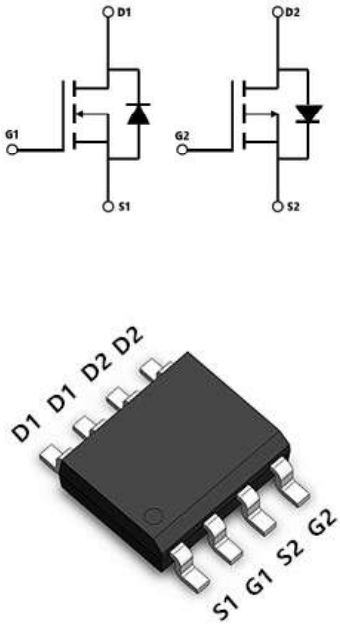
40V N+P-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	20A
V_{DSS}	40V
R_{DSON}-typ(@V_{GS}=10V)	< 21mΩ(Type:16 mΩ)
R_{DSON}-typ(@V_{GS}=4.5V)	< 25mΩ(Type:18 mΩ)
I_D	-18A
V_{DSS}	-40V
R_{DSON}-typ(@V_{GS}=-10V)	< 38mΩ(Type:30 mΩ)
R_{DSON}-typ(@V_{GS}=-4.5V)	< 62mΩ(Type:46 mΩ)



SOP-8

Application

- Wireless charging
- Boost driver
- Brushless motor

Product Specification Classification

Part Number	Package	Marking	Pack
YFW20G04S	SOP-8	YFW 20G04S XXXXX	3000PCS/Tape

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value		Units
		N-Ch	P-Ch	
Drain-Source Voltage	V_{DS}	40	-40	V
Gate - Source Voltage	V_{GS}	±20	±20	V
Maximum Junction Temperature	T_J	150		°C
Storage Temperature Range	T_{STG}	-55 to +150		°C
Diode Continuous Forward Current	I_S	2	-2	A
Pulse Drain Current Tested V_{GS}=10V(N),V_{GS}=-10V(P)	I_{DP}	30	-22	A
Continuous Drain Current T_A=25℃	I_D	7.5	-5.5	A
Continuous Drain Current T_A=70℃		6	-4.5	
Maximum Power Dissipation T_A=25℃	P_D	2	2	W
Maximum Power Dissipation TA=70℃		1.3	1.3	
Thermal Resistance-Junction to Lead	$R_{\theta JL}$	50	50	°C/W
Thermal Resistance Junction-Ambient t £ 10s	$R_{\theta JA}$	62.5	62.5	°C/W
Steady State b		110	110	
Avalanche Current, Single pulse L=0.5m	$I_{AS\ a}$	10	10	A
Avalanche Energy, Single pulse L=0.5m	$E_{AS\ a}$	25	25	mJ

N-Channel Electrical Characteristics (TJ=25 ℃, unless otherwise noted)

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	BV_{DSS}	40	-	-	V
Zero Gate Voltage Drain Current	V_{DS}=32V, V_{GS}=0V	I_{DSS}	-	-	1	mA
	T_J=85℃		-	-	30	
Gate -Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	$V_{GS(th)}$	1.5	2	2.5	V
Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}	-	-	±100	nA
Drain-Source On-state Resistance	V_{GS}=10V, I_D=6A	$R_{DS(ON)}$ c	-	16	21	mW
	V_{GS}=4.5V, I_D=5A		-	18	25	
Diode Forward Voltage	I_{SD}=1A, V_{GS}=0V	V_{SD} c	-	0.75	1.1	V
Reverse Recovery Time	I_{DS}=6A, dI_{SD}/dt=100A/ms	t_{rr}	-	13	-	ns
Reverse Recovery Charge		Q_{rr}	-	8.7	-	nC
Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	R_g	-	2.5	-	W
Input Capacitance	V_{GS}=0V V_{DS}=20V Frequency=1.0MHz	C_{iss}	-	815	-	pF
Output Capacitance		C_{oss}	-	95	-	
Reverse Transfer Capacitance		C_{rss}	-	60	-	
Turn-on delay time	V_{DD} =20V R_L=20W I_{DS}= 1A V_{GEN}=10V R_G = 6W	$t_{d(on)}$	-	7.8	-	ns
Turn-on Rise Time		T_r	-	6.9	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	22.4	-	
Turn-Off Fall Time		t_f	-	4.8	-	
Total Gate Charge	V_{DS}=20V, V_{GS}=10V, I_{DS}=6A	Q_g		15.7	-	
Total Gate Charge	V_{DS}=20V V_{GS}=4.5V I_{DS}=6A	Q_g	-	7.5	22	nC
Threshold Gate Charge		Q_{gth}		1.85	10.5	
Gate-Source Charge		Q_{gs}	-	3.24	-	
Gate-Drain Charge		Q_{gd}	-	2.75	-	

Note c：Pulse test ; pulse width£300ms, duty cycle£2%.
Note d：Guaranteed by design, not subject to production testing.

P-Channel Electrical Characteristics (TJ=25 ℃, unless otherwise noted)

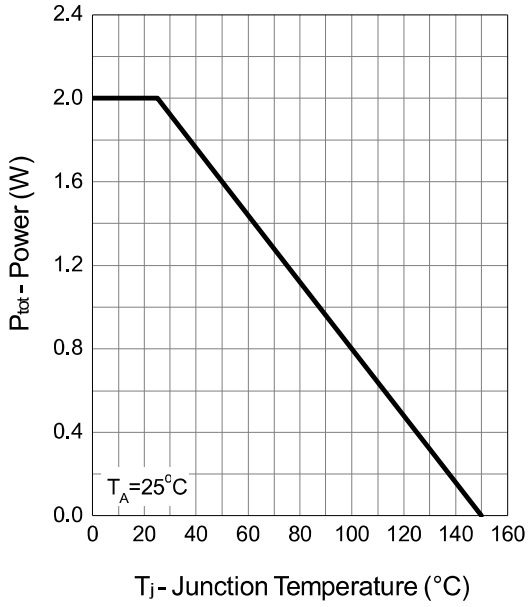
Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250uA	BV_{DSS}	-40	-	-	V
Zero Gate Voltage Drain Current	V_{DS}=-32V, V_{GS}=0V	I_{DSS}	-	-	-1	mA
	T_J=85℃		-	-	-30	mA
Gate -Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	$V_{GS(th)}$	1.5	-2	-2.5	V
Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}	-	-	±100	nA
Drain-Source On-state Resistance	V_{GS}=-10V, I_D=-5.5A	$R_{DS(ON)}$ c	-	30	38	mW
	V_{GS}=-4.5V, I_D=-3.5A		-	46	65	
Diode Forward Voltage	I_{SD}=-1A, V_{GS}=0V	V_{SD} c	-	-0.75	-1	V
Reverse Recovery Time	I_{DS}=-5.5A, dI_{SD}/dt=100A/ms	t_{rr}	-	15	-	ns
Reverse Recovery Charge		Q_{rr}	-	8	-	nC
Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	R_g	-	8	-	W
Input Capacitance	V_{GS}=0V V_{DS}=-20V Frequency=1.0MHz	C_{iss}	-	668	-	pF
Output Capacitance		C_{oss}	-	98	-	
Reverse Transfer Capacitance		C_{rss}	-	72	-	
Turn-on delay time	V_{DD} =-20V R_L=20W I_{DS}= -1A V_{GEN}=-10V R_G = 6W	$t_{d(on)}$	-	8.7	-	ns
Turn-on Rise Time		T_r	-	7	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	31	-	
Turn-Off Fall Time		t_f	-	17	-	
Total Gate Charge	V_{DS}=-20V, V_{GS}=-10V, I_{DS}=-5.5A	Q_g		15	-	nC
Total Gate Charge	V_{DS}=-20V V_{GS}=-4.5V I_{DS}=-5.5A	Q_g	-	7.5	-	
Threshold Gate Charge		Q_{gth}		1.4	-	
Gate-Source Charge		Q_{gs}	-	2.4	-	
Gate-Drain Charge		Q_{gd}	-	3.5	-	

Note c：Pulse test; pulse width£300ms, duty cycle£2%.
Note d：Guaranteed by design, not subject to production testing.

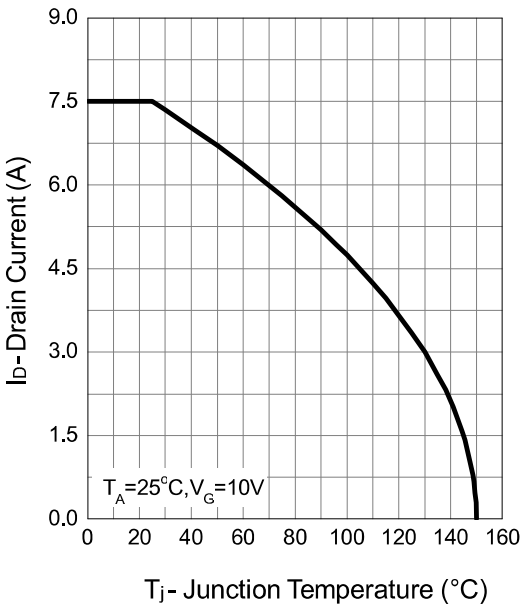
Ratings and Characteristic Curves

N Channel Typical Operating Characteristics

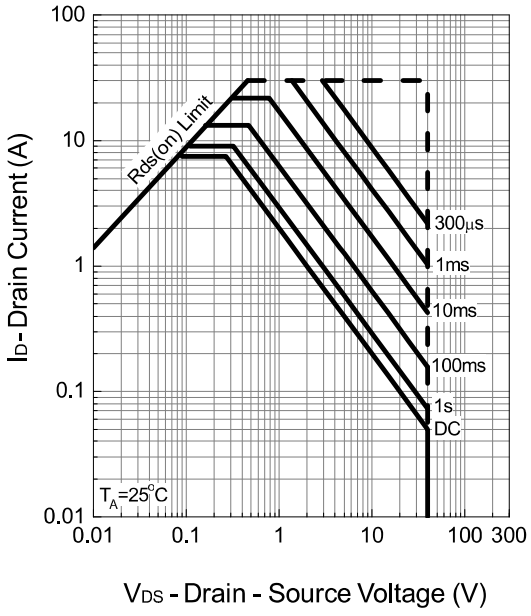
Power Dissipation



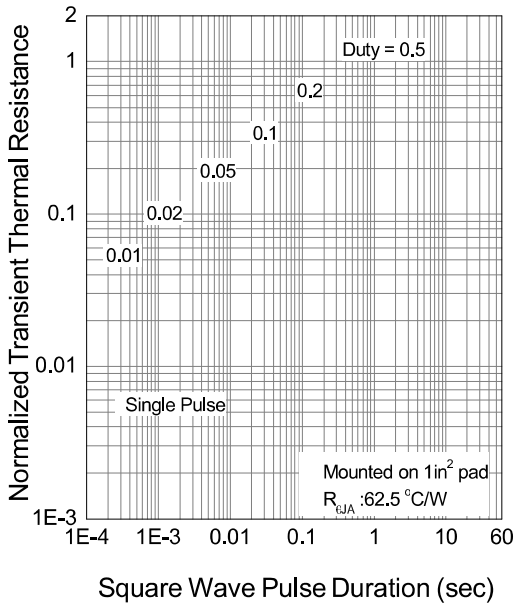
Drain Current



Safe Operation Area

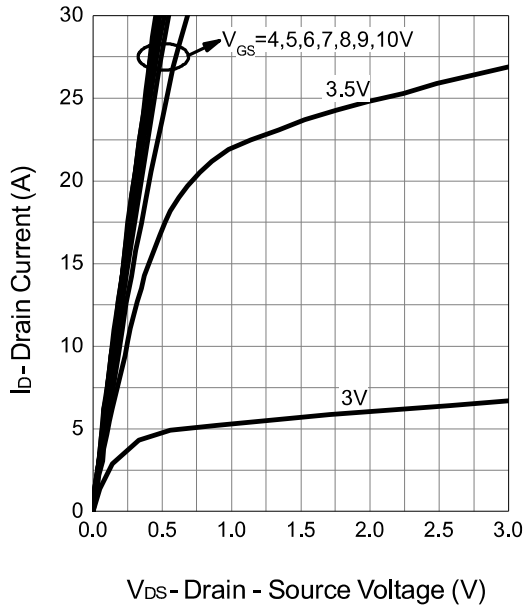


Thermal Transient Impedance

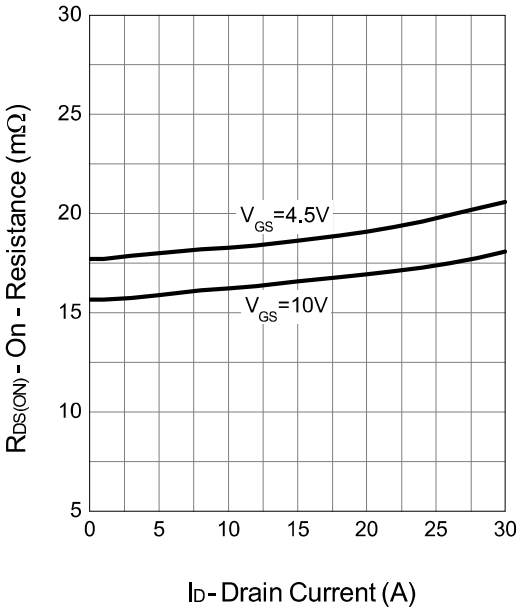


N Channel Typical Operating Characteristics (Cont.)

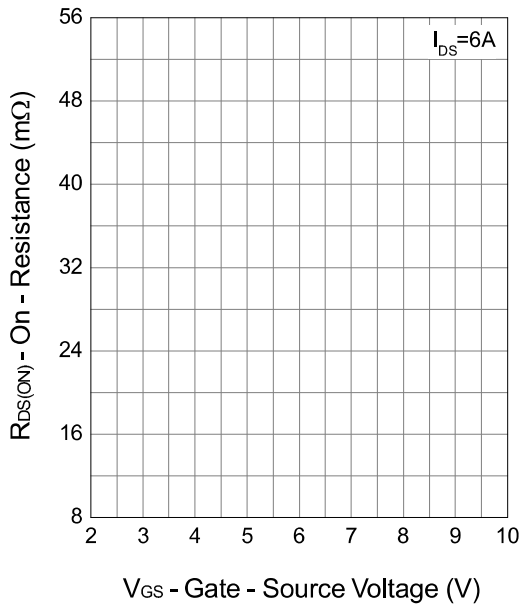
Output Characteristics



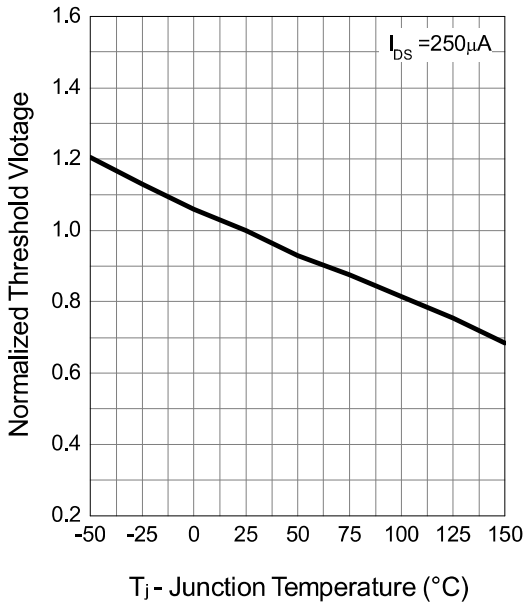
Drain-Source On Resistance



Gate-Source On Resistance

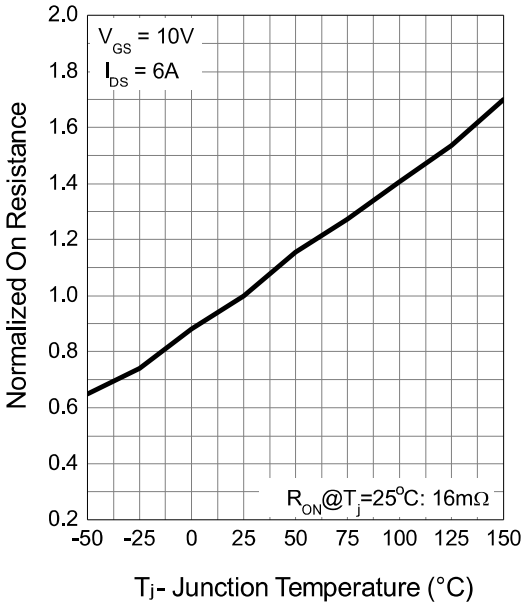


Gate Threshold Voltage

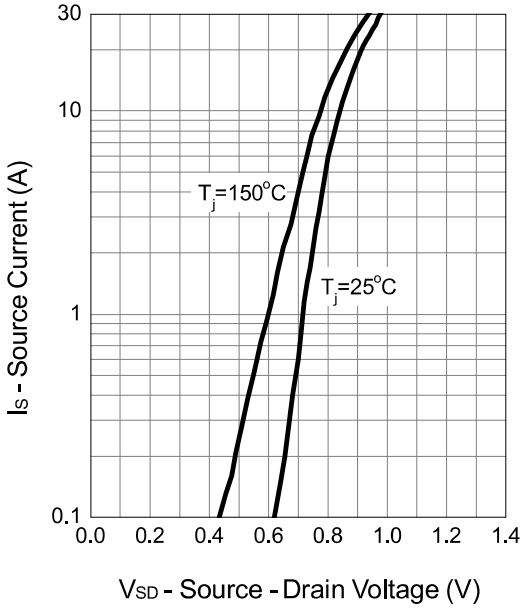


N Channel Typical Operating Characteristics (Cont.)

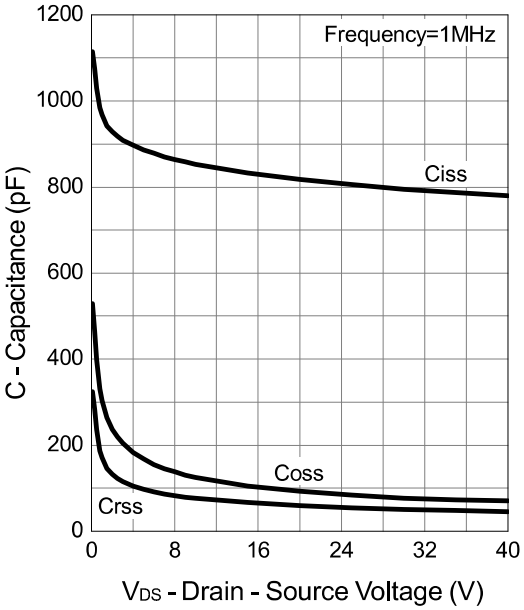
Drain-Source On Resistance



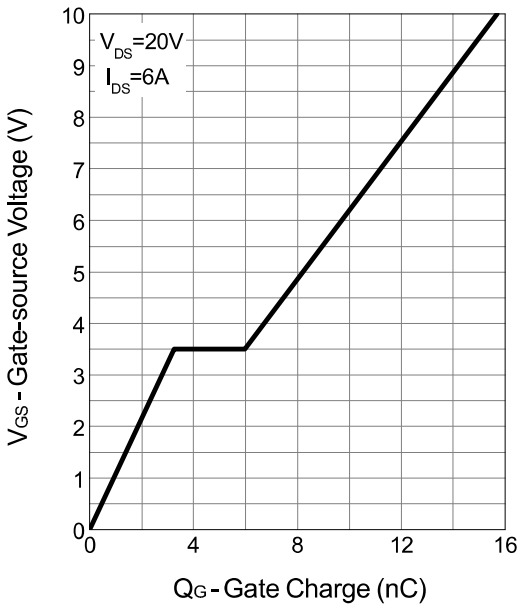
Source-Drain Diode Forward



Capacitance

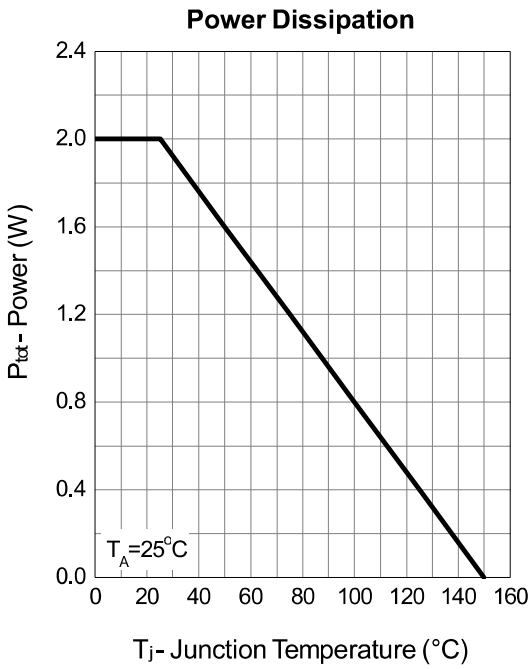


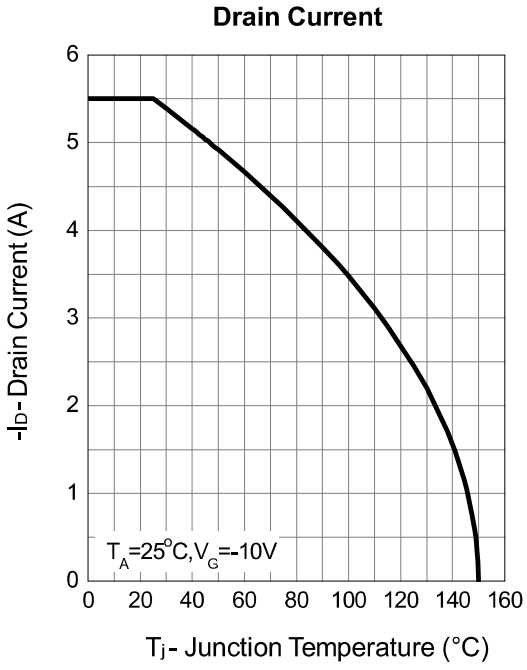
Gate Charge

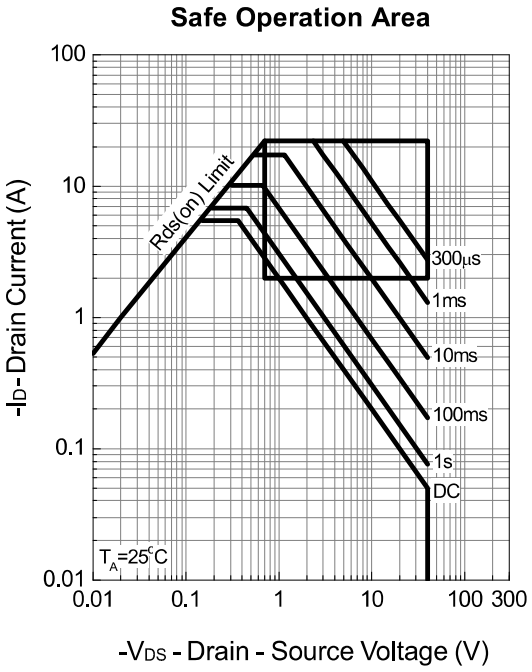


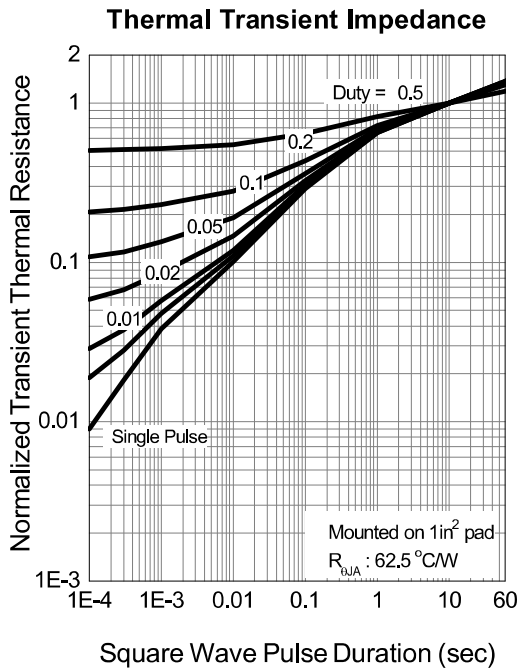
Ratings and Characteristic Curves

P Channel Typical Operating Characteristics



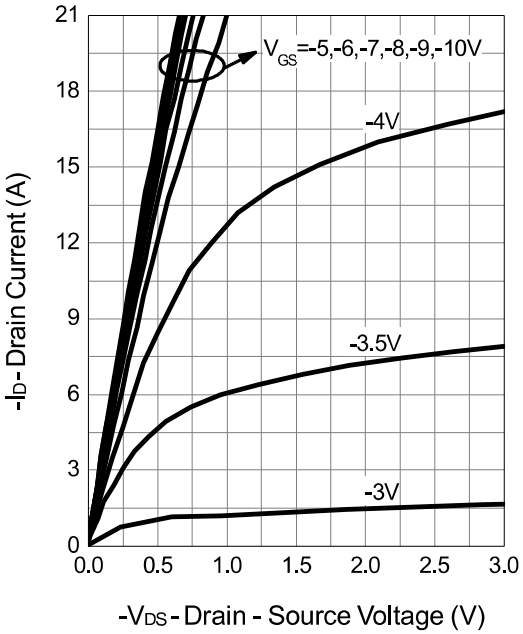




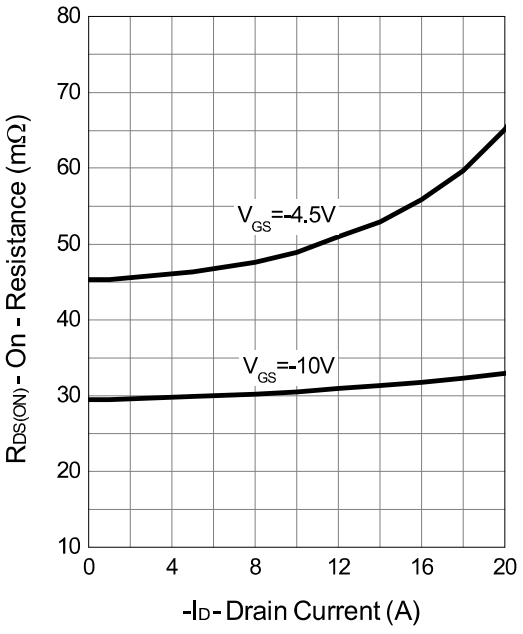


P Channel Typical Operating Characteristics (Cont.)

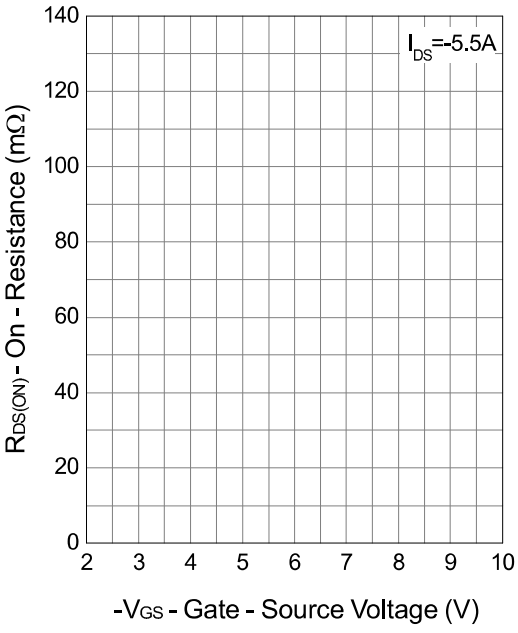
Output Characteristics



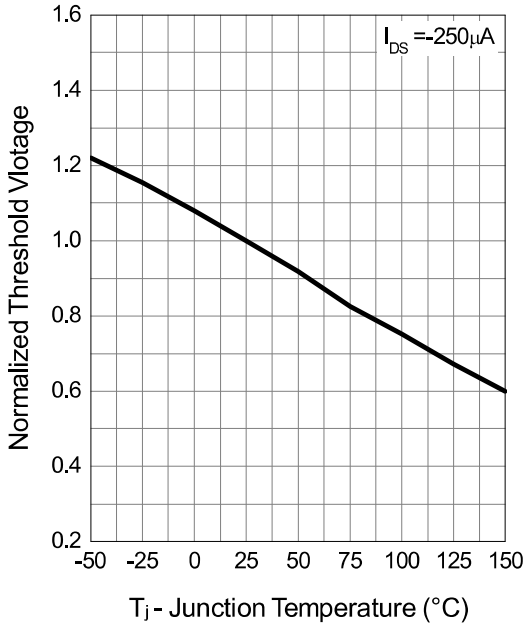
Drain-Source On Resistance



Gate-Source On Resistance

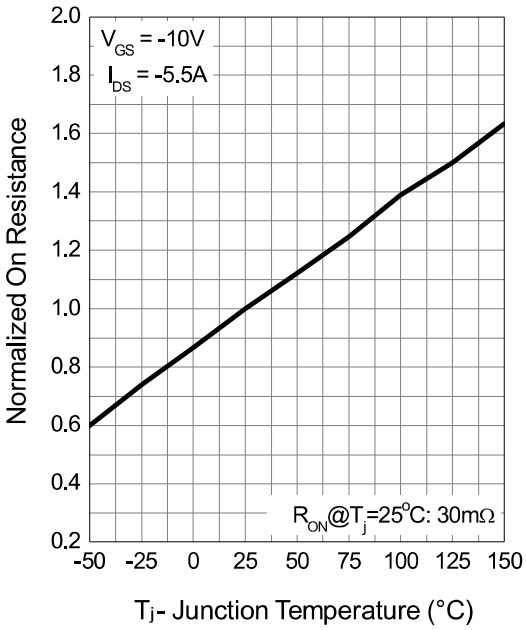


Gate Threshold Voltage

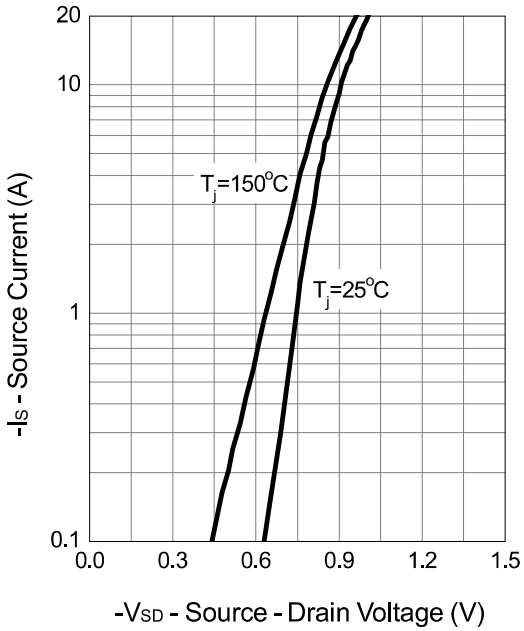


P Channel Typical Operating Characteristics (Cont.)

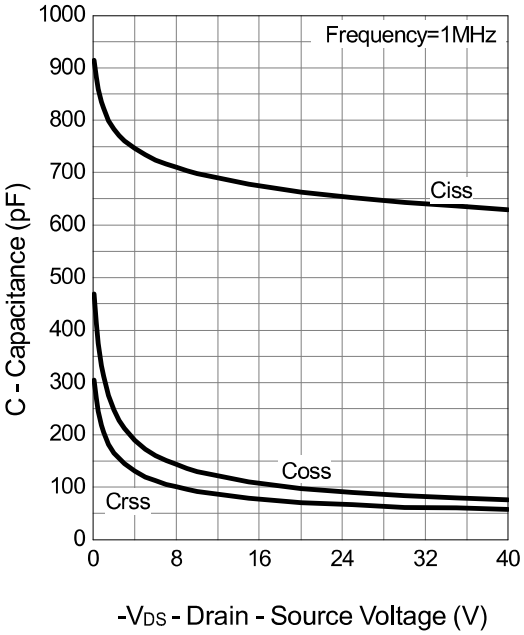
Drain-Source On Resistance



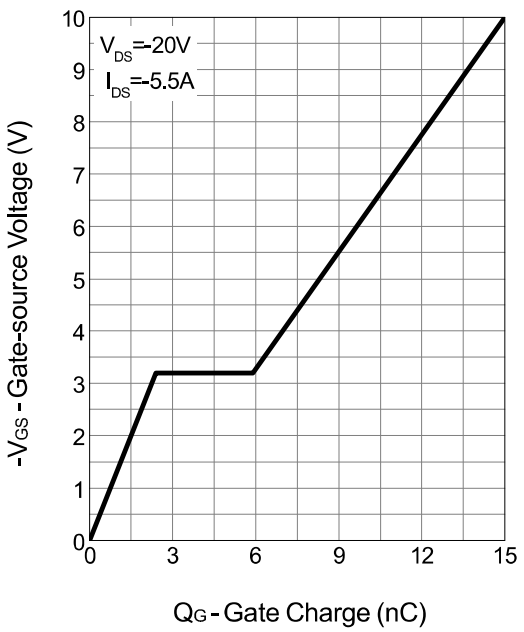
Source-Drain Diode Forward



Capacitance

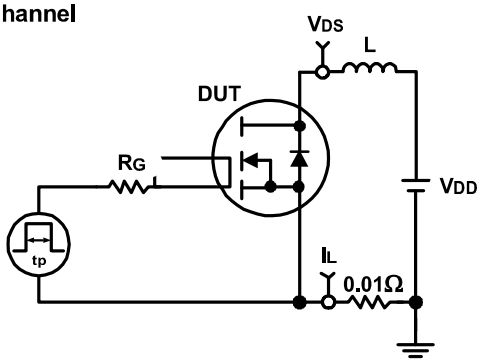


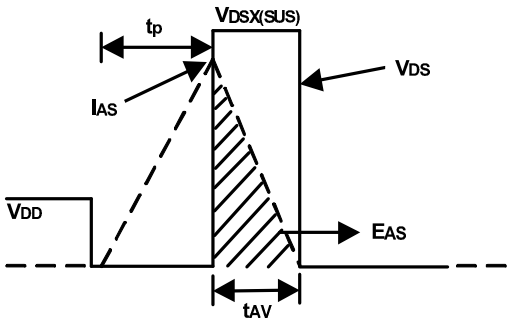
Gate Charge



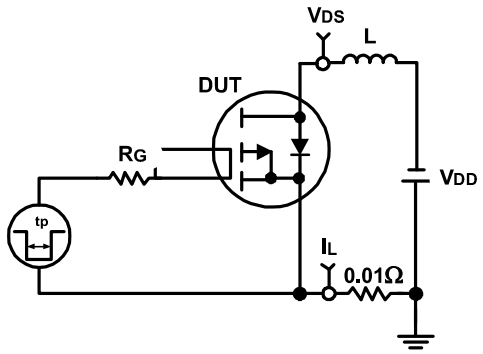
Avalanche Test Circuit and Waveforms

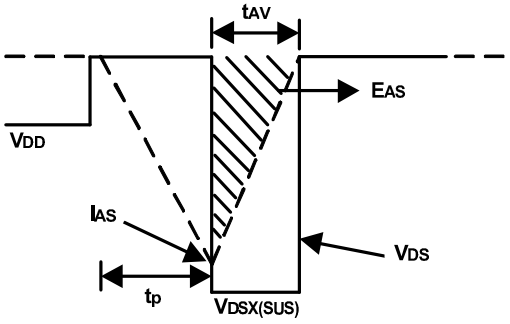
N Channel





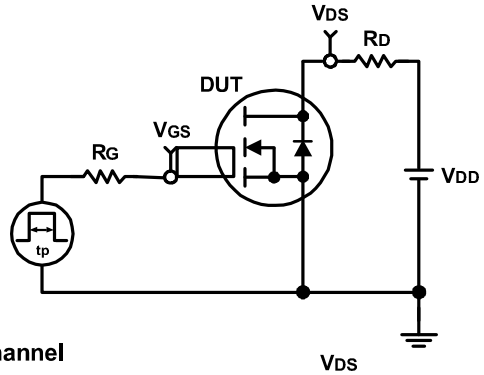
P Channel

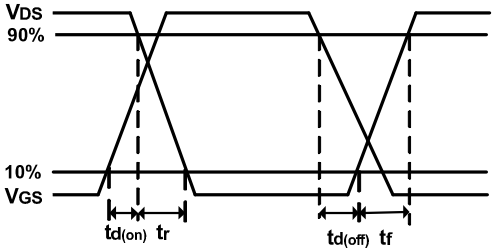




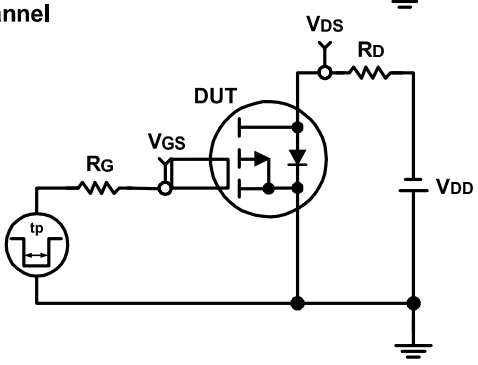
Switching Time Test Circuit and Waveforms

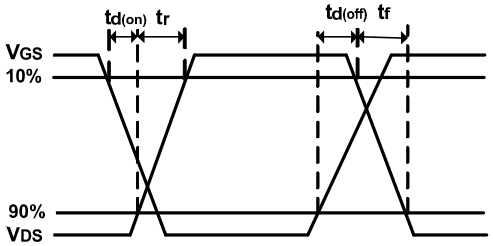
N Channel





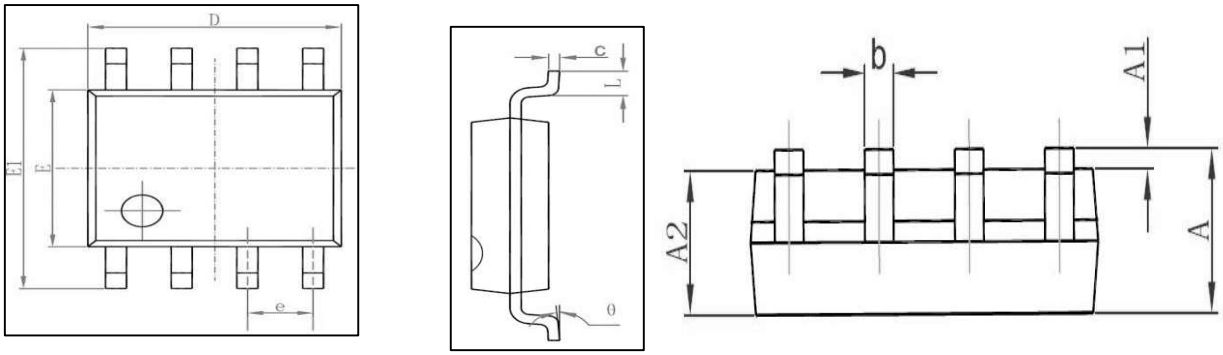
P Channel



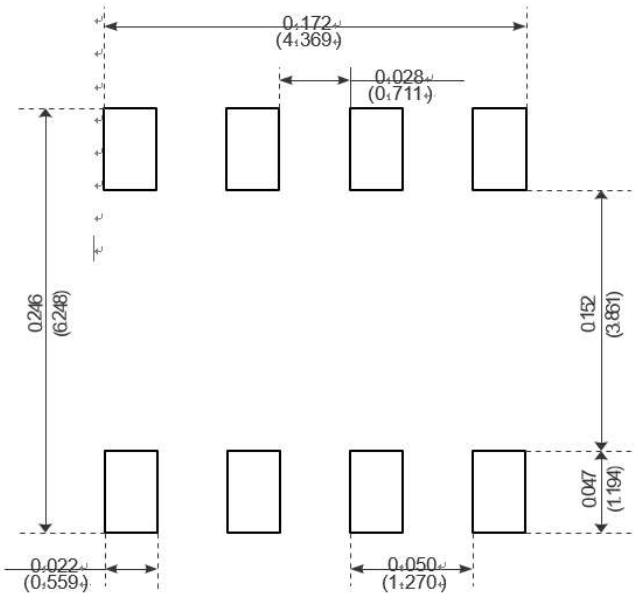


Package Outline Dimensions Millimeters

SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Recommended Minimum Pads