

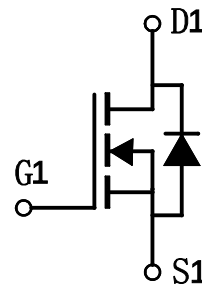
Features

- **N Channel**
40V/16A,
 $R_{DS(ON)} = 15.5m\Omega$ (typ.) @ $V_{GS} = 10V$
 $R_{DS(ON)} = 18.5m\Omega$ (typ.) @ $V_{GS} = 4.5V$
- **P Channel**
-40V/-16A,
 $R_{DS(ON)} = 30m\Omega$ (typ.) @ $V_{GS} = -10V$
 $R_{DS(ON)} = 40m\Omega$ (typ.) @ $V_{GS} = -4.5V$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free Available (RoHS Compliant)

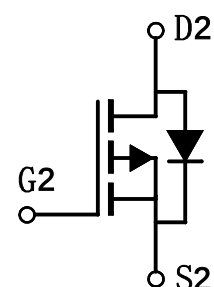
Applications

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

Pin Description



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
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	16	-16	A
I _D	Continuous Drain Current	T _C =25°C	16	-16	A
		T _C =100°C	6.4	-6.4	
P _D	Maximum Power Dissipation	T _C =25°C	18.9		W
		T _C =100°C	7.6		
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	6.6		°C/W
I _D	Continuous Drain Current	T _A =25°C	16	-16	A
		T _A =70°C	6.4	-6.4	
I _{DM} ^a	Pulsed Drain Current	T _A =25°C	48	-48	A
P _D	Maximum Power Dissipation	T _A =25°C	2.78		W
		T _A =70°C	1.78		
R _{θJA} ^b	Thermal Resistance-Junction to Ambient	t ≤ 10s	45		°C/W
		Steady State	95		°C/W
I _{AS} ^c	Avalanche Current, Single pulse	L=0.1mH	26	38	A
E _{AS} ^c	Avalanche Energy, Single pulse	L=0.1mH	33	72	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 150°C (initial temperature $T_J = 25^\circ\text{C}$)

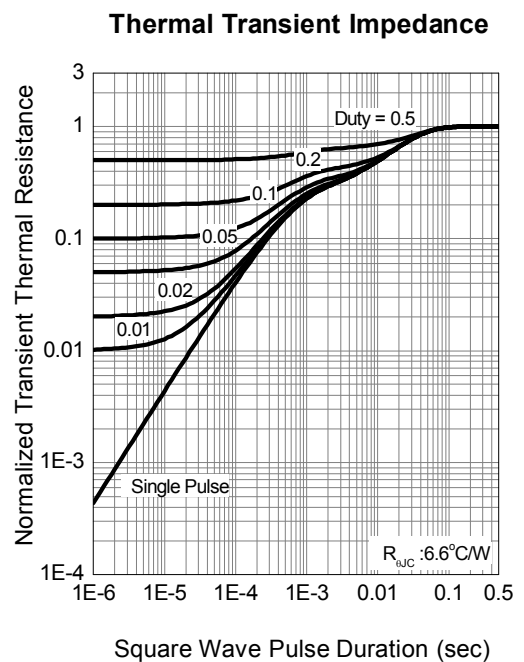
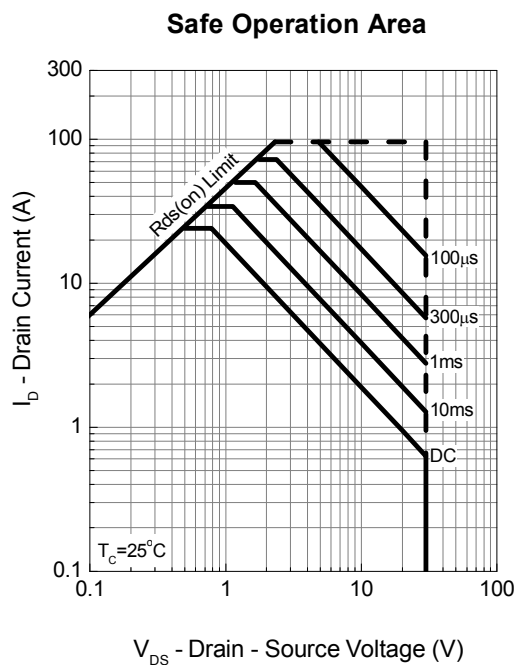
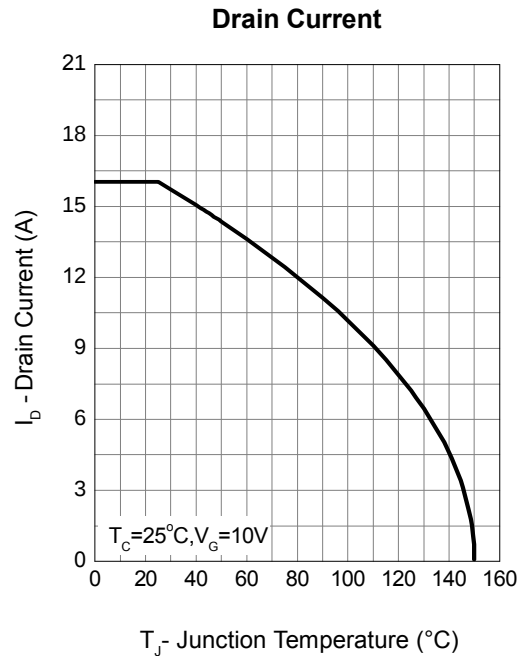
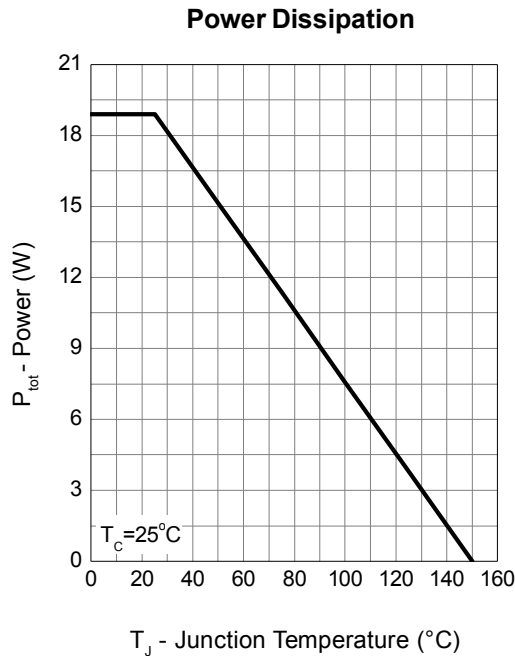
N Channel Electrical Characteristics (T_A = 25°C unless otherwise noted)

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	-	-	50	μA
		T _J =85°C	-	-	5	mA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.3	1.8	2.3	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} =9A	-	15.5	20	mΩ
		V _{GS} =4.5V, I _{DS} =8A	-	18.5	24	mΩ
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =1A, V _{GS} =0V	0.3	0.4	0.55	V
t _{rr}	Reverse Recovery Time	I _{SD} =4.0A, dI _{SD} /dt=100A/μs	-	11	-	ns
Q _{rr}	Reverse Recovery Charge		-	3.5	-	nC
Dynamic Characteristics ^e						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,f=1MHz	-	3.3	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz	-	395	514	pF
C _{oss}	Output Capacitance		-	105	-	
C _{rss}	Reverse Transfer Capacitance		-	42	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	5.5	-	ns
t _r	Turn-on Rise Time		-	10.5	-	
t _{d(OFF)}	Turn-off Delay Time		-	15	-	
t _f	Turn-off Fall Time		-	3.7	-	
Gate Charge Characteristics ^e						
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =4.5V, I _{DS} =4.0A	-	4	-	nC
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V, I _{DS} =4.0A	-	8.3	-	
Q _{gs}	Gate-Source Charge		-	1.1	-	
Q _{gd}	Gate-Drain Charge		-	1.8	-	

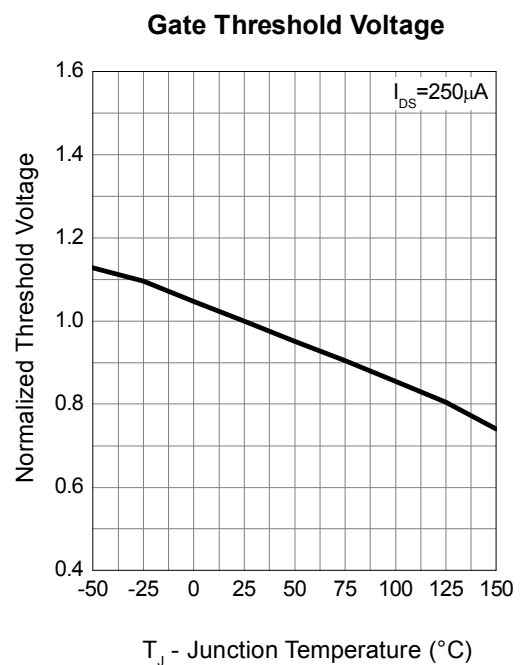
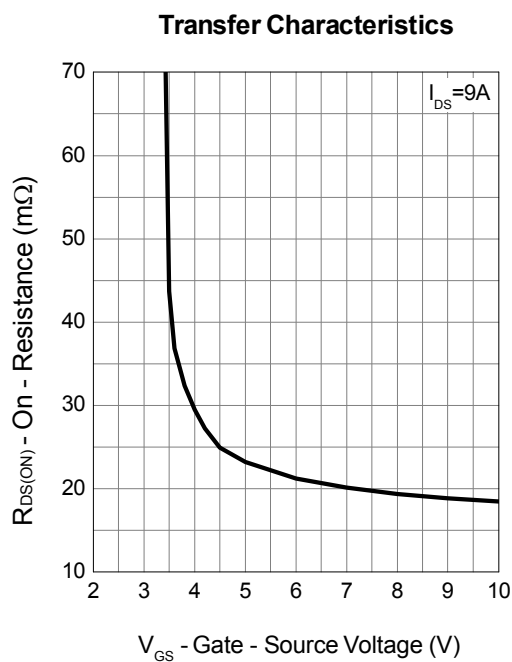
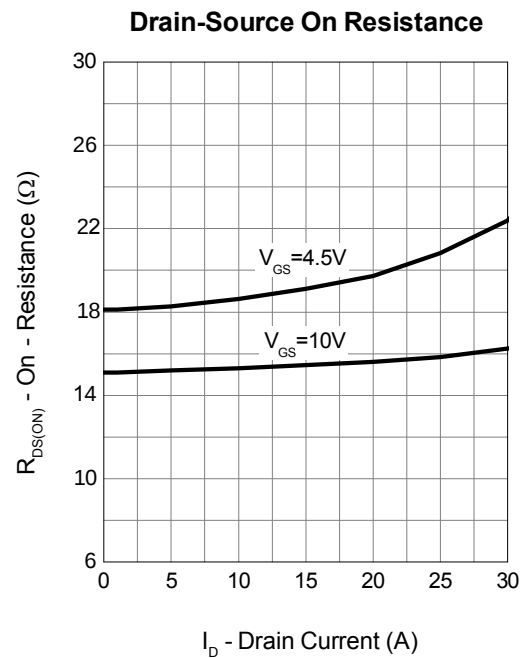
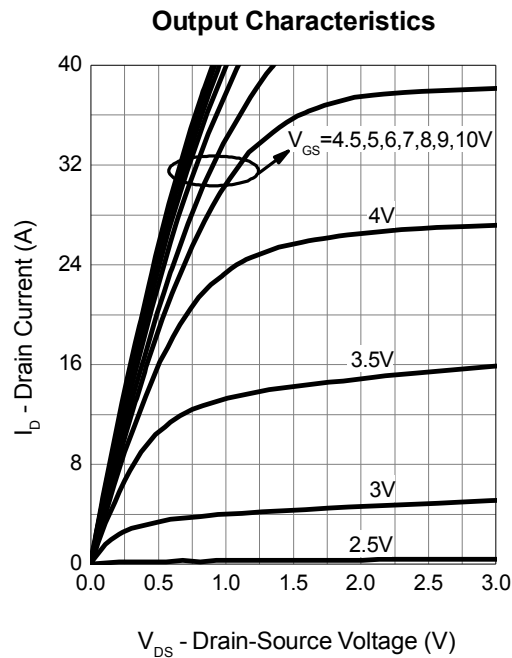
Note d : Pulse test ; pulse width≤300μs, duty cycle≤2%.

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

N Channel Typical Operating Characteristics

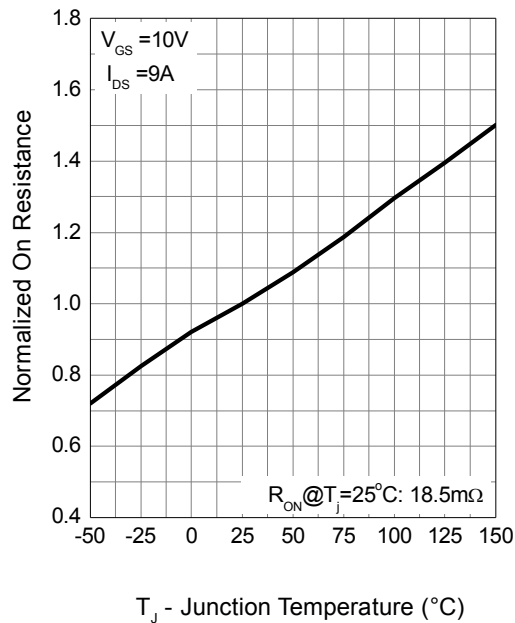


N Channel Typical Operating Characteristics (Cont.)

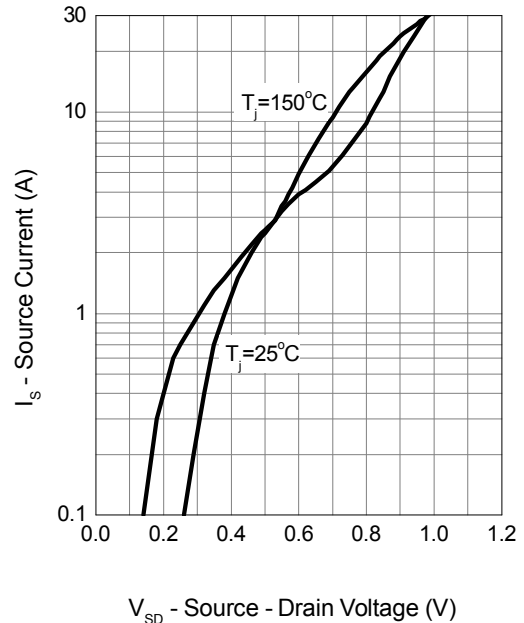


N Channel Typical Operating Characteristics (Cont.)

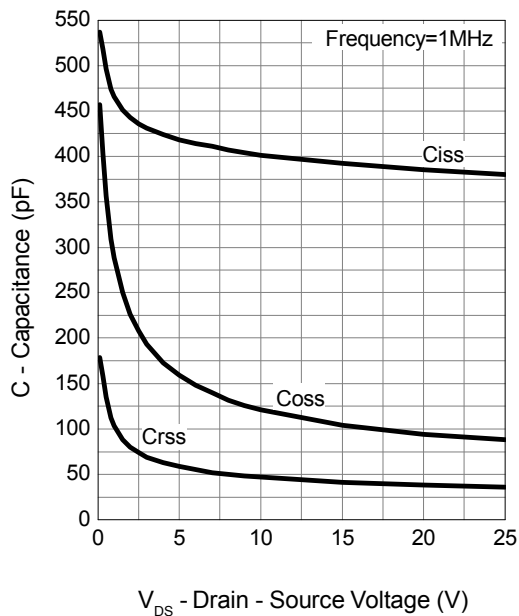
Drain-Source On Resistance



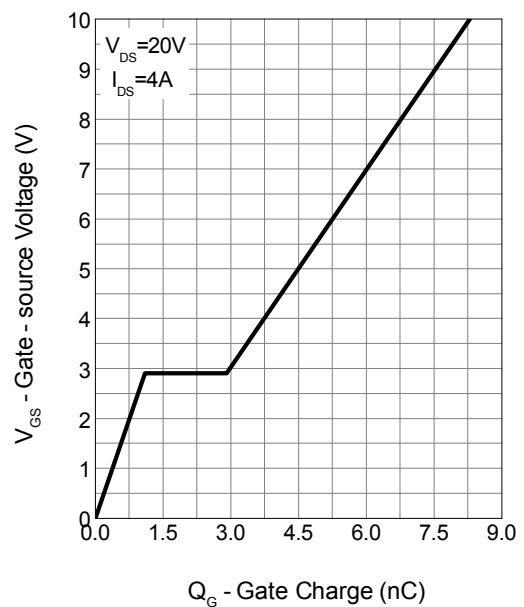
Source-Drain Diode Forward



Capacitance



Gate Charge



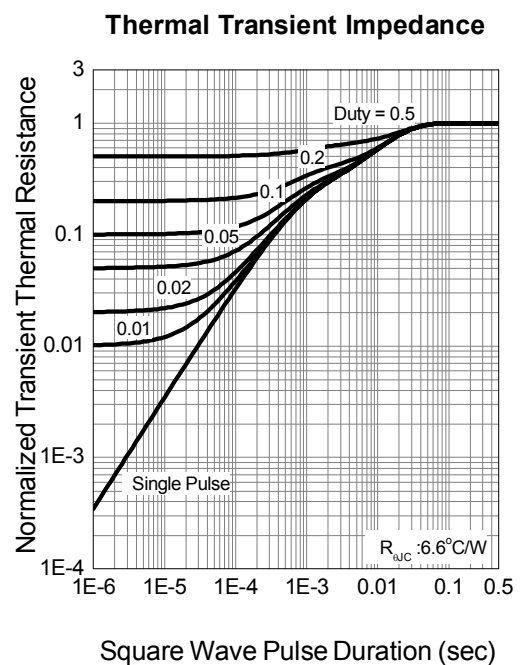
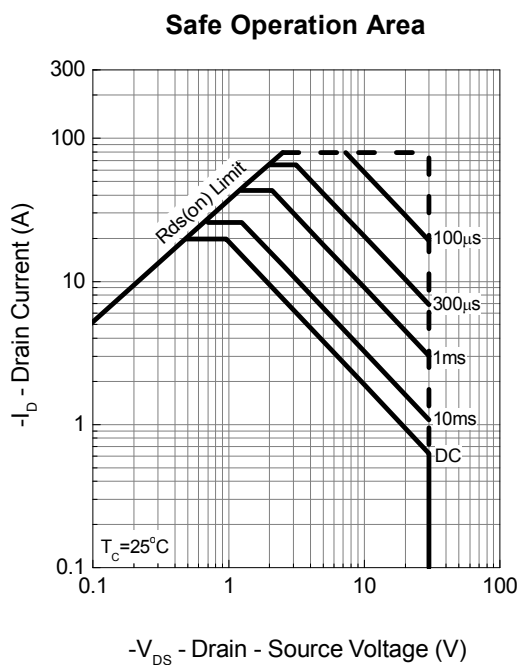
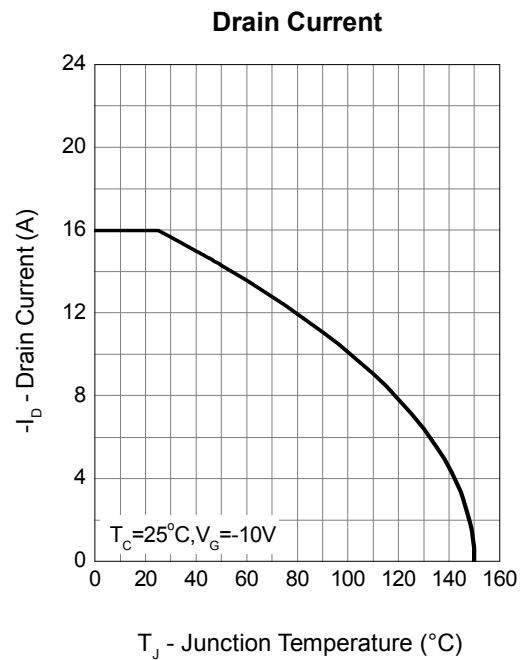
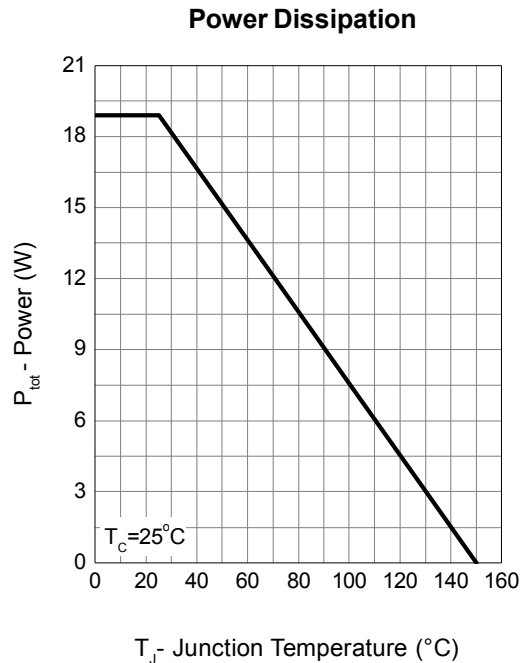
P Channel Electrical Characteristics (T_A = 25°C unless otherwise noted)

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	-1.3	-1.8	2.3	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} =-7A	-	30	35	mΩ
		V _{GS} =-4.5V, I _{DS} =-4A	-	40	55	mΩ
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =-1A, V _{GS} =0V	-	-0.75	-1	V
t _{rr}	Reverse Recovery Time	I _{SD} =-7.0A,	-	17	-	ns
Q _{rr}	Reverse Recovery Charge	di _{SD} /dt=100A/μs	-	9	-	nC
Dynamic Characteristics ^e						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	12	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-20V, Frequency=1.0MHz	-	750	-	pF
C _{oss}	Output Capacitance		-	142	-	
C _{rss}	Reverse Transfer Capacitance		-	102	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-20V, R _L =15Ω, I _{DS} =-1A, V _{GEN} =-10V, R _G =6Ω	-	9	-	ns
t _r	Turn-on Rise Time		-	11	-	
t _{d(OFF)}	Turn-off Delay Time		-	55	-	
t _f	Turn-off Fall Time		-	34	-	
Gate Charge Characteristics ^e						
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-4.5V, I _{DS} =-7.0A	-	8	-	nC
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-10V, I _{DS} =-7.0A	-	17	-	
Q _{gth}	Threshold Gate Charge		-	1	-	
Q _{gs}	Gate-Source Charge		-	2	-	
Q _{gd}	Gate-Drain Charge		-	4	-	

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

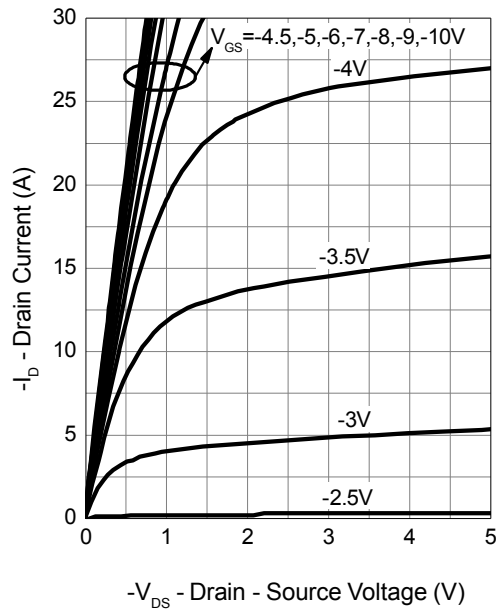
Note e : Guaranteed by design, not subject to production testing.

P Channel Typical Operating Characteristics

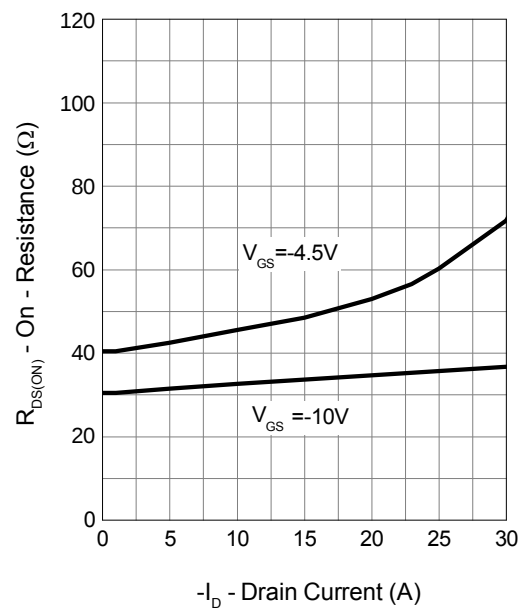


P Channel Typical Operating Characteristics (Cont.)

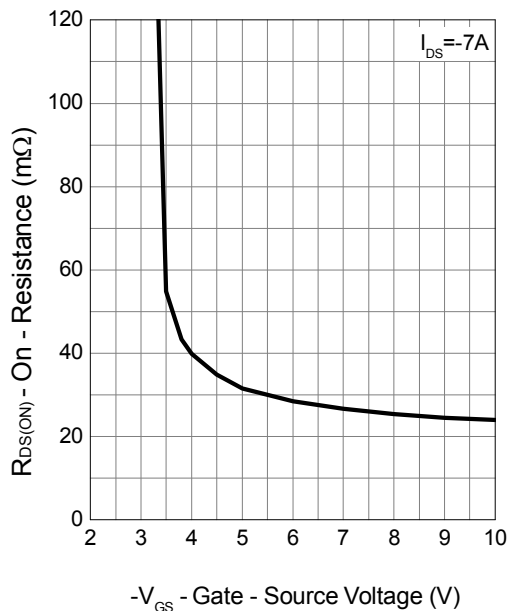
Output Characteristics



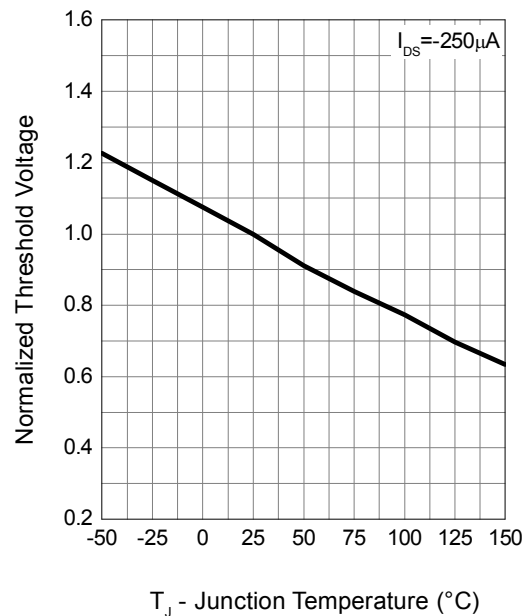
Drain-Source On Resistance



Transfer Characteristics

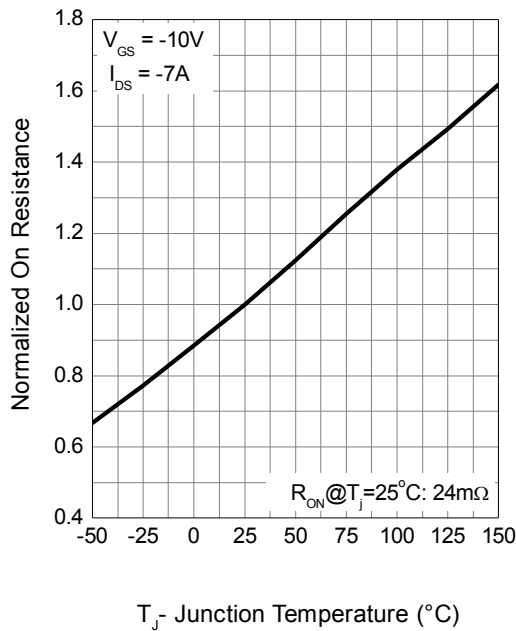


Gate Threshold Voltage

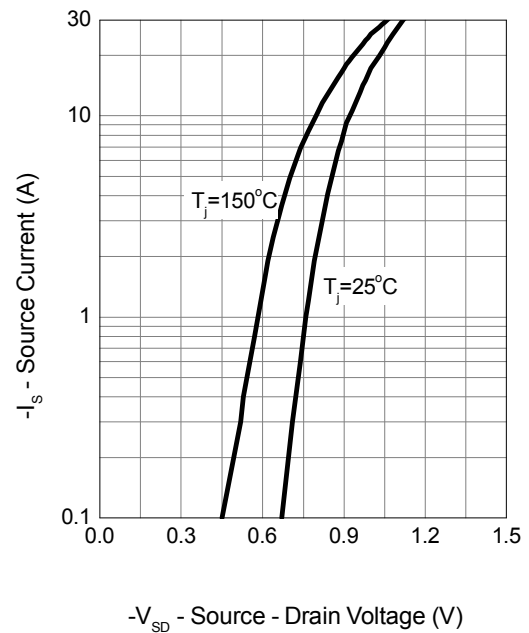


P Channel Typical Operating Characteristics (Cont.)

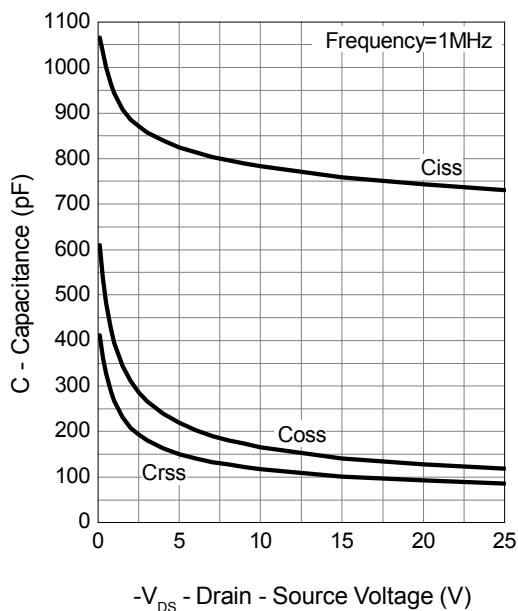
Drain-Source On Resistance



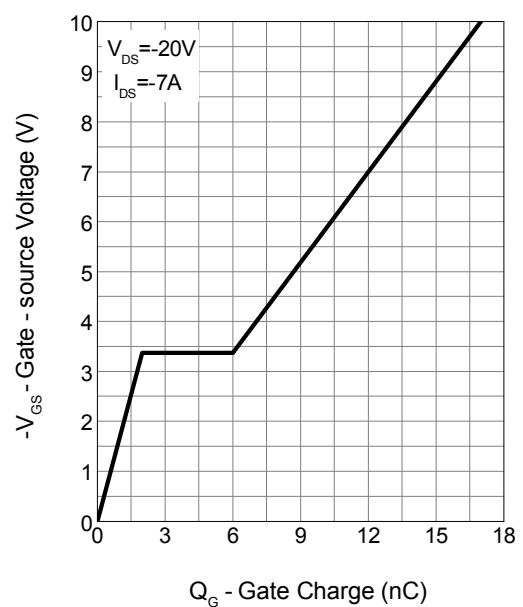
Source-Drain Diode Forward



Capacitance

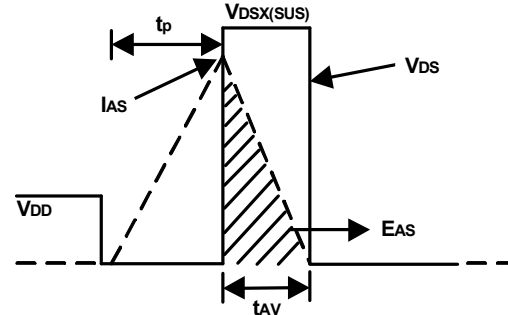
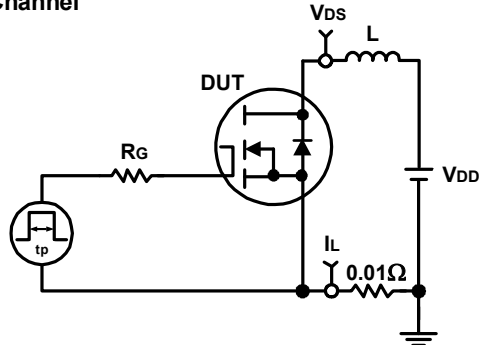


Gate Charge

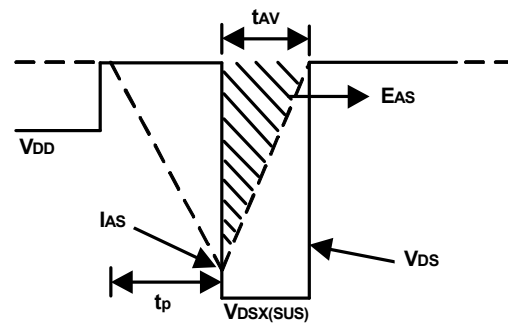
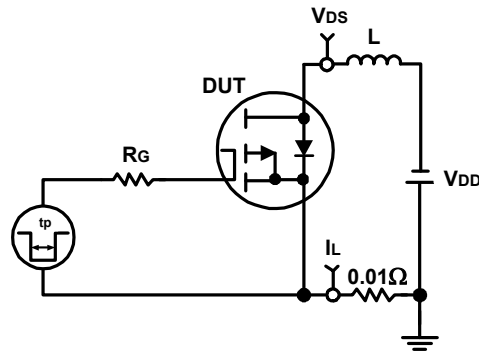


Avalanche Test Circuit and Waveforms

N Channel

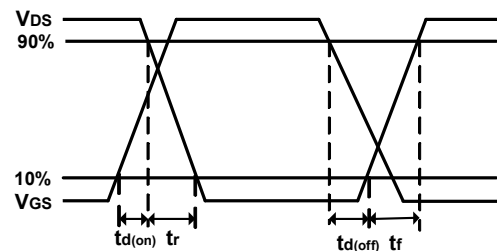
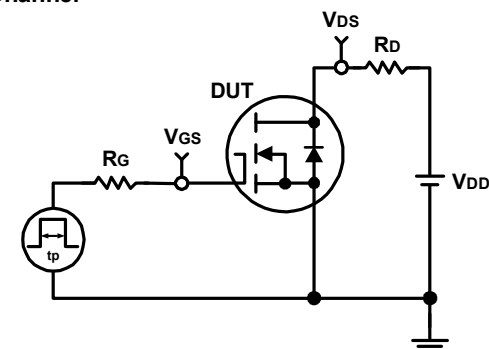


P Channel

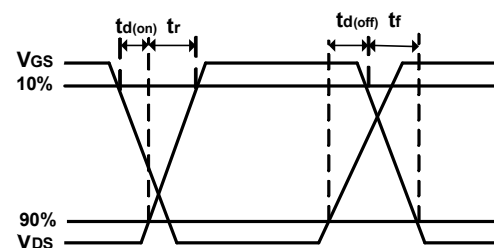
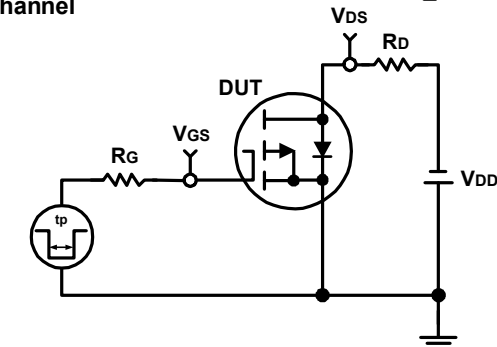


Switching Time Test Circuit and Waveforms

N Channel



P Channel



DFN5×6 OUTLINE

