD}=4A, dI_{SD}/dt=100A/μs	-	11	-	ns
Q_{rr}	Reverse Recovery Charge		-	2	-	nC
Dynamic Characteristics^{e}						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	2.8	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz	-	823	1070	pF
C_{oss}	Output Capacitance		-	106	-	
C_{rss}	Reverse Transfer Capacitance		-	74	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V, R_L=15Ω, I_{DS}=1A, V_{GEN}=10V, R_G=6Ω	-	11	20	ns
t_r	Turn-on Rise Time		-	7	13	
$t_{d(OFF)}$	Turn-off Delay Time		-	29	53	
t_f	Turn-off Fall Time		-	6	11	
Gate Charge Characteristics^{e}						
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}=4.5V, I_{DS}=4A	-	7	11	nC
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}=10V, I_{DS}=4A	-	14.3	21	
Q_{gs}	Gate-Source Charge		-	2	-	
Q_{gd}	Gate-Drain Charge		-	2.5	-	

Note d : Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note e : Guaranteed by design, not subject to production testing.

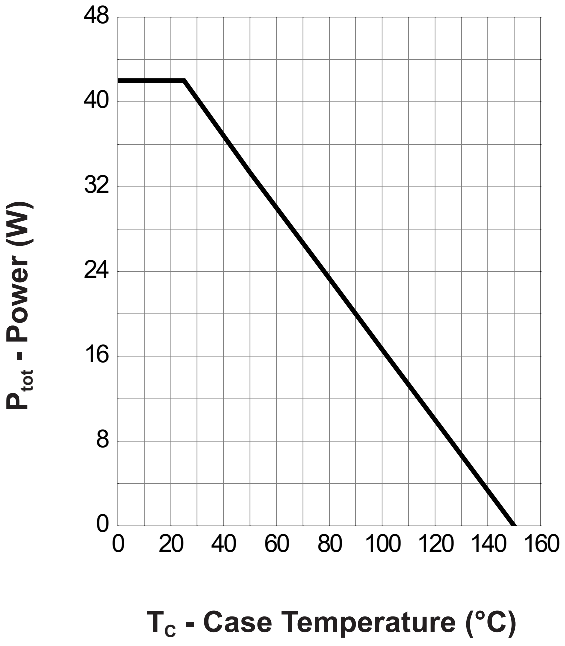
P Channel Electrical Characteristics (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	P Channel			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=-250μA	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-24V, V_{GS}=0V	-	-	-1	μA
		T_J=85°C	-	-	-30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	-1.0	-1.8	-2.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±25V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$[d]	Drain-Source On-state Resistance	V_{GS}=-10V, I_{DS}=-4A	-	15	18	mΩ
		V_{GS}=-4.5V, I_{DS}=-2.4A	-	25	30	
Diode Characteristics						
V_{SD}[d]	Diode Forward Voltage	I_{SD}=-4A, V_{GS}=0V	-	-0.8	-1.1	V
t_{rr}	Reverse Recovery Time	I_{SD}=-4A, dI_{SD}/dt=100A/μs	-	18	-	ns
Q_{rr}	Reverse Recovery Charge		-	7	-	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}=-15V, Frequency=1.0MHz	-	1580	2050	pF
C_{oss}	Output Capacitance		-	215	-	
C_{rss}	Reverse Transfer Capacitance		-	150	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=-15V, R_L=-15Ω, I_{DS}=-1A, V_{GEN}=-10V, R_G=6Ω	-	10	18	ns
t_r	Turn-on Rise Time		-	10	18	
$t_{d(OFF)}$	Turn-off Delay Time		-	98	176	
t_f	Turn-off Fall Time		-	85	153	
Gate Charge Characteristics[e]						
Q_g	Total Gate Charge	V_{DS}=-15V, V_{GS}=-4.5V, I_{DS}=-4A	-	13.7	-	nC
Q_g	Total Gate Charge	V_{DS}=-15V, V_{GS}=-10V, I_{DS}=-4A	-	26.8	40	
Q_{gs}	Gate-Source Charge		-	4.3	-	
Q_{gd}	Gate-Drain Charge		-	5.4	-	

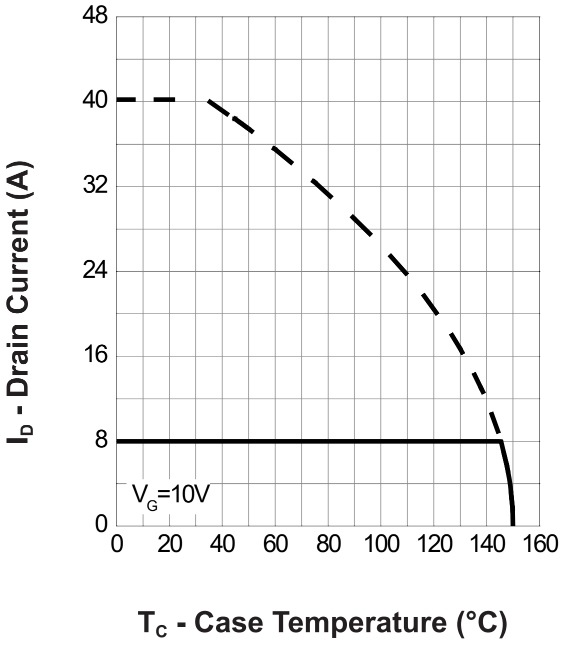
Note d : Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note e : Guaranteed by design, not subject to production testing.

N Channel Typical Operating Characteristics

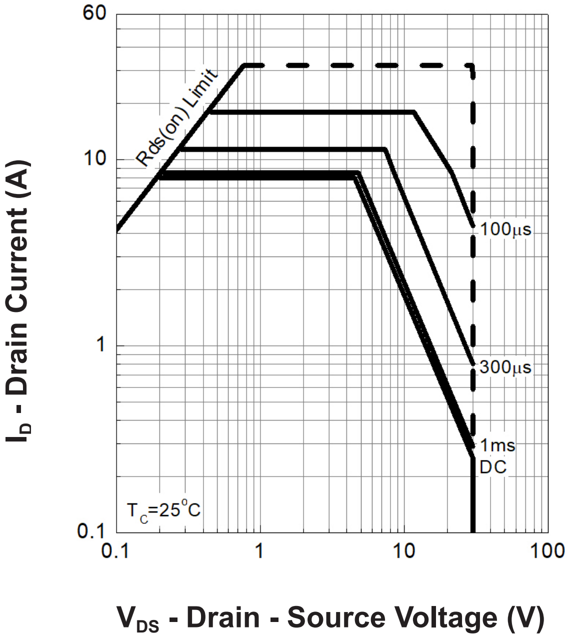
Power Dissipation



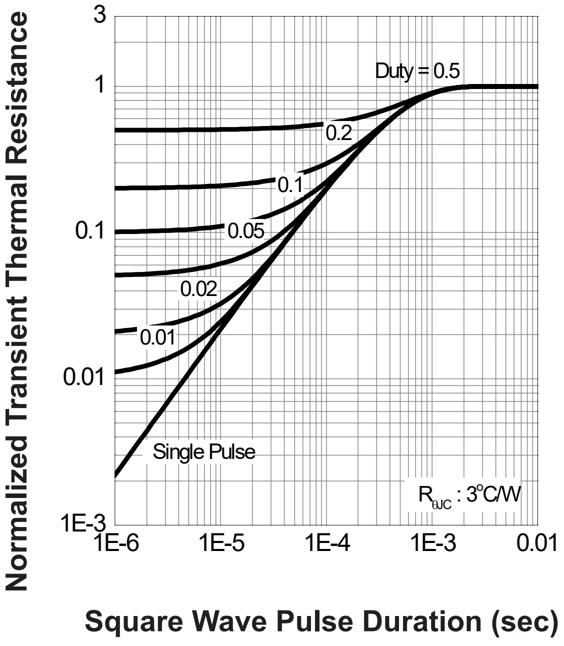
Drain Current



Safe Operation Area

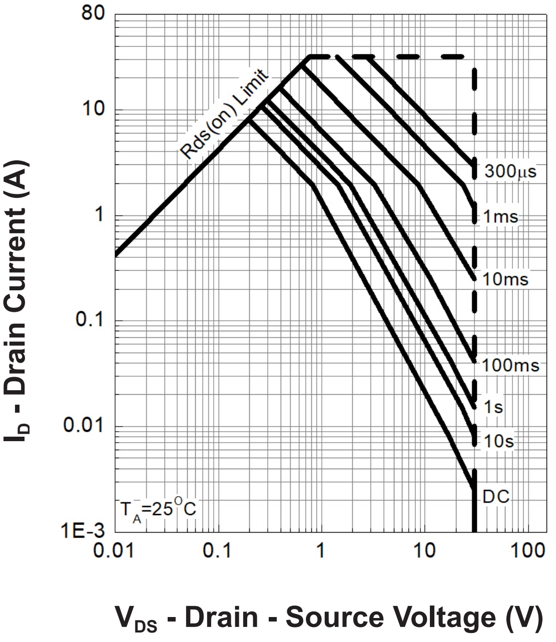


Thermal Transient Impedance

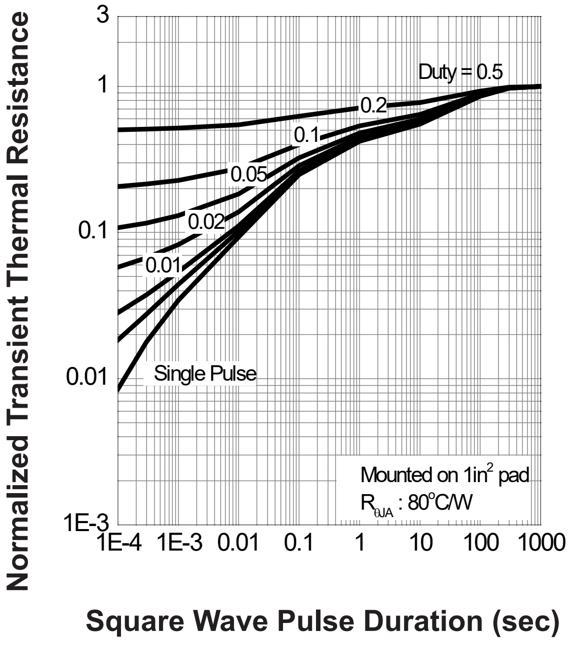


N Channel Typical Operating Characteristics(Cont.)

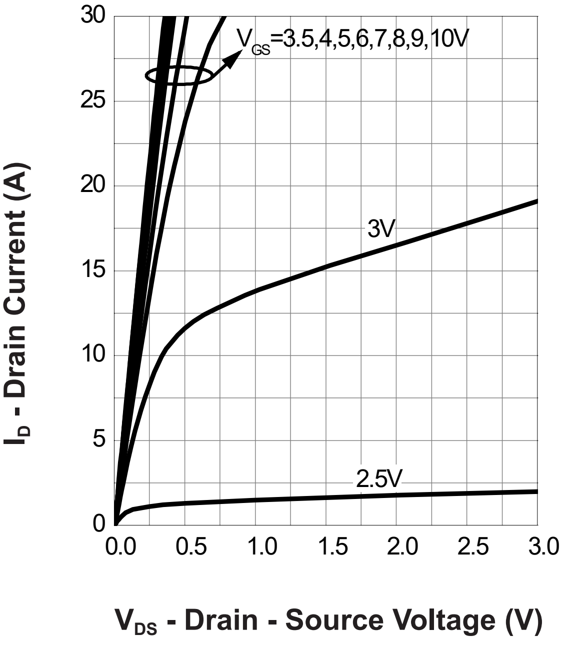
Safe Operation Area



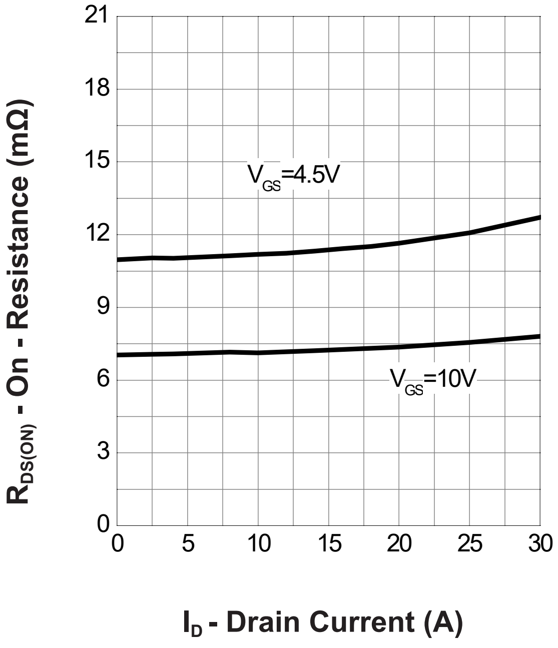
Thermal Transient Impedance



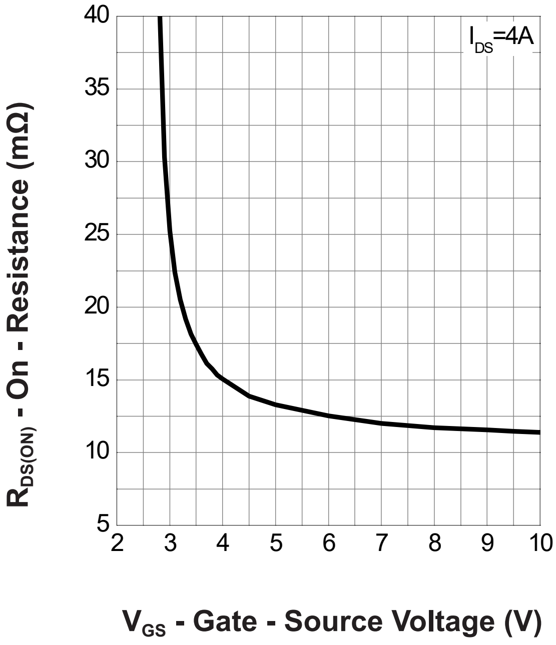
Output Characteristics

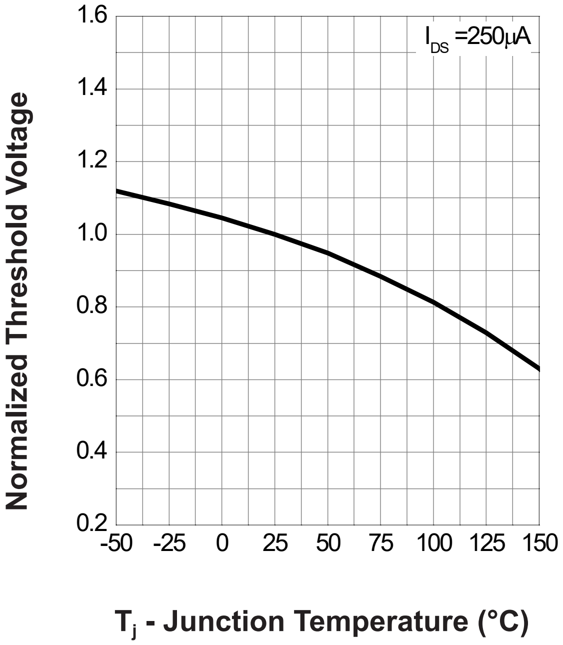


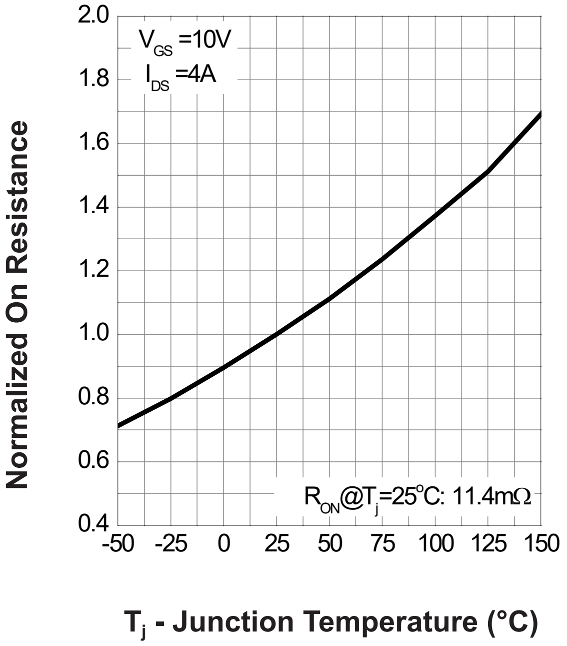
Drain-Source On Resistance

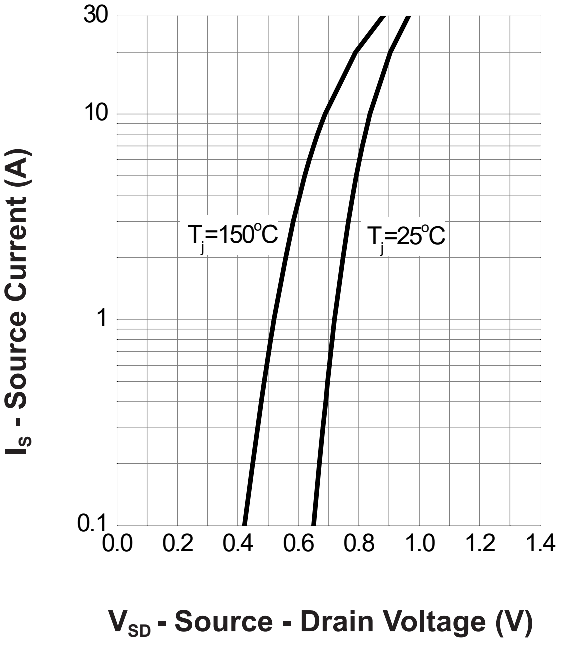


N Channel Typical Operating Characteristics(Cont.)

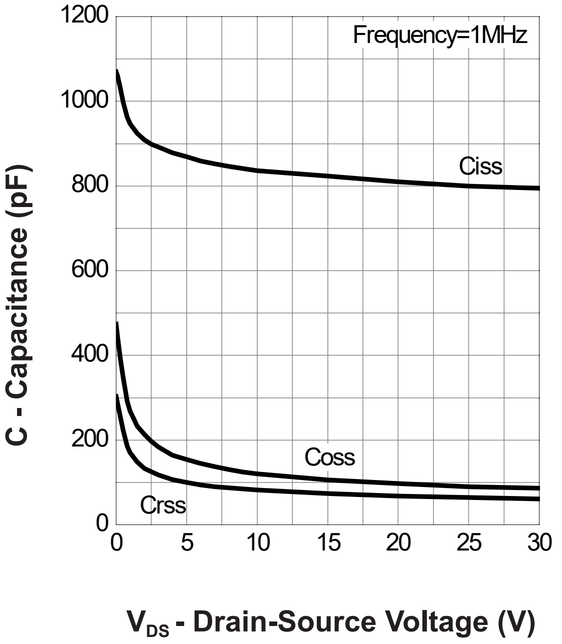

Gate-Source On Resistance

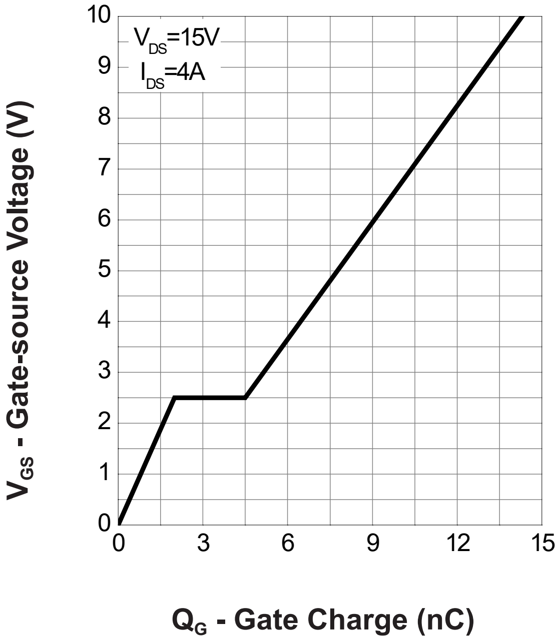

Gate Threshold Voltage

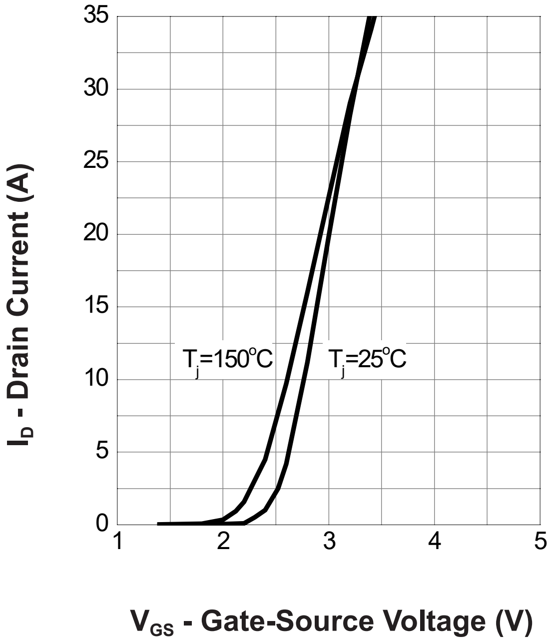

Drain-Source On Resistance


Source-Drain Diode Forward

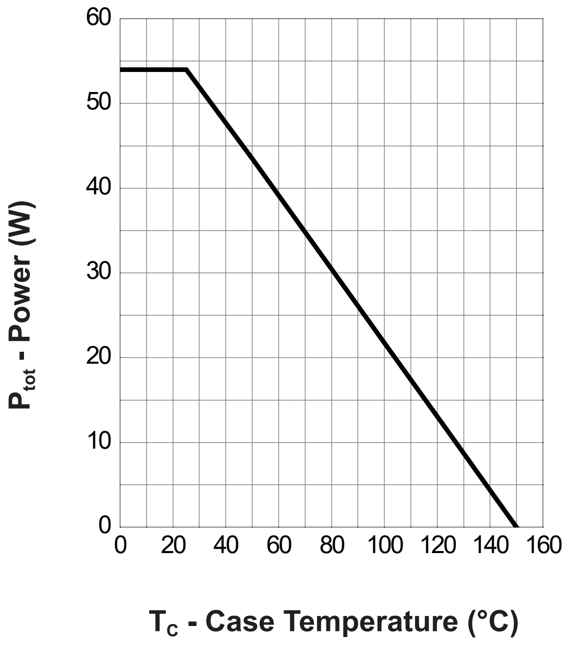
N Channel Typical Operating Characteristics(Cont.)

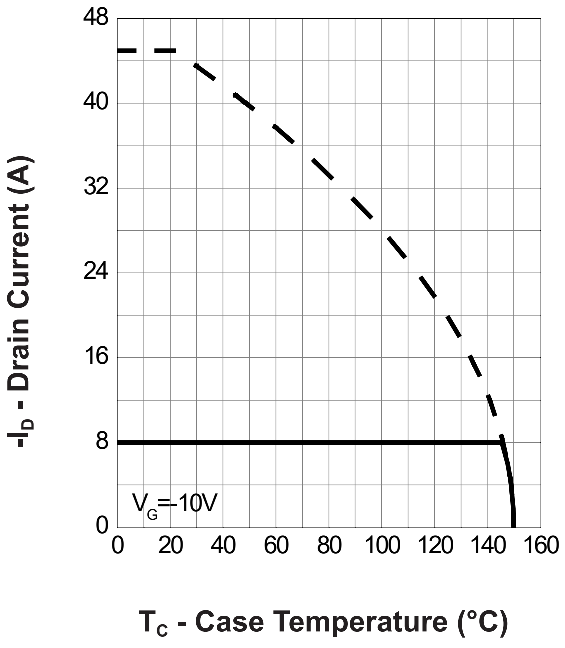

Capacitance

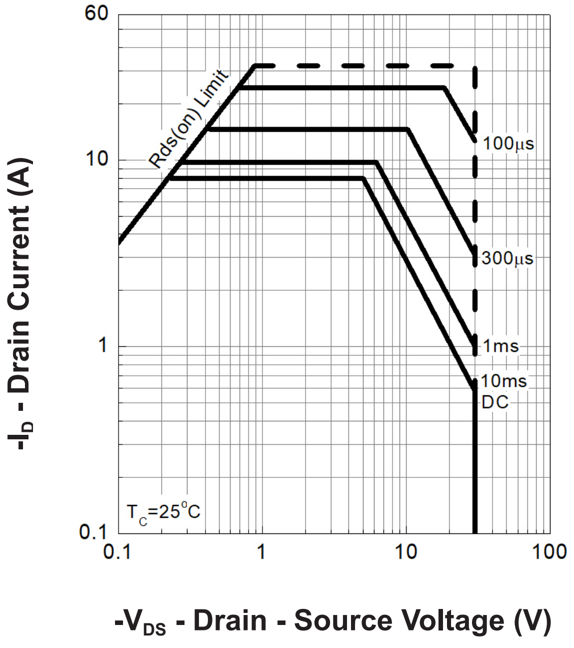

Gate Charge

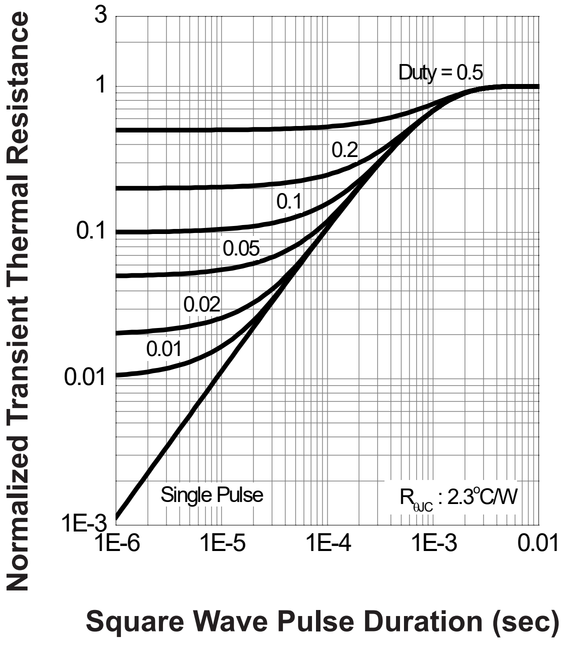

Transfer Characteristics

P Channel Typical Operating Characteristics


Power Dissipation

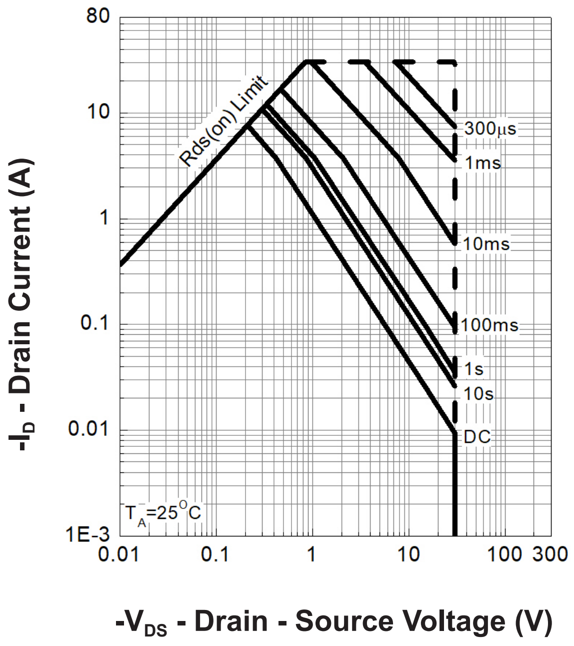

Drain Current


Safe Operation Area

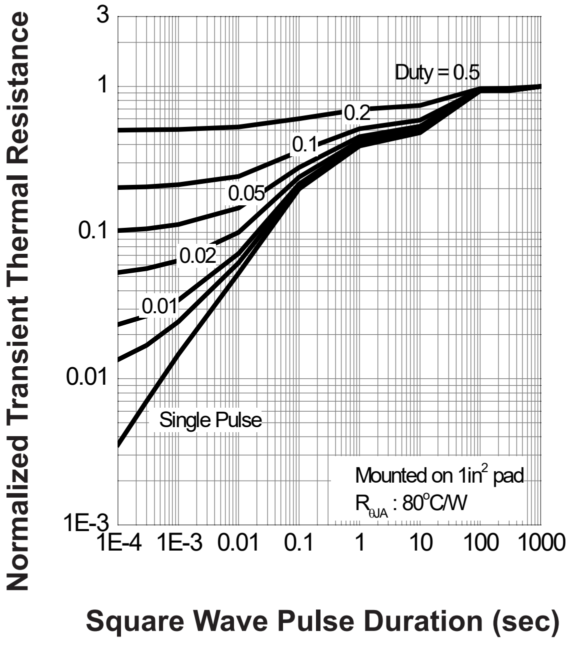

Thermal Transient Impedance

P Channel Typical Operating Characteristics(Cont.)

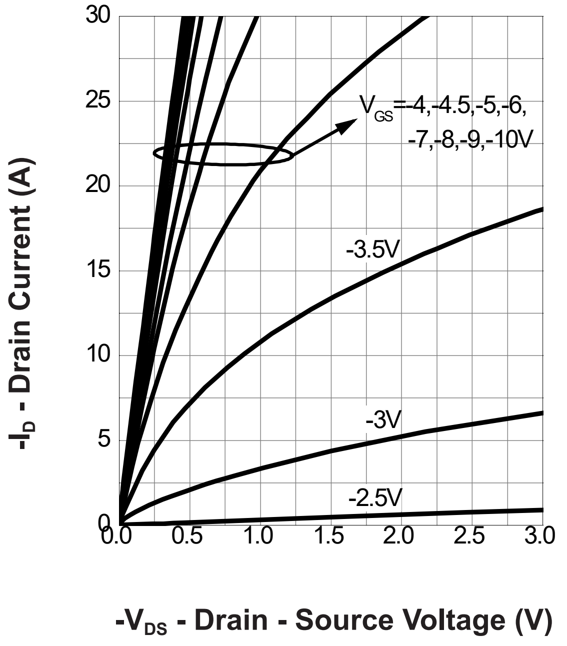
Safe Operation Area



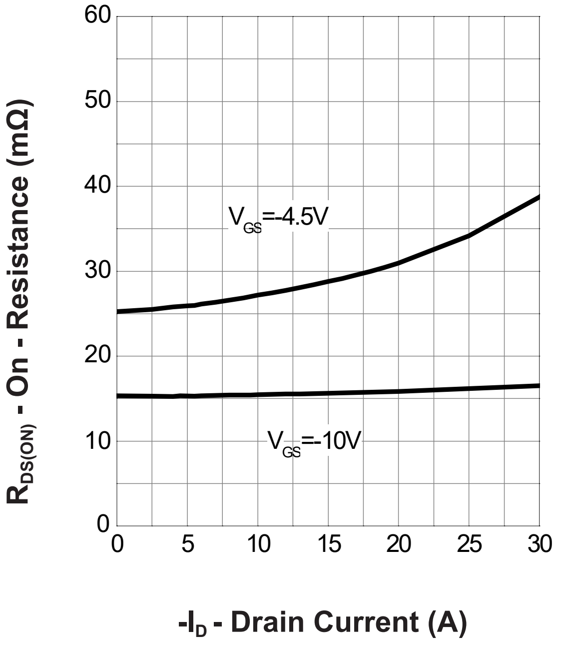
Thermal Transient Impedance



Output Characteristics

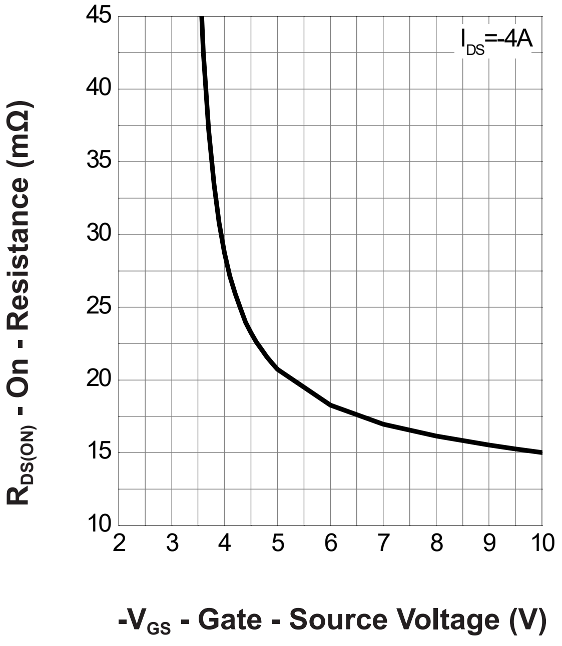


Drain-Source On Resistance

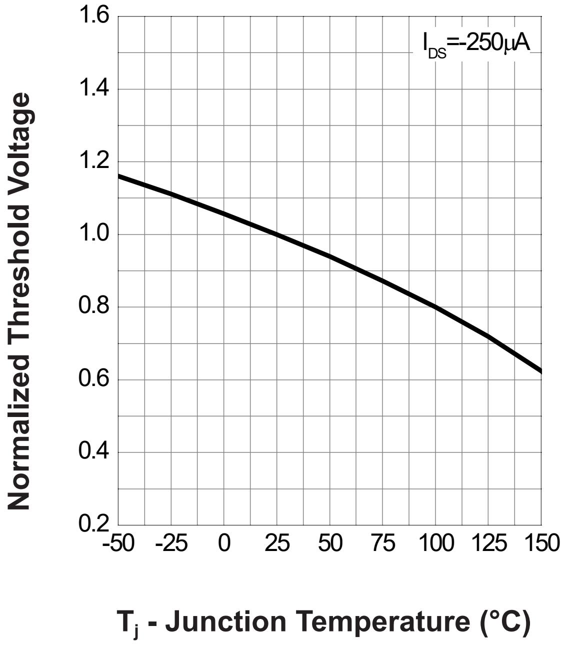


P Channel Typical Operating Characteristics(Cont.)

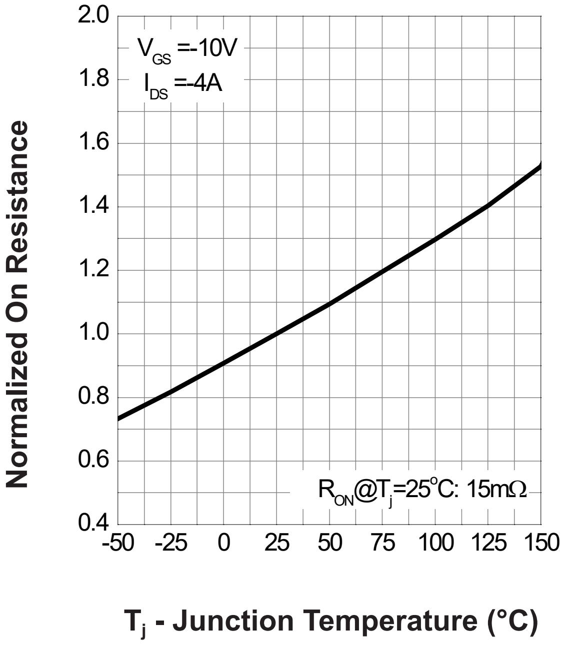
Gate-Source On Resistance



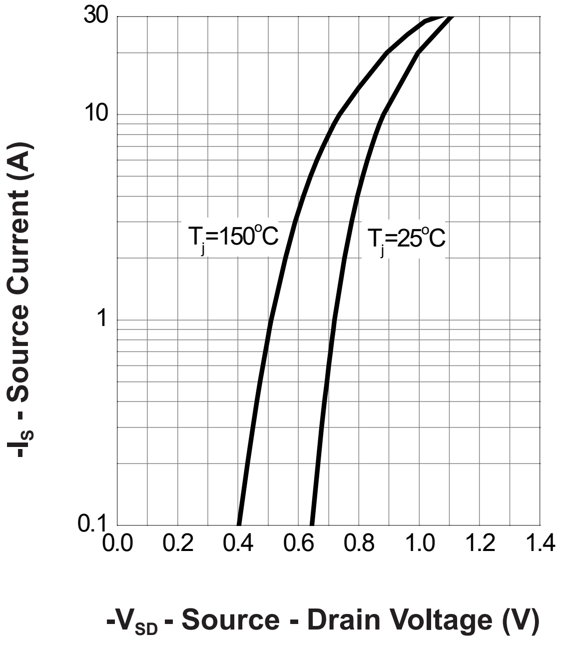
Gate Threshold Voltage



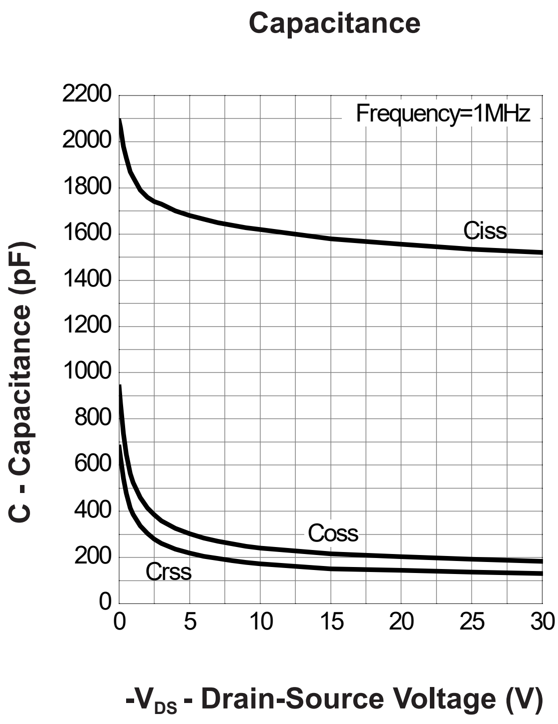
Drain-Source On Resistance

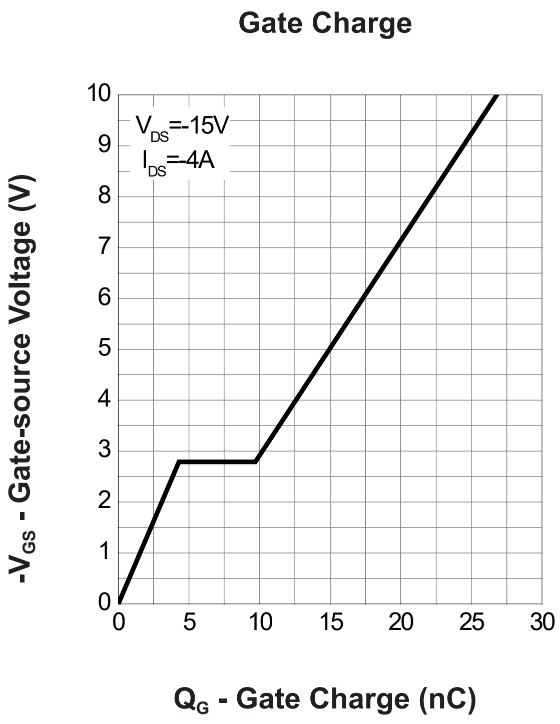


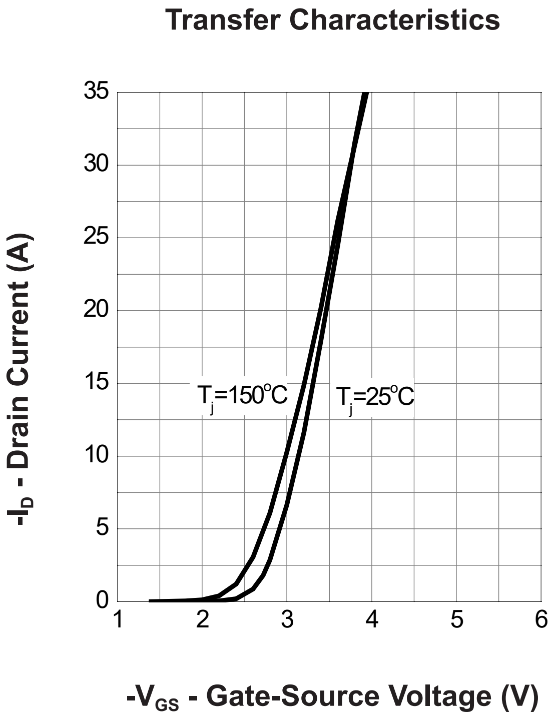
Source-Drain Diode Forward



P Channel Typical Operating Characteristics(Cont.)

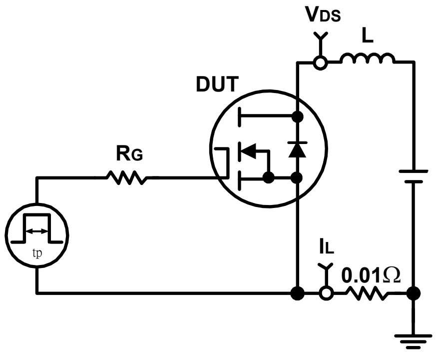


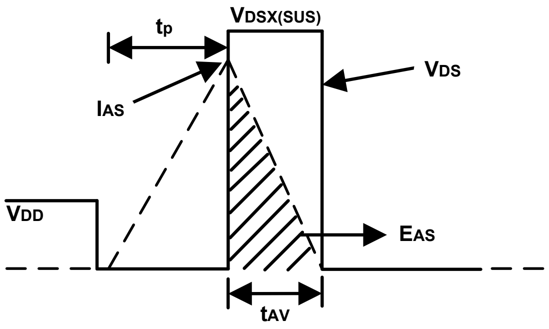




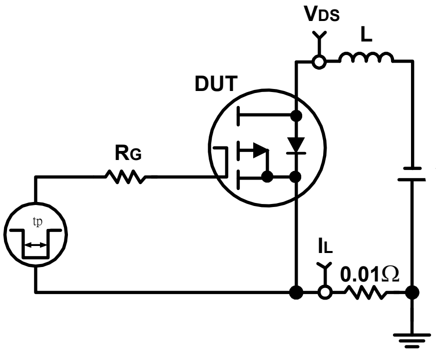
Avalanche Test Circuit and Waveforms

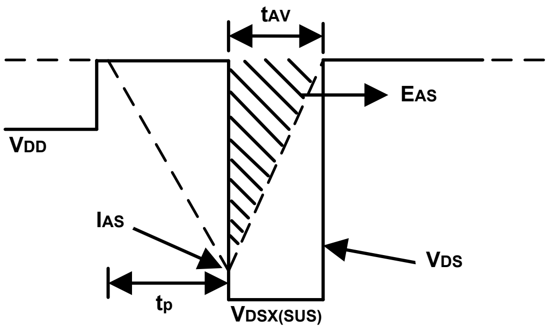
N Channel





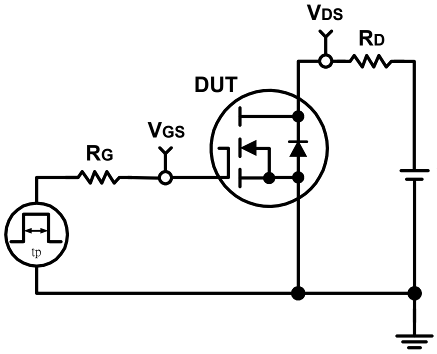
P Channel

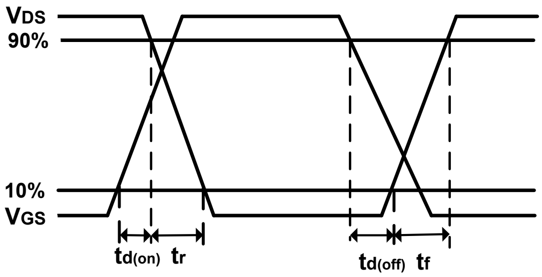




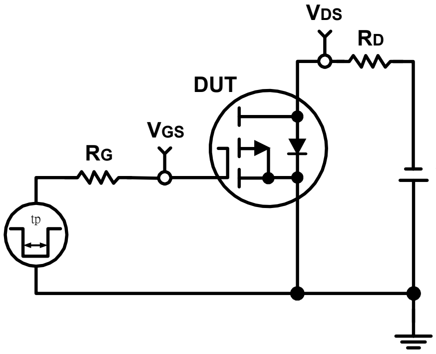
Switching Time Test Circuit and Waveforms

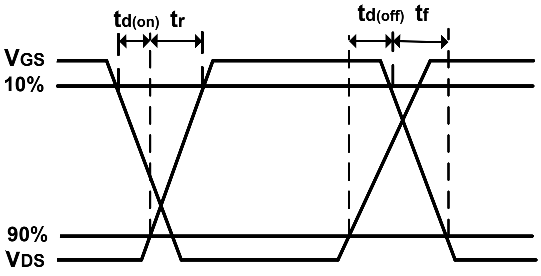
N Channel





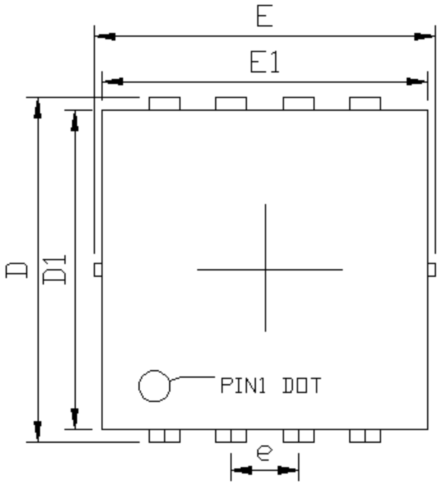
P Channel



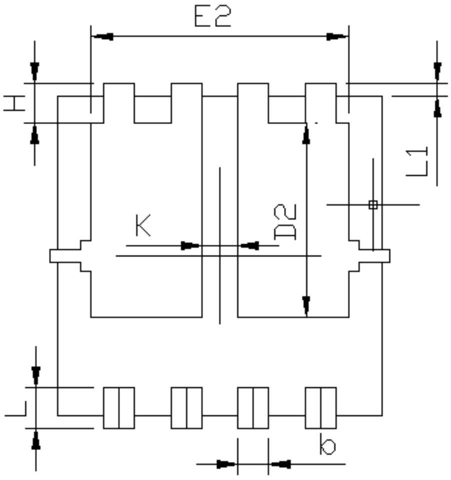


Package Information

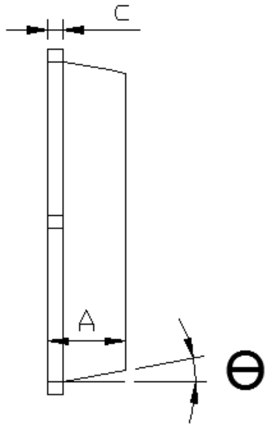
PDFN3.3*3.3-8L



Top View



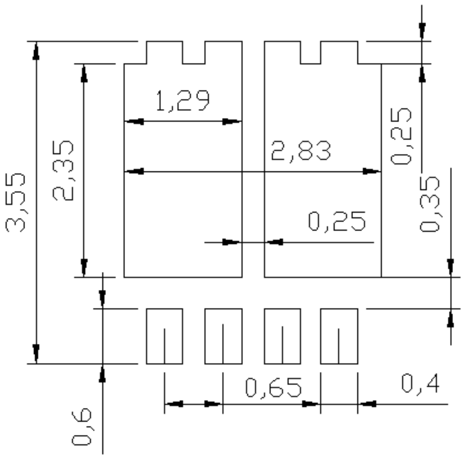
Bottom View



Side View

SYMBOLS	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