

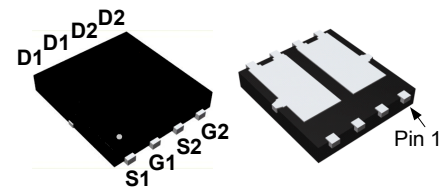
Features

- **N Channel**
40V/60A,
 $R_{DS(ON)} = 6\text{ m}\Omega$ (typ.) @ $V_{GS} = 10\text{V}$
 $R_{DS(ON)} = 8\text{ m}\Omega$ (typ.) @ $V_{GS} = 4.5\text{V}$
- **P Channel**
-40V/-60A,
 $R_{DS(ON)} = 12\text{ m}\Omega$ (typ.) @ $V_{GS} = -10\text{V}$
 $R_{DS(ON)} = 17\text{ m}\Omega$ (typ.) @ $V_{GS} = -4.5\text{V}$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free Available (RoHS Compliant)
- Moisture Sensitivity Level MSL1
(per JEDEC J-STD-020D)

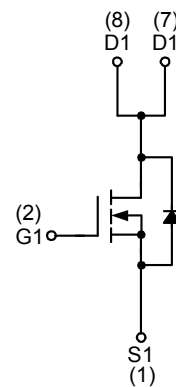
Applications

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

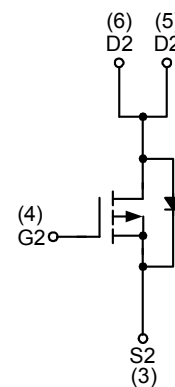
Pin Description



DFN5x6C-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		40	-40	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	60	-60	A
I _D	Continuous Drain Current	T _C =25°C	60	-60	A
		T _C =100°C	45	-45	
P _D	Maximum Power Dissipation	T _C =25°C	19	19	W
		T _C =100°C	7.7	7.7	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	6.5	6.5	°C/W
R _{θJA} ^b	Thermal Resistance-Junction to Ambient	t ≤ 10s	45	45	°C/W
		Steady State	88	88	°C/W
I _{AS} ^c	Avalanche Current, Single pulse	L=0.1mH	23	-24	A
E _{AS} ^c	Avalanche Energy, Single pulse	L=0.1mH	26.45	-28.8	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 $T_J=25^\circ\text{C}$)

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	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	1.5	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} =8A	-	6	9	mΩ
		T _J =125°C	-	11.9	-	
		V _{GS} =4.5V, I _{DS} =5A	-	8	11	
G _{fs}	Forward Transconductance	V _{DS} =5V, I _{DS} =5A	-	15	-	S
Diode Characteristics						
V _{SD} ^e	Diode Forward Voltage	I _{SD} =3A, V _{GS} =0V	-	0.75	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =8A, dI _{SD} /dt=100A/μs	-	11.7	-	ns
t _a	Charge Time		-	4.8	-	
t _b	Discharge Time		-	6.9	-	
Q _{rr}	Reverse Recovery Charge		-	1.7	-	nC
Dynamic Characteristics ^f						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	0.9	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	-	940	-	pF
C _{oss}	Output Capacitance		-	150	-	
C _{rss}	Reverse Transfer Capacitance		-	100	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =1Ω	-	11.9	-	ns
t _r	Turn-on Rise Time		-	10.1	-	
t _{d(OFF)}	Turn-off Delay Time		-	22	-	
t _f	Turn-off Fall Time		-	5	-	
Gate Charge Characteristics ^f						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _{DS} =8A	-	8.7	-	nC
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V, I _{DS} =8A	-	18	-	
Q _{gth}	Threshold Gate Charge		-	1.24	-	
Q _{gs}	Gate-Source Charge		-	2	-	
Q _{gd}	Gate-Drain Charge		-	4	-	

Note e : Pulse test ; pulse width≤300μs, duty cycle≤2%.

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

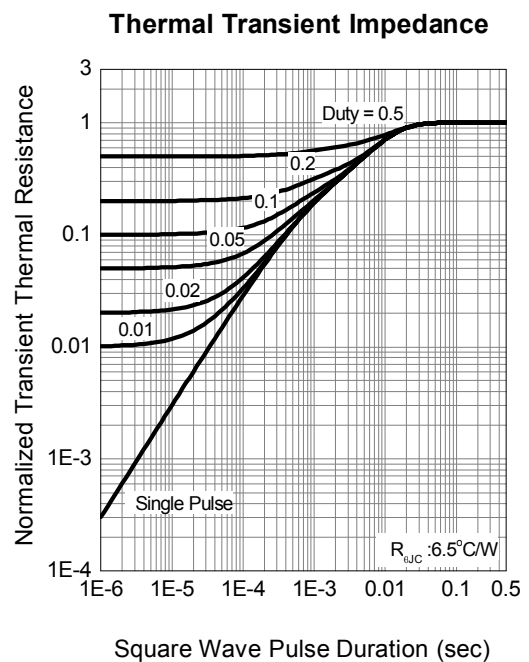
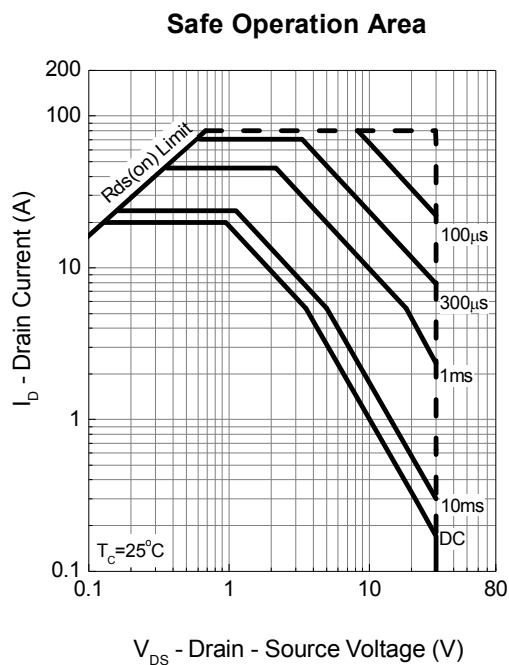
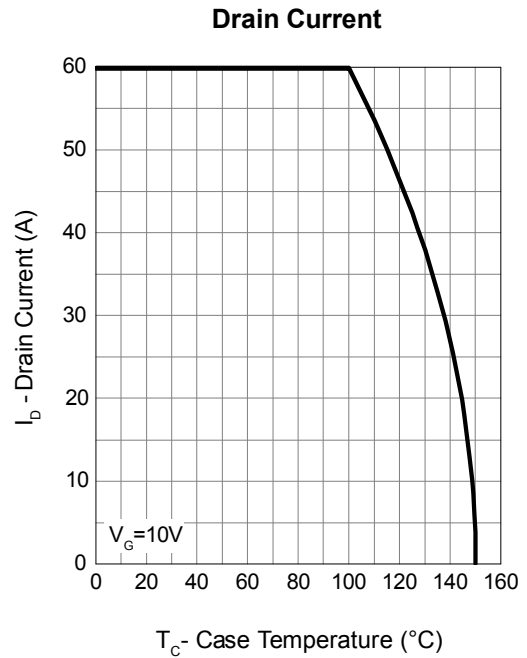
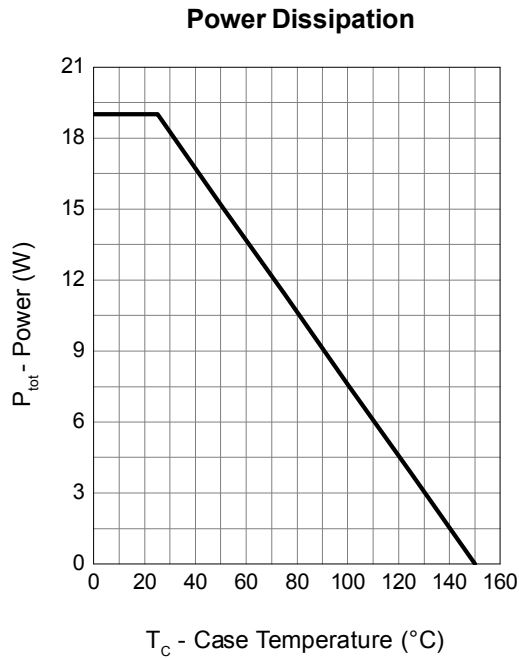
P Channel Electrical Characteristics (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	P Channel			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250μA	-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	-1.5	-2	-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} =-10A	-	12	15	mΩ
		T _J =125°C	-	14.9	-	
		V _{GS} =-4.5V, I _{DS} =-5A	-	17	22	
Gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =5A	-	13	-	S
Diode Characteristics						
V _{SD} ^e	Diode Forward Voltage	I _{SD} =-1A, V _{GS} =0V	-	-0.75	-1	V
t _{rr}	Reverse Recovery Time	I _{SD} =-10A, dI _{SD} /dt=100A/μs	-	26	-	ns
t _a	Charge Time		-	8	-	
t _b	Discharge Time		-	18	-	
Q _{rr}	Reverse Recovery Charge		-	7	-	nC
Dynamic Characteristics ^f						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	3.4	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, Frequency=1.0MHz	-	1000	-	pF
C _{oss}	Output Capacitance		-	210	-	
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	-	11	-	ns
t _r	Turn-on Rise Time		-	12	-	
t _{d(OFF)}	Turn-off Delay Time		-	26	-	
t _f	Turn-off Fall Time		-	12	-	
Gate Charge Characteristics ^f						
Q _g	Total Gate Charge	V _{DS} =-15V, V _{GS} =-4.5V, I _{DS} =-10A	-	9.6	-	nC
Q _g	Total Gate Charge	V _{DS} =-15V, V _{GS} =-10V, I _{DS} =-10A	-	21	-	
Q _{gth}	Threshold Gate Charge		-	1.5	-	
Q _{gs}	Gate-Source Charge		-	3.5	-	
Q _{gd}	Gate-Drain Charge		-	5.9	-	

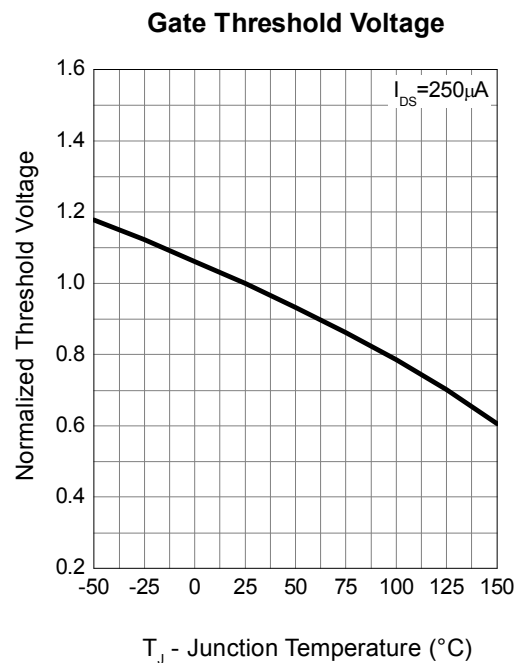
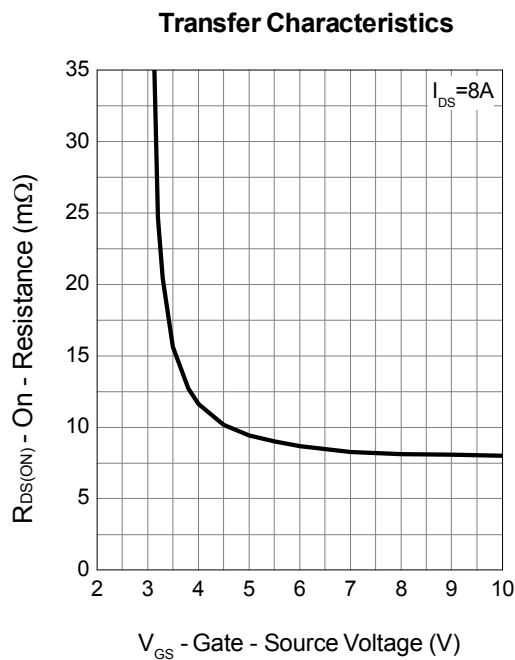
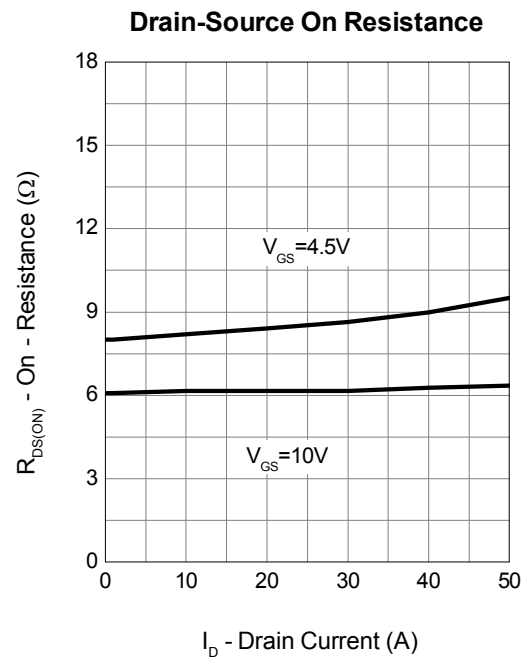
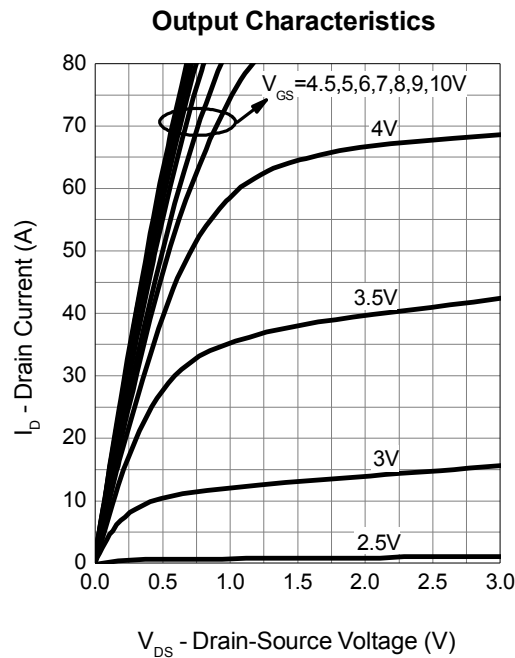
Note e : Pulse test ; pulse width≤300μs, duty cycle≤2%.

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

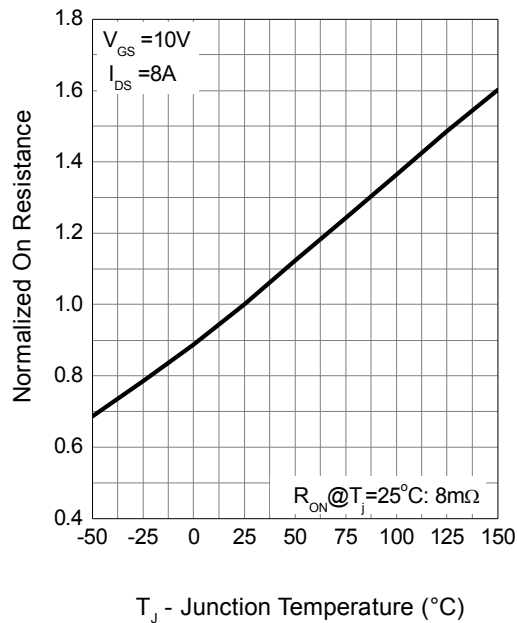
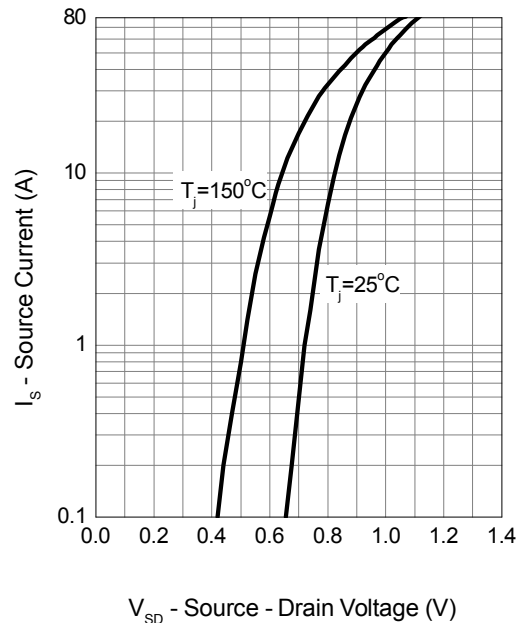
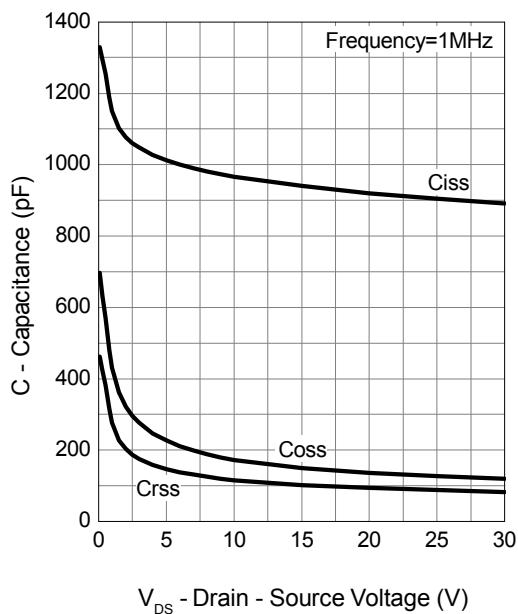
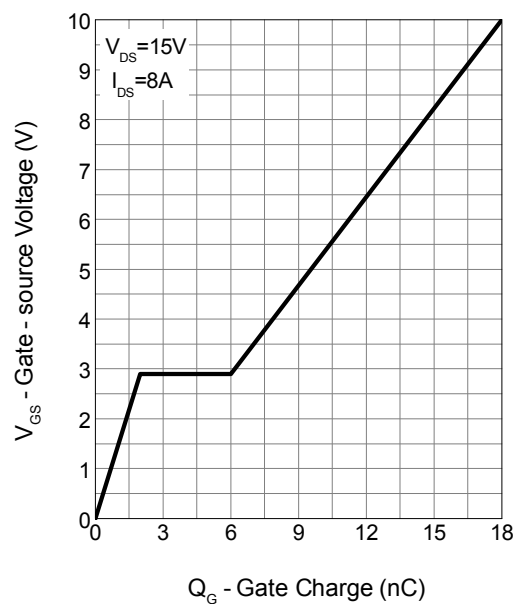
N Channel Typical Operating Characteristics



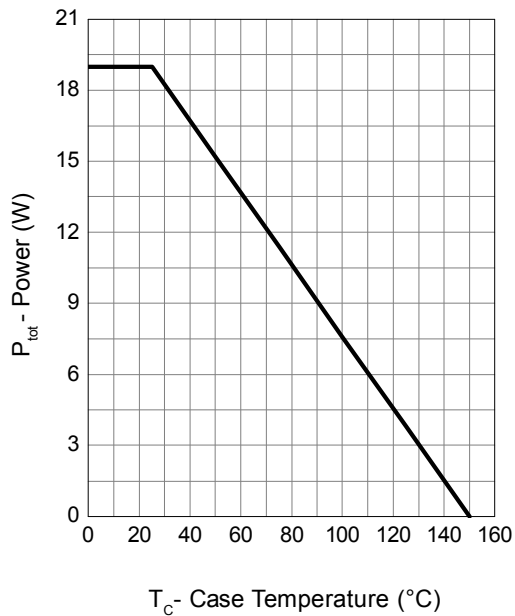
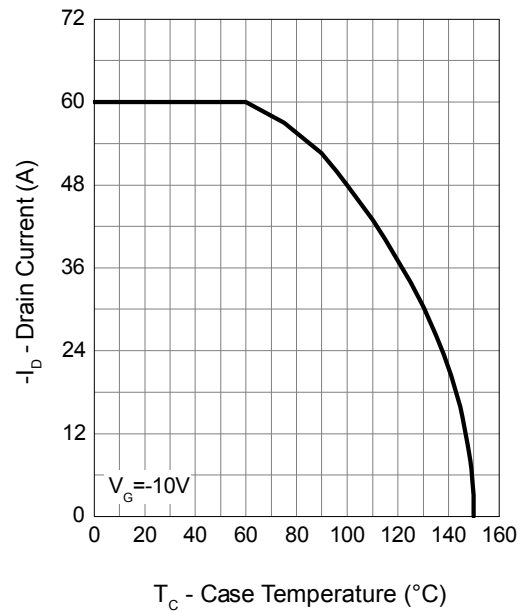
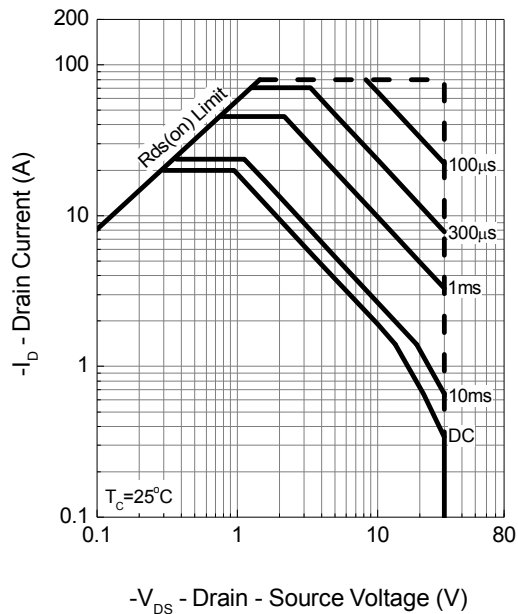
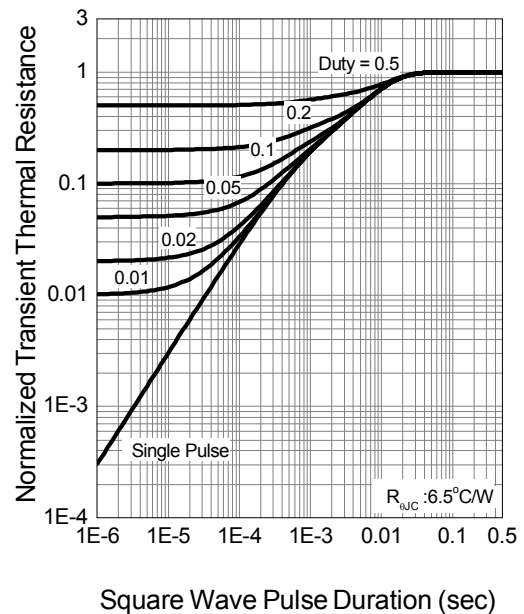
N Channel Typical Operating Characteristics (Cont.)



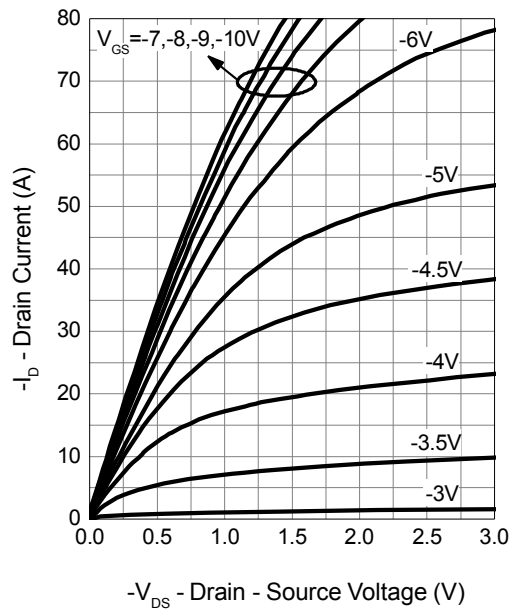
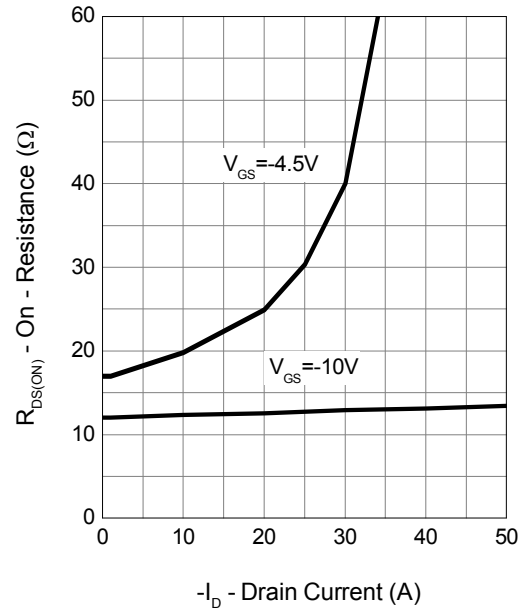
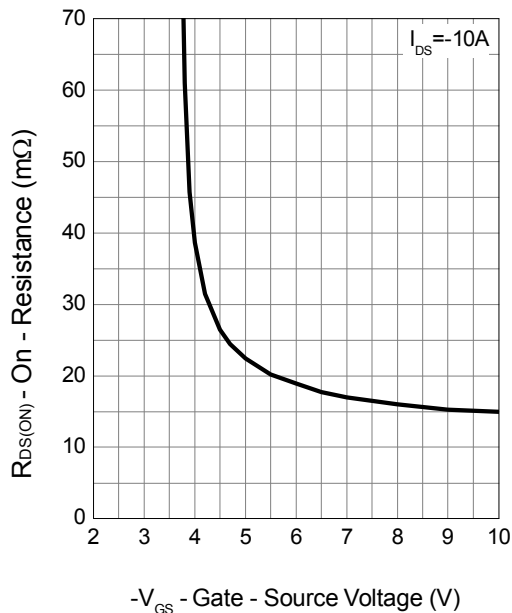
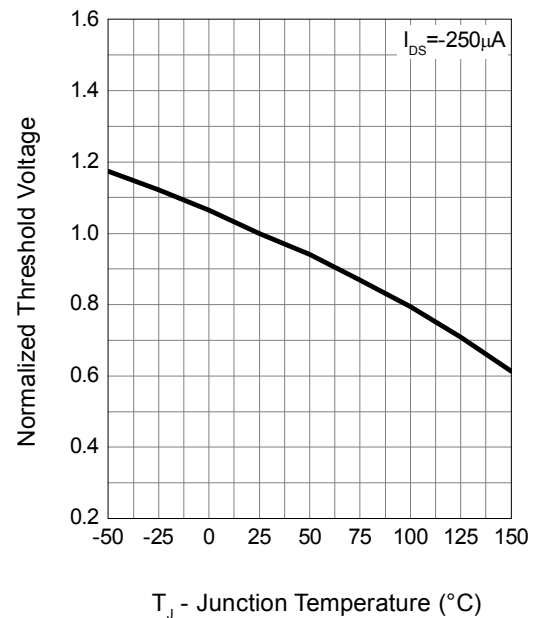
N Channel Typical Operating Characteristics (Cont.)

Drain-Source On Resistance

Source-Drain Diode Forward

Capacitance

Gate Charge


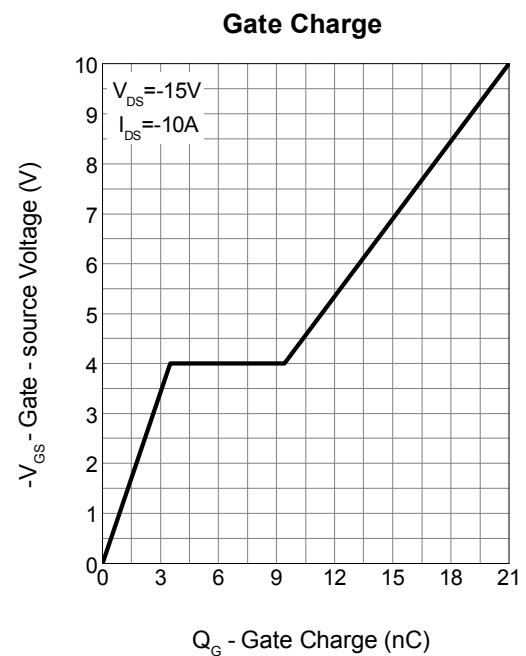
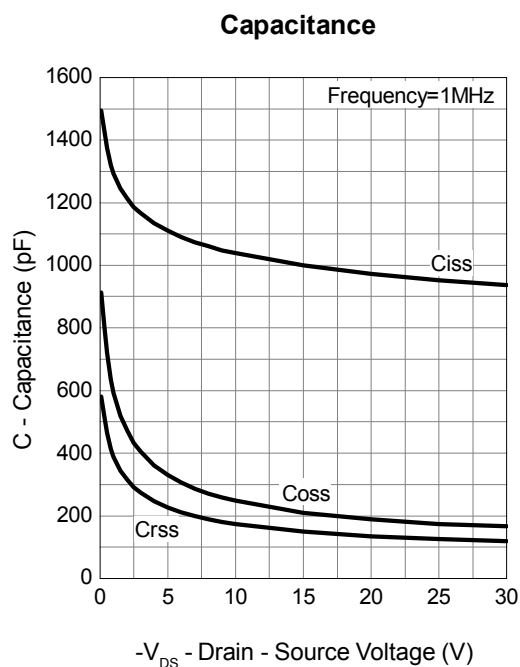
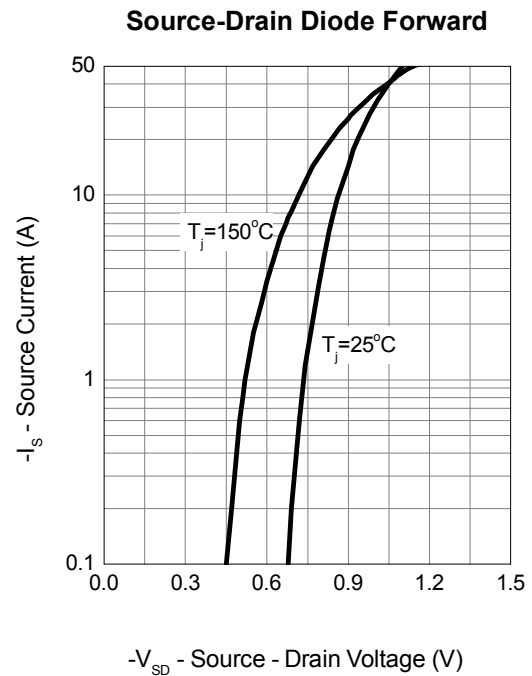
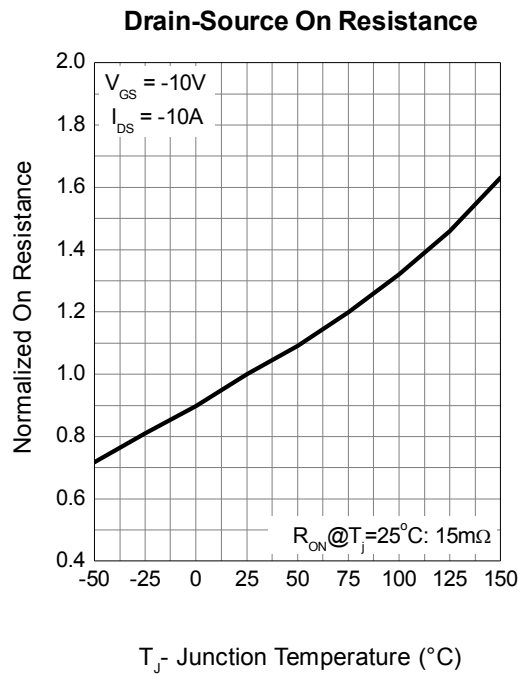
P Channel Typical Operating Characteristics

Power Dissipation

Drain Current

Safe Operation Area

Thermal Transient Impedance


P Channel Typical Operating Characteristics (Cont.)

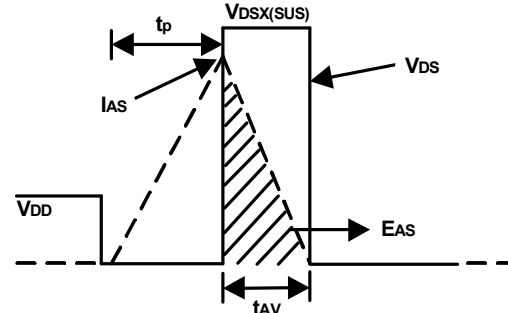
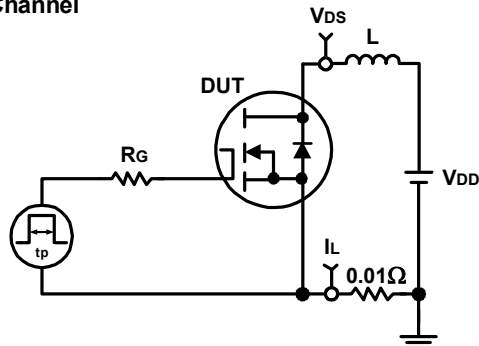
Output Characteristics

Drain-Source On Resistance

Transfer Characteristics

Gate Threshold Voltage


P Channel Typical Operating Characteristics (Cont.)

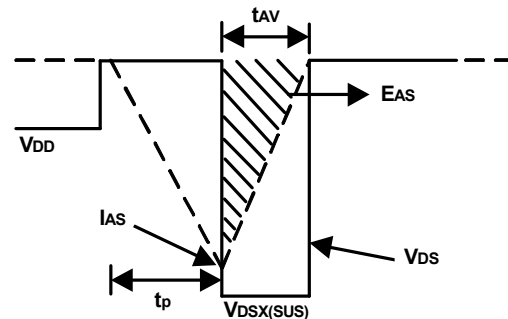
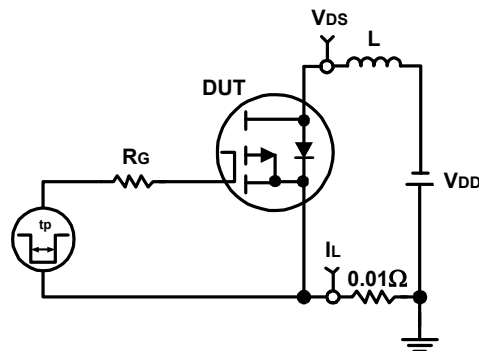


Avalanche Test Circuit and Waveforms

N Channel

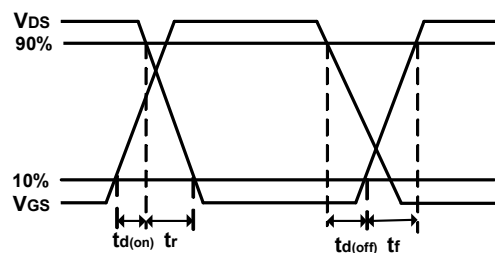
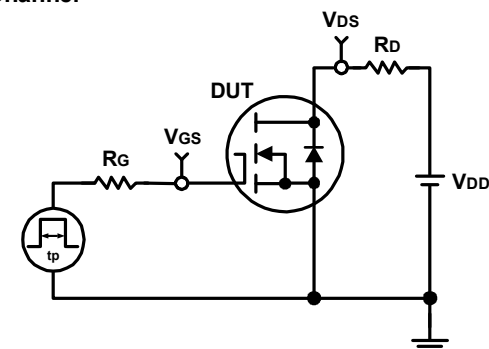


P Channel

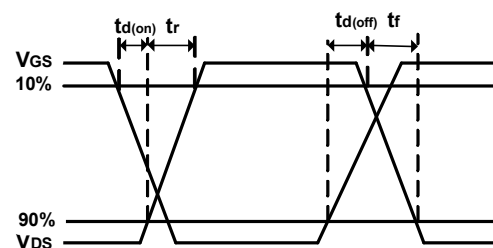
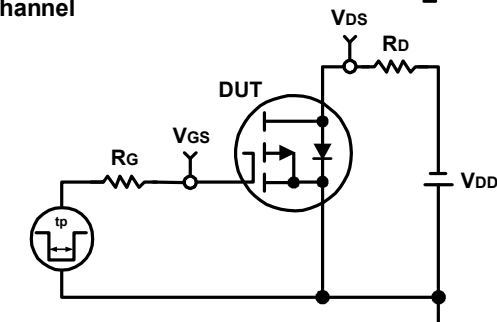


Switching Time Test Circuit and Waveforms

N Channel



P Channel



DFN5×6 OUTLINE

