

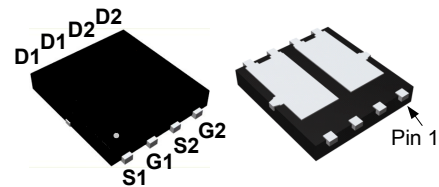
Features

- N Channel : 40V/42A,
 $R_{DS(ON)}=7m\Omega(\text{typ.})@V_{GS}=10V$
 $R_{DS(ON)}=9m\Omega(\text{typ.})@V_{GS}=4.5V$
- P Channel : -40V/-38A,
 $R_{DS(ON)}=10m\Omega(\text{typ.})@V_{GS}=-10V$
 $R_{DS(ON)}=15m\Omega(\text{typ.})@V_{GS}=-4.5V$
- 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)

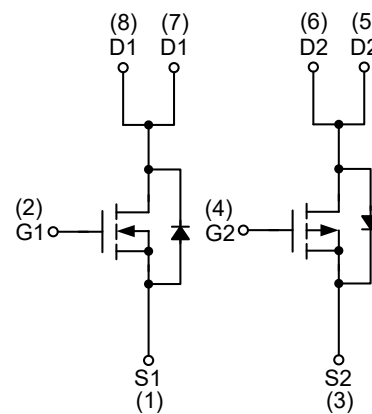
Applications

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

Pin Description



PDFN5*6-8L



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		40	-40	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	42	-38	A
I _D	Continuous Drain Current(Wire Bond Limited)	T _C =25°C	42	-38	A
		T _C =100°C	32	-29	
I _D	Continuous Drain Current(Silicon Limited)	T _C =25°C	55	-42	A
		T _C =100°C	35	-26	
I _{DM} ^a	Pulse Drain Current Tested	T _C =25°C	126	-114	A
P _D	Maximum Power Dissipation	T _C =25°C	46		W
		T _C =100°C	19		
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	2.7		°C/W
R _{θJA} ^c	Thermal Resistance-Junction to Ambient	Steady State	75		°C/W
I _{AS} ^b	Avalanche Current, Single pulse	L=0.1mH	77	-87	A
E _{AS} ^b	Avalanche Energy, Single pulse	L=0.1mH	296	378	mJ

Note * : Current limited by bonding wire.

Note a : Pulse width limited by maximum junction temperature.

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

Note c : Surface mounted on 1in^2 pad area.

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	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =32V, V _{GS} =0V	-	-	1	μA
		T _J =85°C	-	-	30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1	1.7	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} =10A	-	7	10	mΩ
		V _{GS} =4.5V, I _{DS} =6A	-	9	12	
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =5A, V _{GS} =0V	-	0.8	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =10A, dI _{SD} /dt=100A/μs	-	8	-	ns
Q _{rr}	Reverse Recovery Charge		-	1	-	nC
Dynamic Characteristics ^e						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,f=1MHz	-	1.6	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	-	2395	3946	pF
C _{oss}	Output Capacitance		-	198	-	
C _{rss}	Reverse Transfer Capacitance		-	143	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	12	22	ns
t _r	Turn-on Rise Time		-	11	20	
t _{d(OFF)}	Turn-off Delay Time		-	29	52	
t _f	Turn-off Fall Time		-	7	13	
Gate Charge Characteristics ^e						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _{DS} =10A	-	9.5	14.3	nC
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V, I _{DS} =10A	-	19	28.5	
Q _{gs}	Gate-Source Charge		-	2.5	-	
Q _{gd}	Gate-Drain Charge		-	3.5	-	

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

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

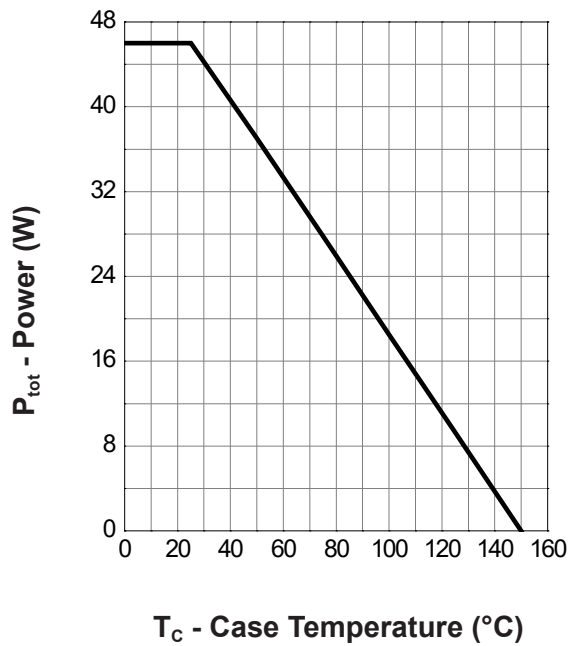
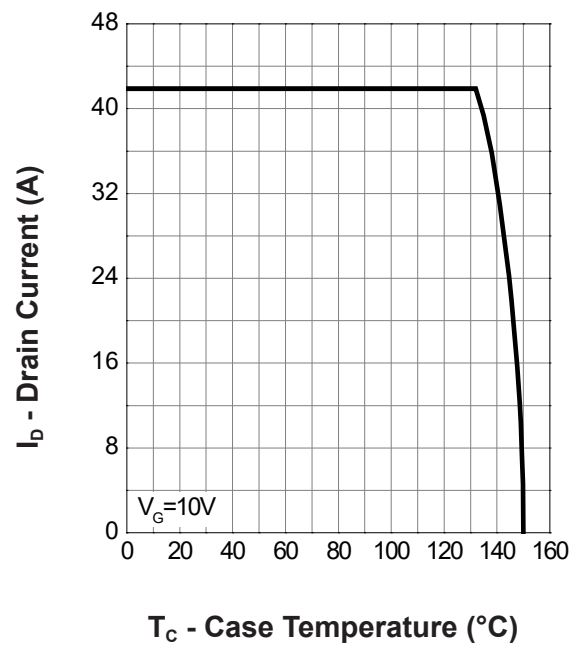
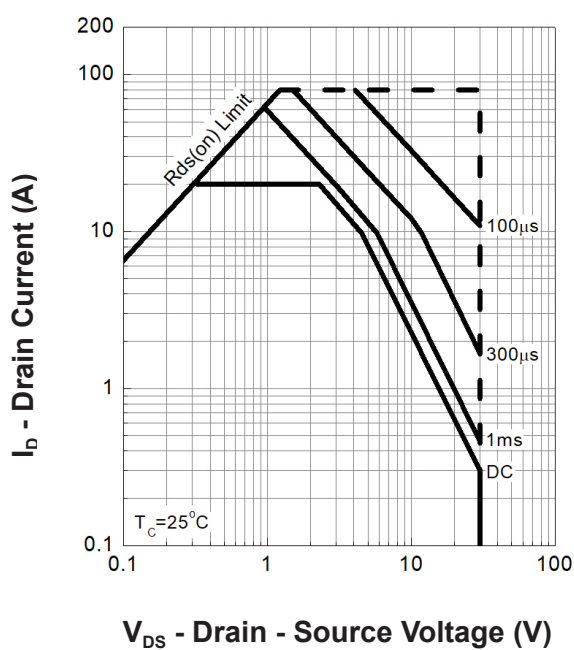
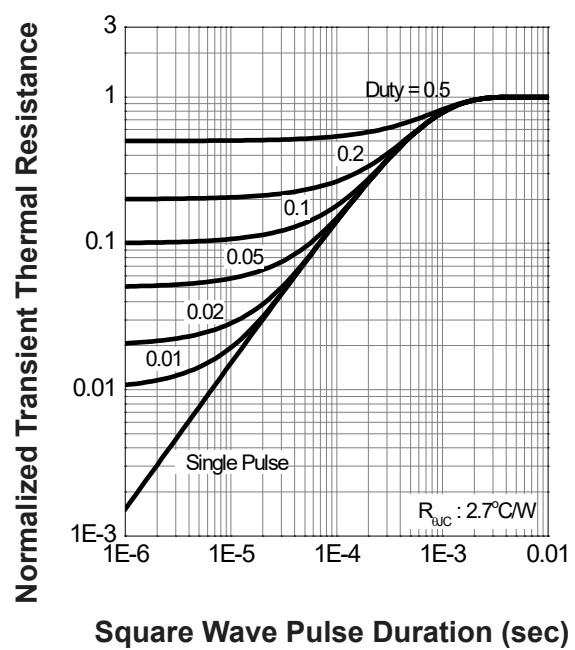
P Channel Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	P Channel			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250μA	-40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-32V, 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} =±25V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^d	Drain-Source On-state Resistance	V _{GS} =-10V, I _{DS} =-10A	-	10	14	mΩ
		V _{GS} =-4.5V, I _{DS} =-6A	-	15	20	
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =-6.5A, V _{GS} =0V	-	-0.8	-1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =-10A, dI _{SD} /dt=100A/μs	-	15	-	ns
Q _{rr}	Reverse Recovery Charge		-	2.2	-	nC
Dynamic Characteristics ^e						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	13	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, Frequency=1.0MHz	-	2832	3640	pF
C _{oss}	Output Capacitance		-	270	-	
C _{rss}	Reverse Transfer Capacitance		-	90	-	
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		-	11	20	
t _{d(OFF)}	Turn-off Delay Time		-	99	178	
t _f	Turn-off Fall Time		-	53	95	
Gate Charge Characteristics ^e						
Q _g	Total Gate Charge	V _{DS} =-15V, V _{GS} =-4.5V, I _{DS} =-10A	-	11	-	nC
Q _g	Total Gate Charge	V _{DS} =-15V, V _{GS} =-10V, I _{DS} =-10A	-	22	33	
Q _{gs}	Gate-Source Charge		-	4	-	
Q _{gd}	Gate-Drain Charge		-	4.5	-	

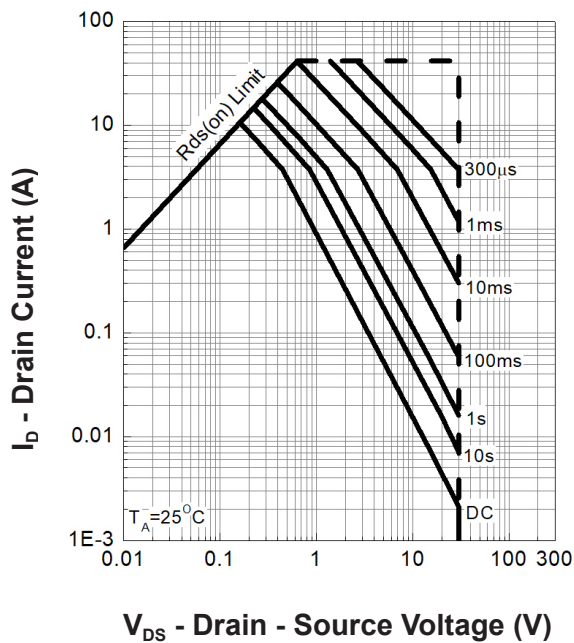
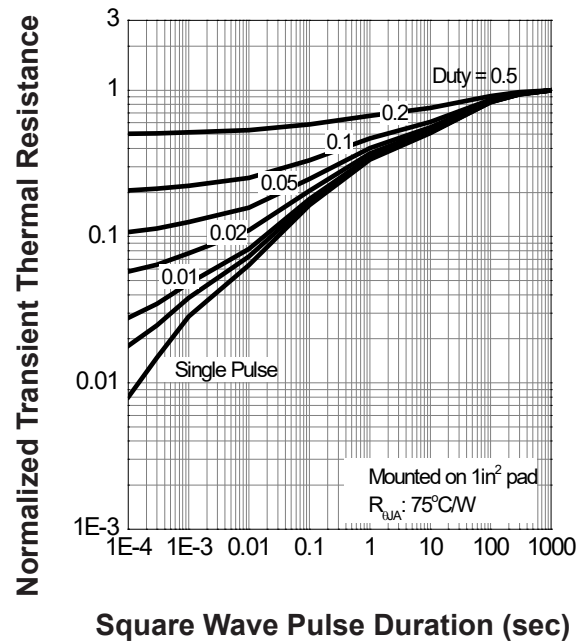
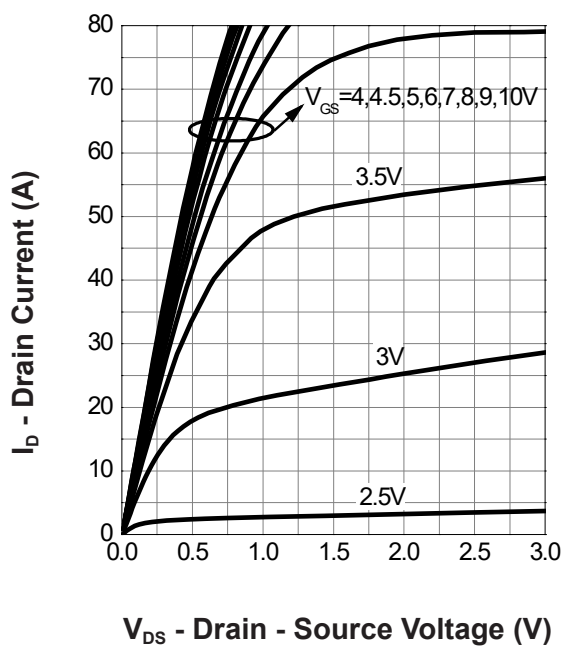
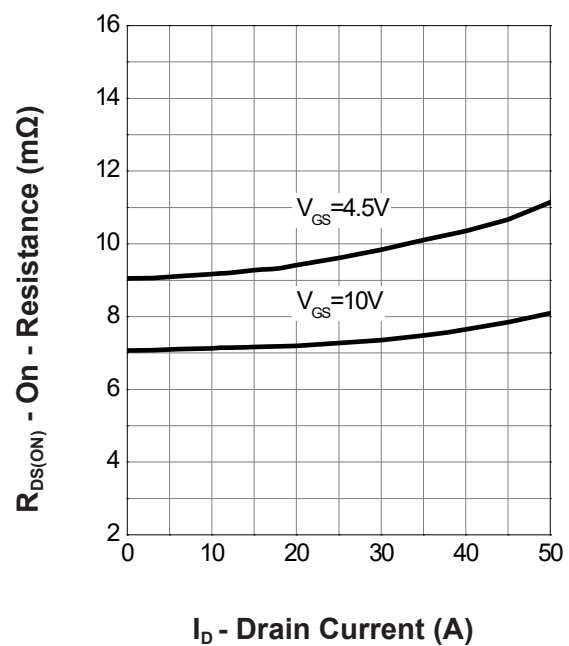
Note d : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

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

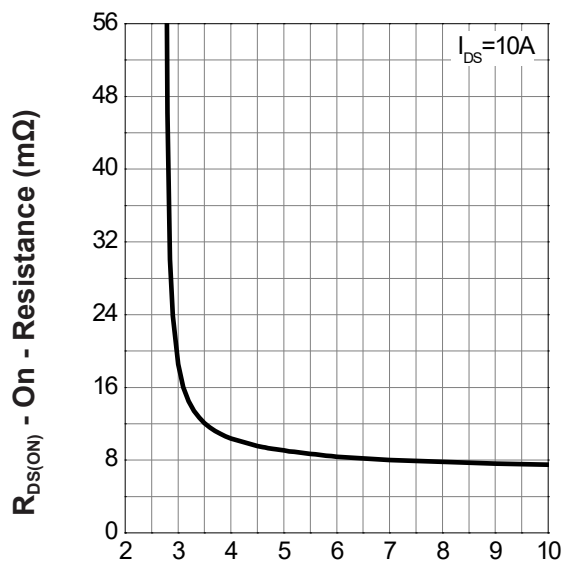
N Channel Typical Operating Characteristics

Power Dissipation

Drain Current

Safe Operation Area

Thermal Transient Impedance


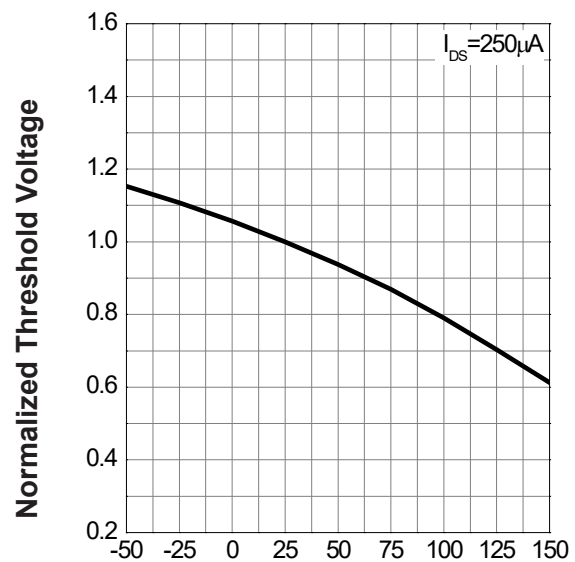
N Channel Typical Operating Characteristics(Cont.)

Safe Operation Area

Thermal Transient Impedance

Output Characteristics

Drain-Source On Resistance


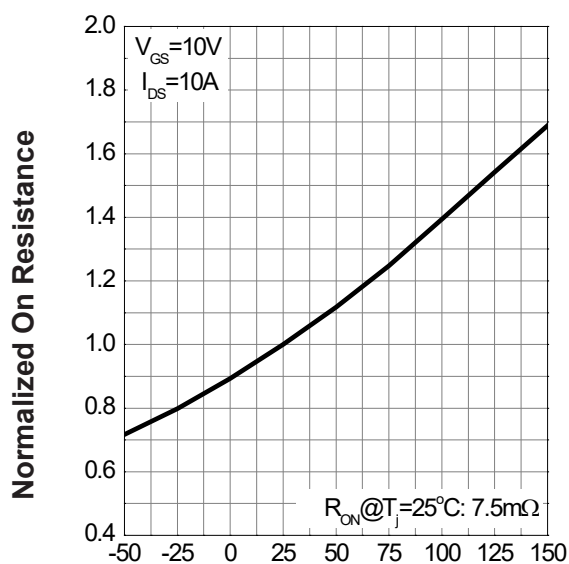
N Channel Typical Operating Characteristics(Cont.)

Gate-Source On Resistance


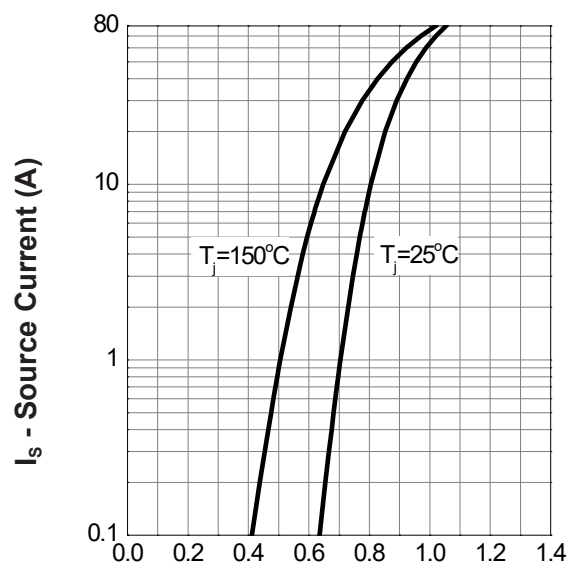
V_{GS} - Gate - Source Voltage (V)

Gate Threshold Voltage


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

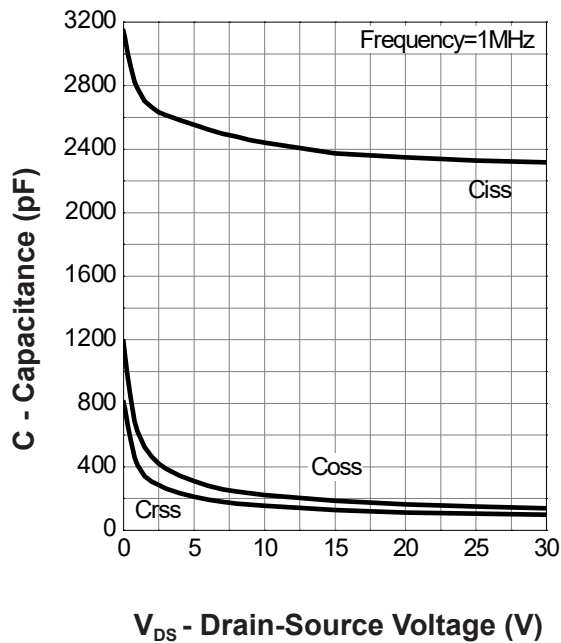
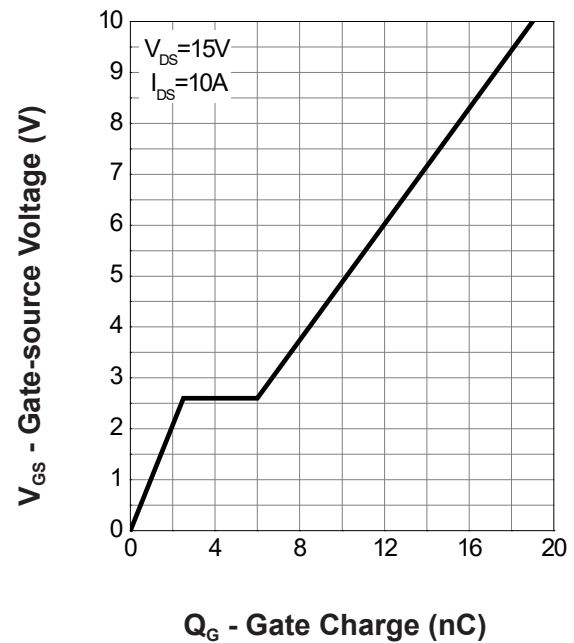
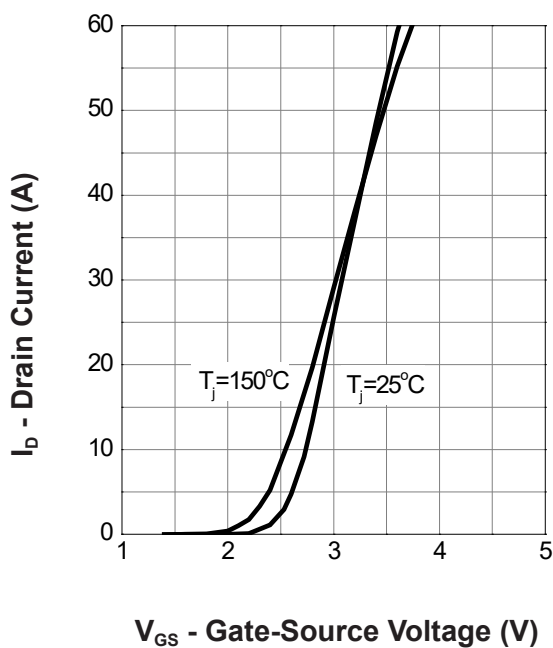
Drain-Source On Resistance


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

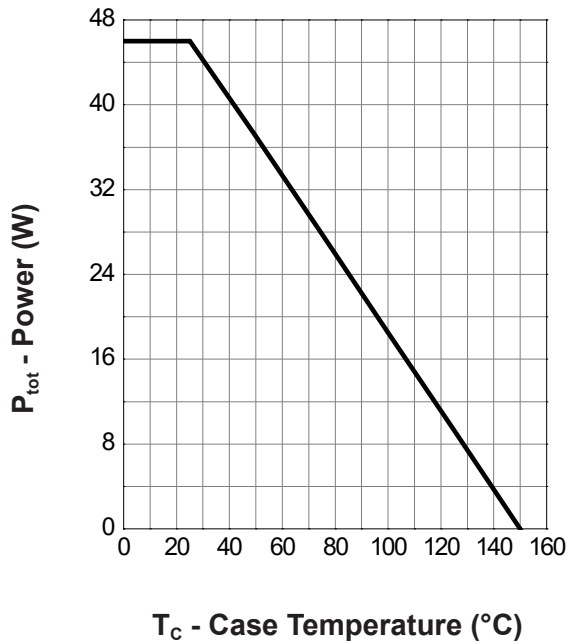
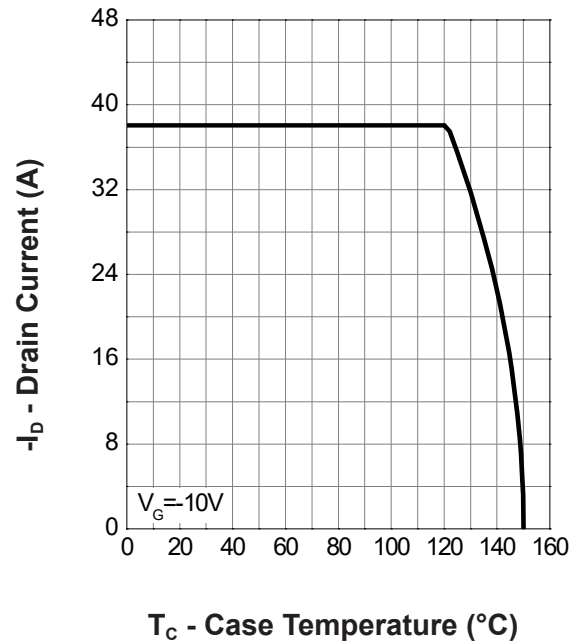
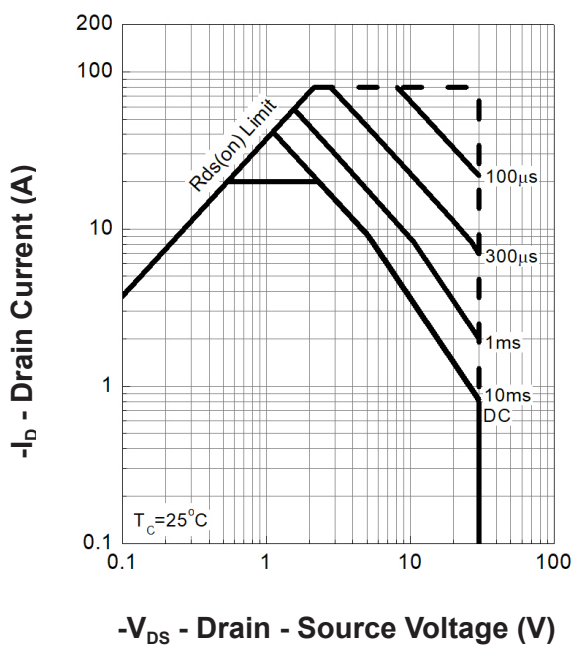
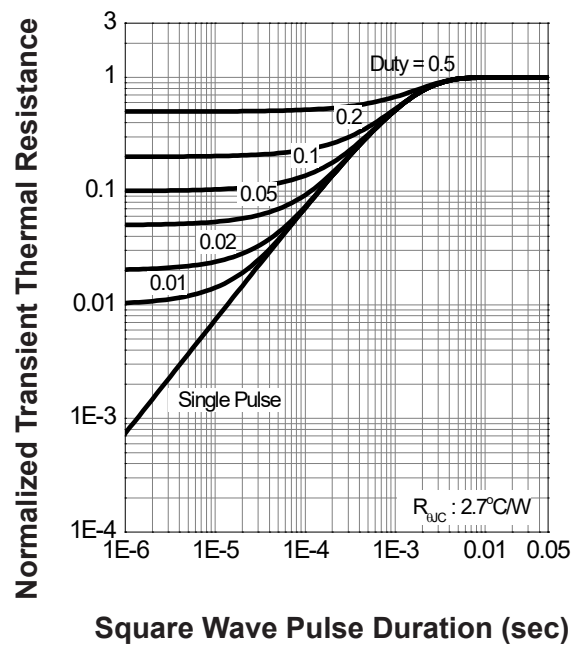
Source-Drain Diode Forward


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

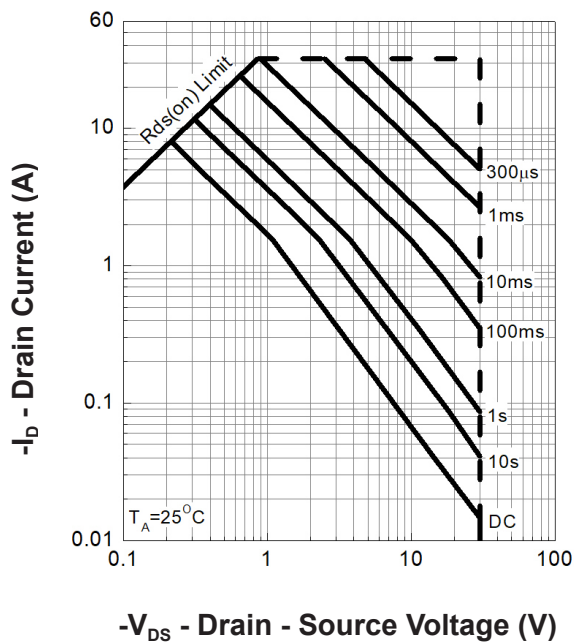
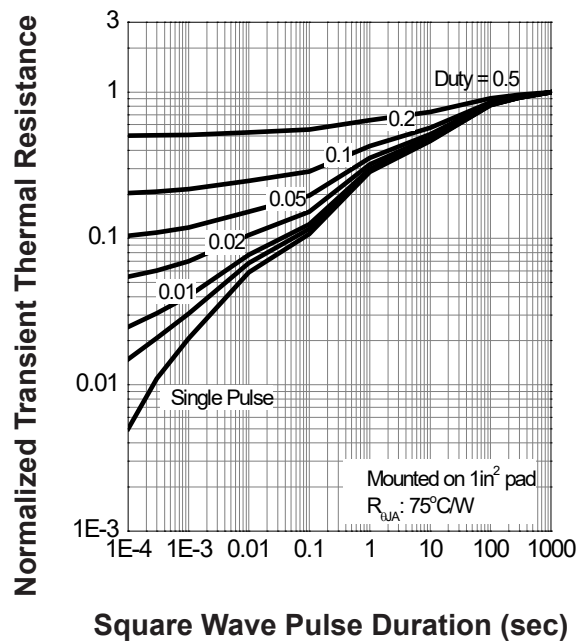
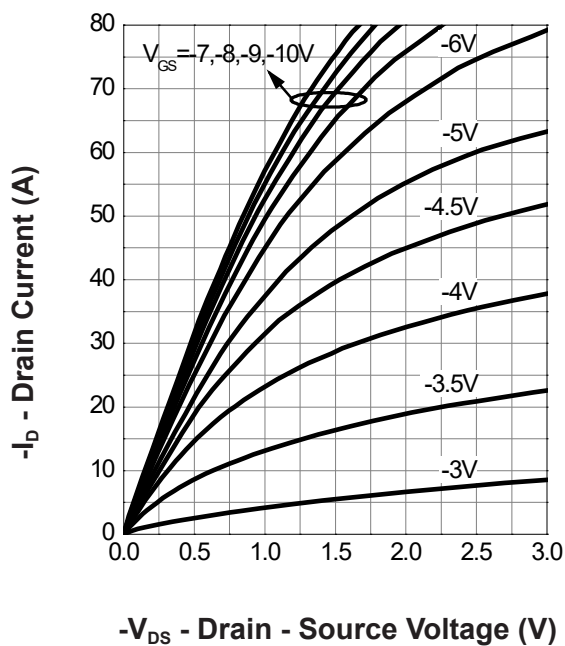
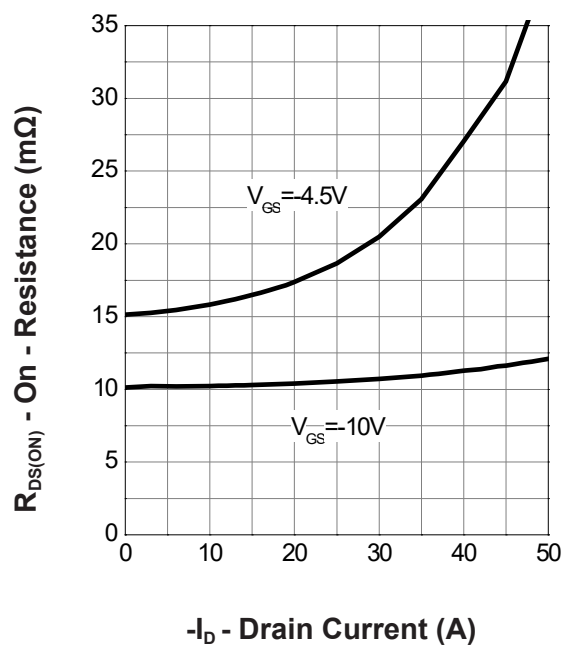
N Channel Typical Operating Characteristics(Cont.)

Capacitance

Gate Charge

Transfer Characteristics


P Channel Typical Operating Characteristics

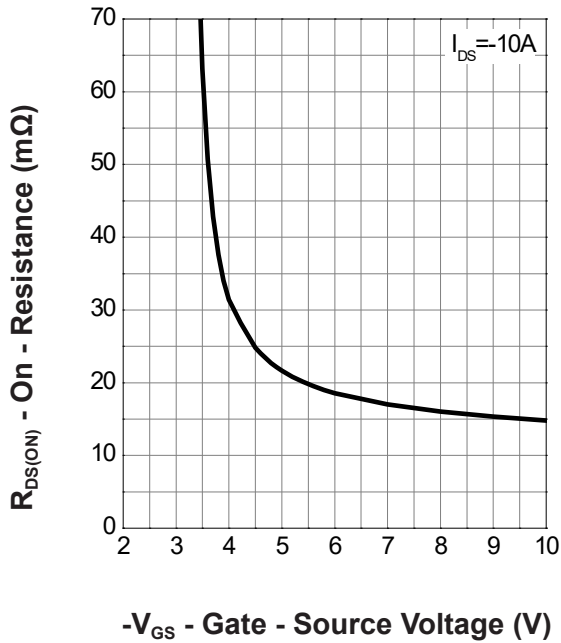
Power Dissipation

Drain Current

Safe Operation Area

Thermal Transient Impedance


P Channel Typical Operating Characteristics(Cont.)

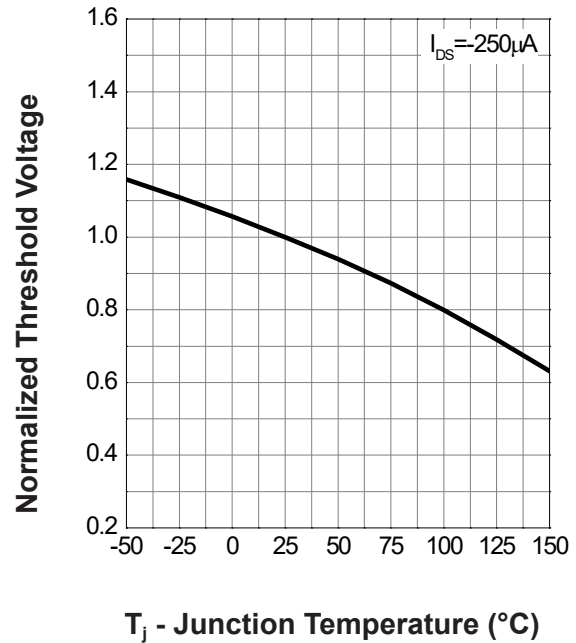
Safe Operation Area

Thermal Transient Impedance

Output Characteristics

Drain-Source On Resistance


P Channel Typical Operating Characteristics(Cont.)

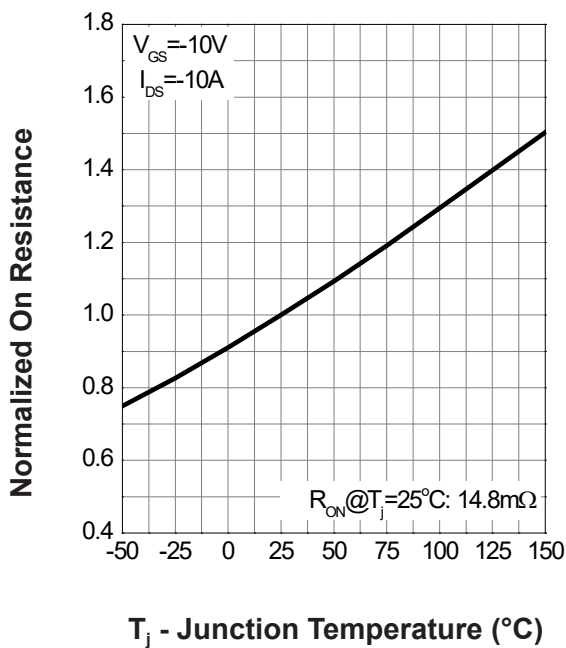
Gate-Source On Resistance



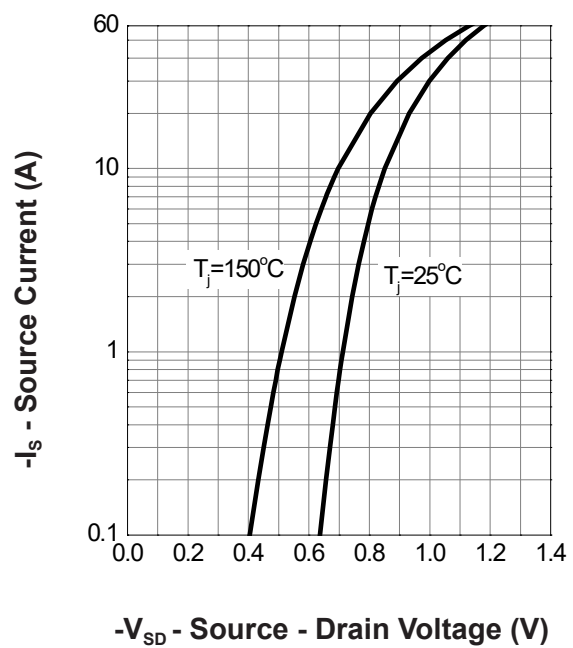
Gate Threshold Voltage



Drain-Source On Resistance

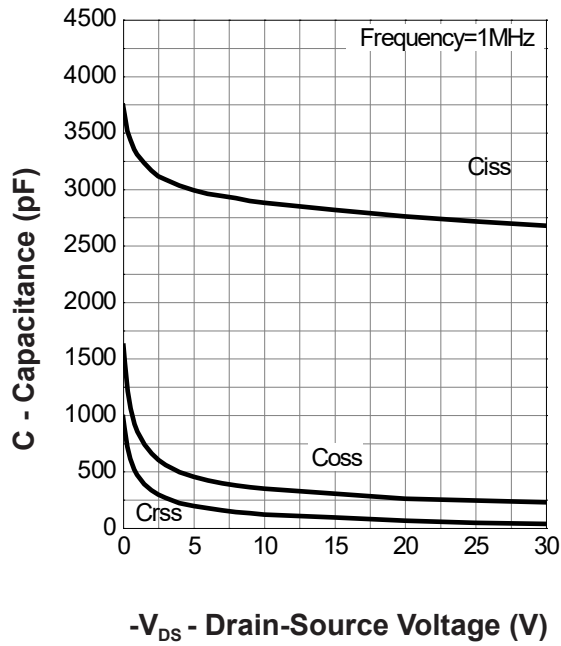


Source-Drain Diode Forward

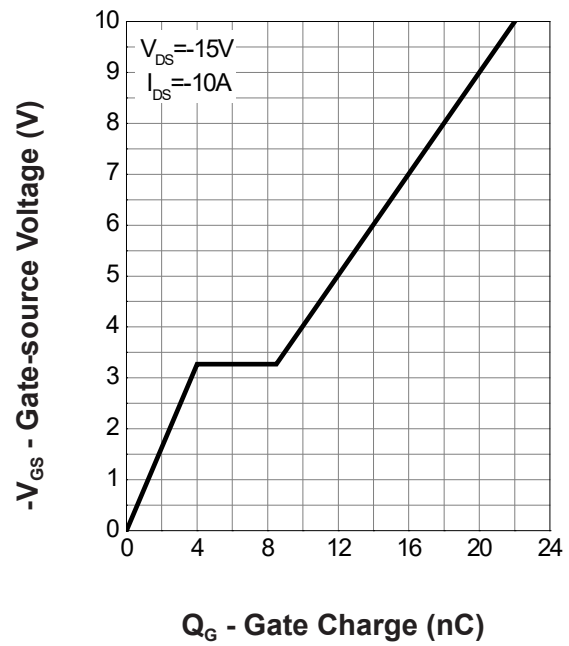


P Channel Typical Operating Characteristics(Cont.)

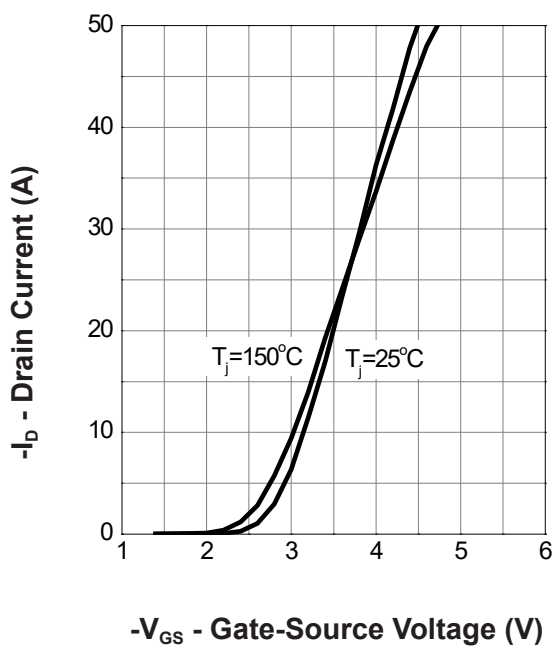
Capacitance



Gate Charge

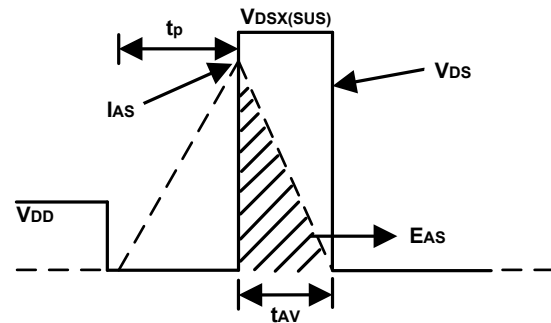
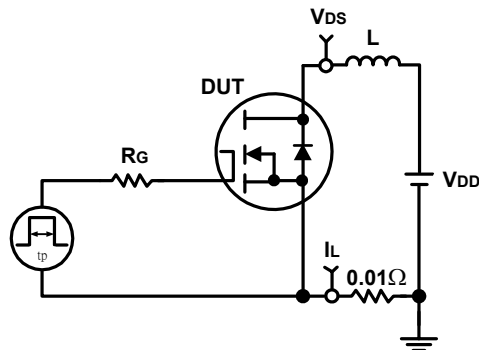


Transfer Characteristics

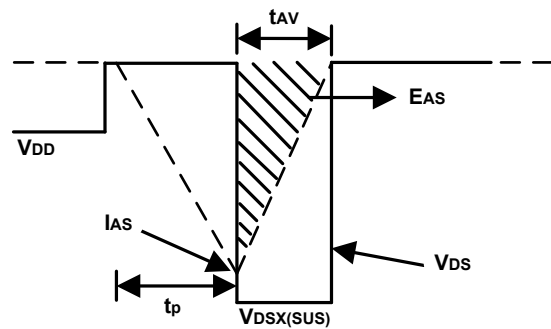
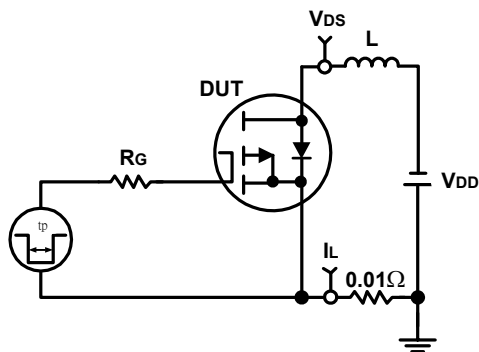


Avalanche Test Circuit and Waveforms

N Channel

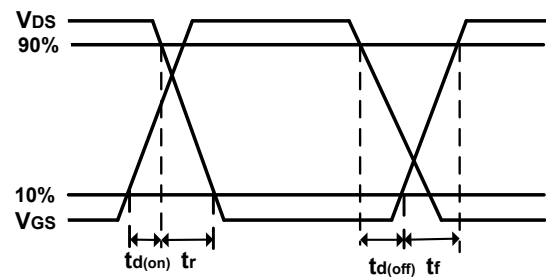
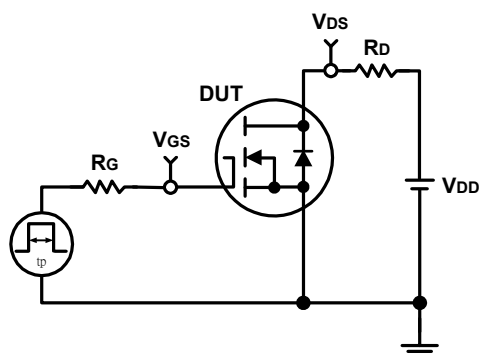


P Channel

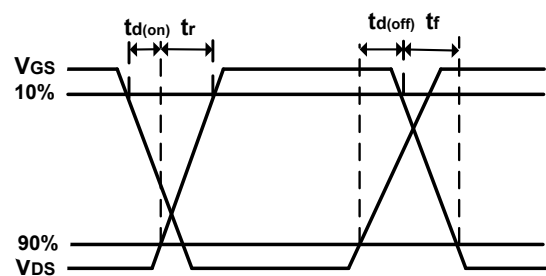
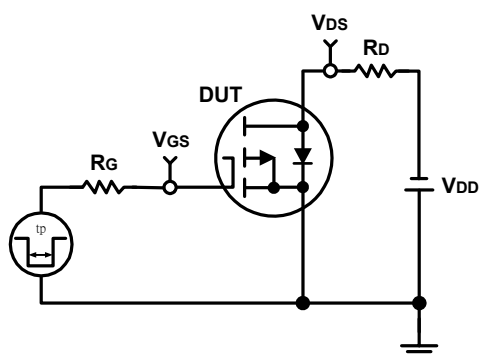


Switching Time Test Circuit and Waveforms

N Channel



P Channel



PDFN5*6-8L OUTLINE

