

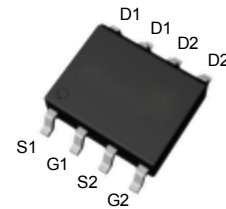
Features

- **N Channel**
40V/10A,
 $R_{DS(ON)} = 13m\Omega$ (typ.) @ $V_{GS} = 10V$
 $R_{DS(ON)} = 19m\Omega$ (typ.) @ $V_{GS} = 4.5V$
- **P Channel**
-40V/-10A,
 $R_{DS(ON)} = 30m\Omega$ (typ.) @ $V_{GS} = -10V$
 $R_{DS(ON)} = 44m\Omega$ (typ.) @ $V_{GS} = -4.5V$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free Available (RoHS Compliant)
- EAS, DVDS, RG 100% tested

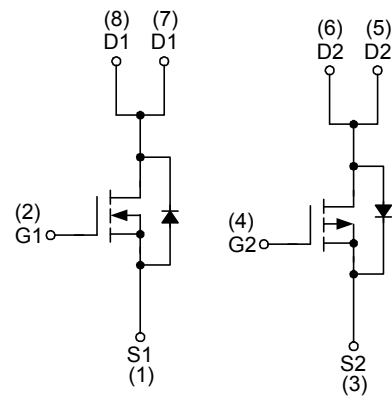
Applications

- Synchronous Rectification
- Motor Control
- Fan Pre-driver H-bridge

Pin Description



Top View of SOP-8



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	V	
T _J	Maximum Junction Temperature		150		°C	
T _{STG}	Storage Temperature Range		-55 to 150		°C	
I _S	Diode Continuous Forward Current		10	-10	A	
I _{DP}	Pulse Drain Current Tested	V _{GS} =10V(N), V _{GS} =-10V(P)	30	-30	A	
I _D	Continuous Drain Current		T _A =25°C	10	-10	A
			T _A =70°C	7.5	-7.5	
P _D	Maximum Power Dissipation	T _A =25°C	2	2	W	
		T _A =70°C	1.3	1.3		
R _{θJL}	Thermal Resistance-Junction to Lead	Steady State	50	50	°C/W	
R _{θJA}	Thermal Resistance-Junction to Ambient	t ≤ 10s	62.5	62.5	°C/W	
		Steady State ^b	110	110		
I _{AS} ^a	Avalanche Current, Single pulse	L=0.5mH	15	15	A	
E _{AS} ^a	Avalanche Energy, Single pulse	L=0.5mH	56	56	mJ	

Note a : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_J=25^{\circ}\text{C}$).

Note b : Surface Mounted on 1in^2 pad area, $t=999\text{sec}$.

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	2.3	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^c	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =6A	-	13	16	mΩ
		V _{GS} =4.5V, I _{DS} =5A	-	19	22	
Diode Characteristics						
V _{SD} ^c	Diode Forward Voltage	I _{SD} =1A, V _{GS} =0V	-	0.75	1.1	V
t _{rr}	Reverse Recovery Time	I _{DS} =6A, dI _{SD} /dt=100A/μs	-	13	-	ns
Q _{rr}	Reverse Recovery Charge		-	8.7	-	nC
Dynamic Characteristics ^d						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	2.5	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz	-	1050	-	pF
C _{oss}	Output Capacitance		-	75	-	
C _{rss}	Reverse Transfer Capacitance		-	65	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, R _L =20Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	7.8	-	ns
t _r	Turn-on Rise Time		-	6.9	-	
t _{d(OFF)}	Turn-off Delay Time		-	22.4	-	
t _f	Turn-off Fall Time		-	4.8	-	
Gate Charge Characteristics ^d						
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V, I _{DS} =6A	-	15.7	22	nC
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =4.5V, I _{DS} =6A	-	7.5	10.5	
Q _{gth}	Threshold Gate Charge		-	1.85	-	
Q _{gs}	Gate-Source Charge		-	3.24	-	
Q _{gd}	Gate-Drain Charge		-	2.75	-	

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

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

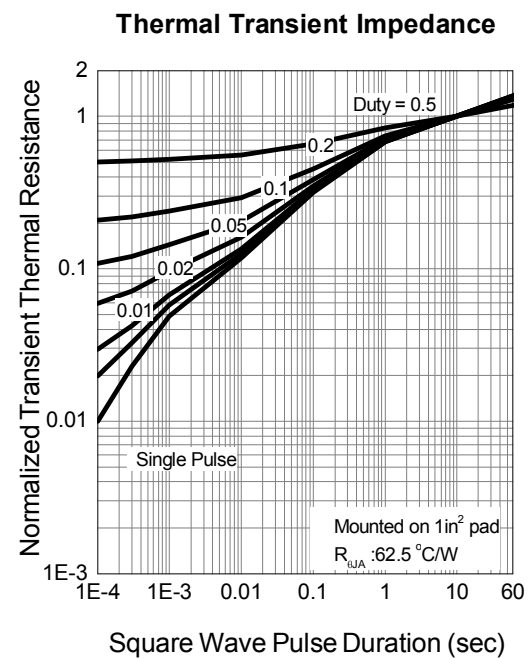
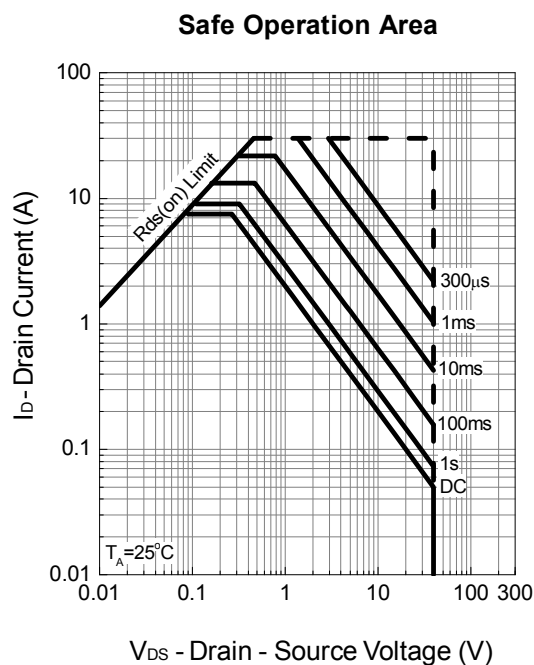
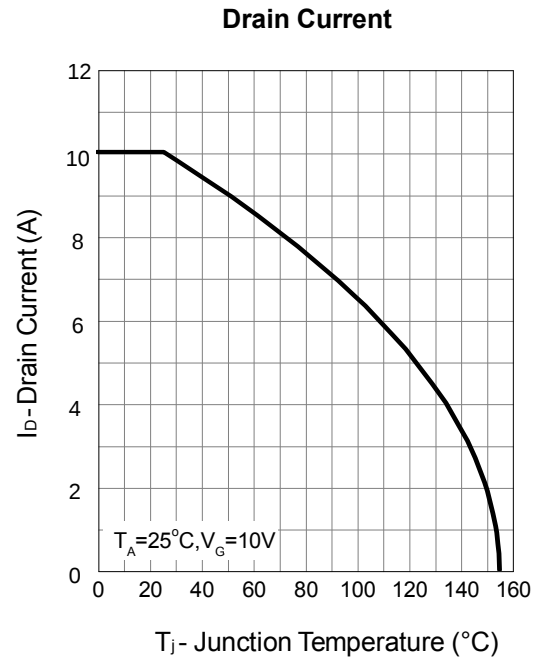
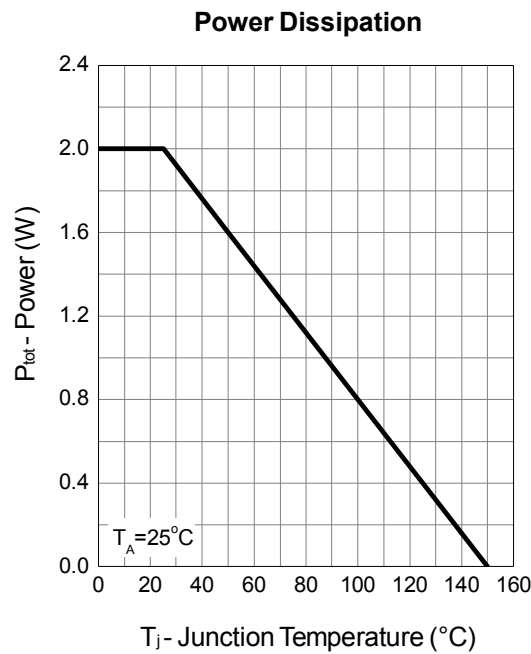
P Channel Electrical Characteristics (T_A = 25°C unless otherwise noted)

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	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)} ^c	Drain-Source On-state Resistance	V _{GS} =-10V, I _{DS} =-5.5A	-	30	35	mΩ
		V _{GS} =-4.5V, I _{DS} =-3.5A	-	44	49	
Diode Characteristics						
V _{SD} ^c	Diode Forward Voltage	I _{SD} =-1A, V _{GS} =0V	-	-0.75	-1	V
t _{rr}	Reverse Recovery Time	I _{DS} =-5.5A,	-	15	-	ns
Q _{rr}	Reverse Recovery Charge	dI _{SD} /dt=100A/μs	-	8	-	nC
Dynamic Characteristics ^d						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	8	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-20V, Frequency=1.0MHz	-	1243	-	pF
C _{oss}	Output Capacitance		-	97	-	
C _{rss}	Reverse Transfer Capacitance		-	80	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-20V, R _L =20Ω, I _{DS} =-1A, V _{GEN} =-10V, R _G =6Ω	-	7.8	-	ns
t _r	Turn-on Rise Time		-	7	-	
t _{d(OFF)}	Turn-off Delay Time		-	31	-	
t _f	Turn-off Fall Time		-	17	-	
Gate Charge Characteristics ^d						
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-10V, I _{DS} =-5.5A	-	15	-	nC
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-4.5V, I _{DS} =-5.5A	-	7.5	-	
Q _{gth}	Threshold Gate Charge		-	1.4	-	
Q _{gs}	Gate-Source Charge		-	2.4	-	
Q _{gd}	Gate-Drain Charge		-	3.5	-	

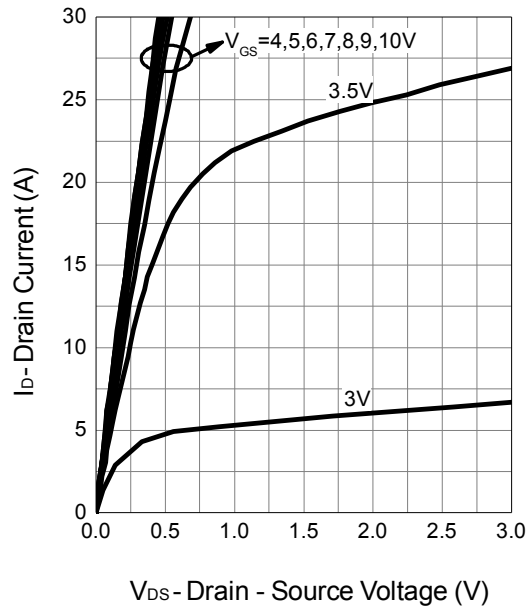
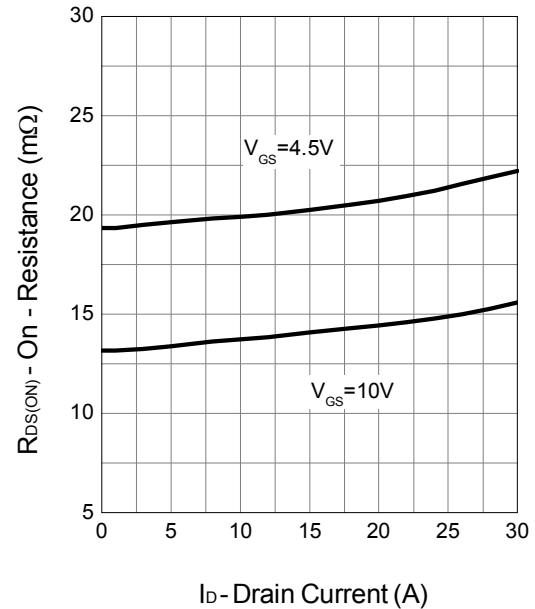
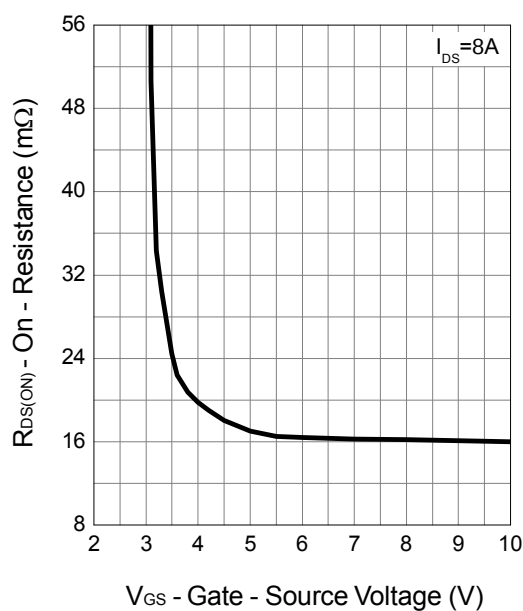
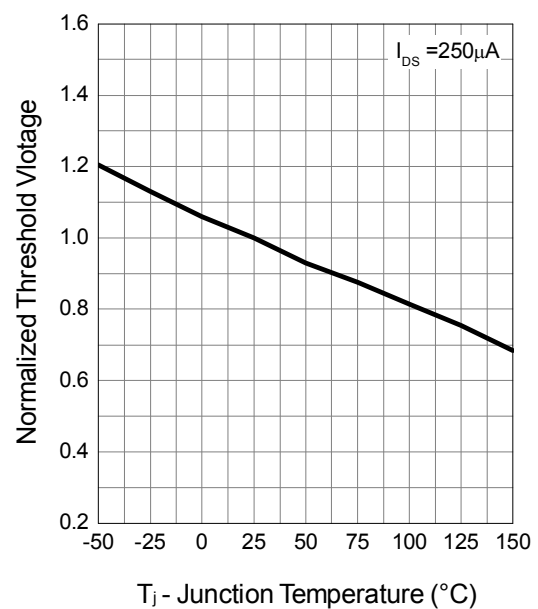
Note c : Pulse test; pulse width≤300μs, duty cycle≤2%.

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

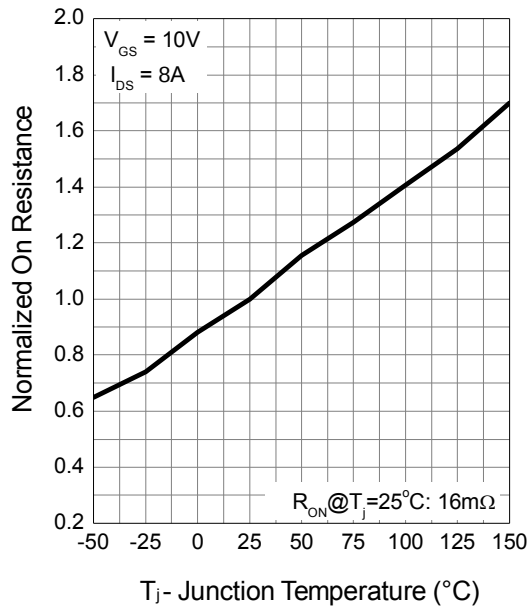
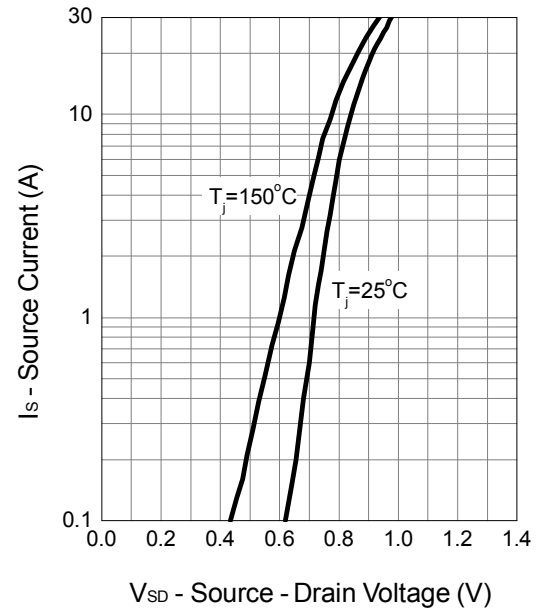
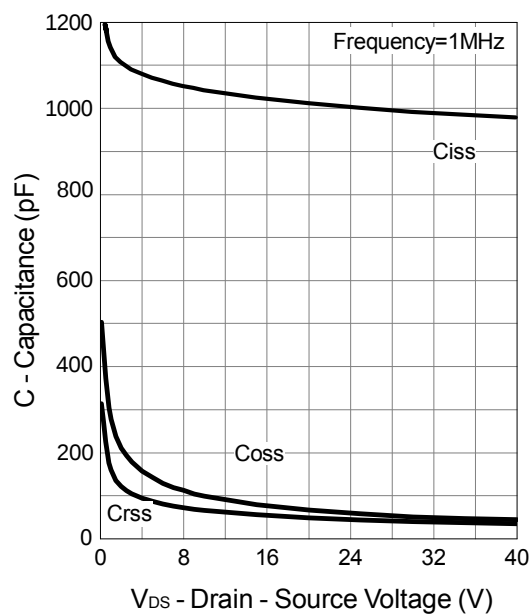
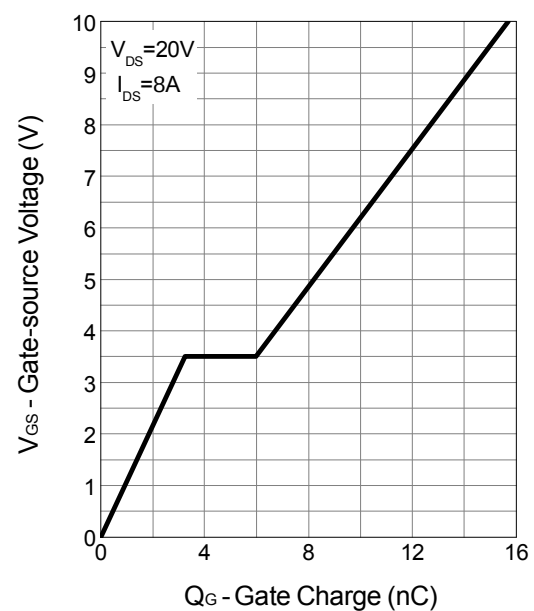
N Channel Typical Operating Characteristics



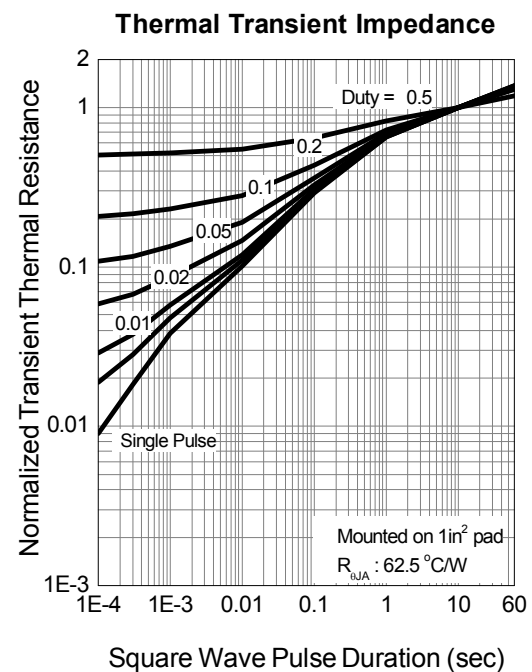
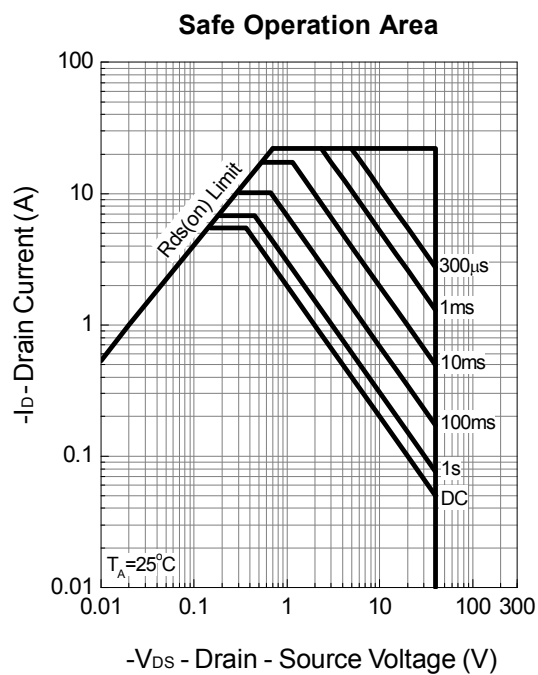
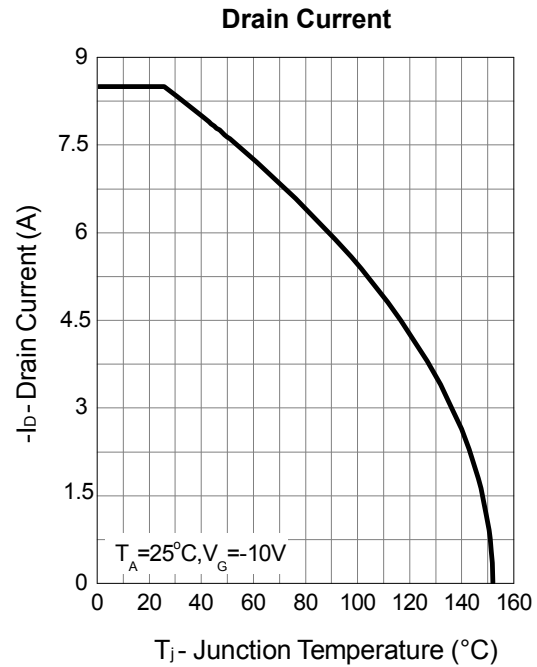
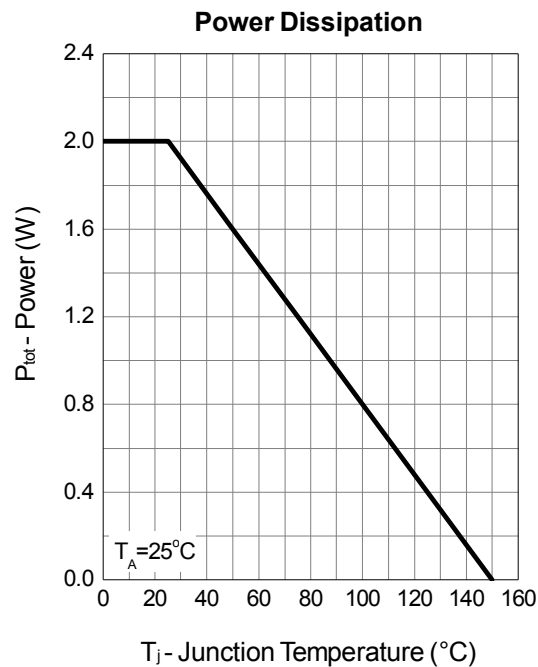
N Channel Typical Operating Characteristics (Cont.)

Output Characteristics

Drain-Source On Resistance

Gate-Source On Resistance

Gate Threshold Voltage


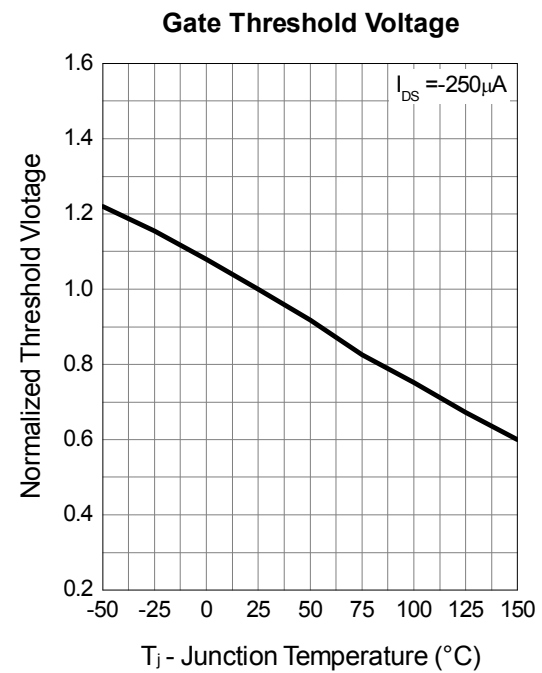
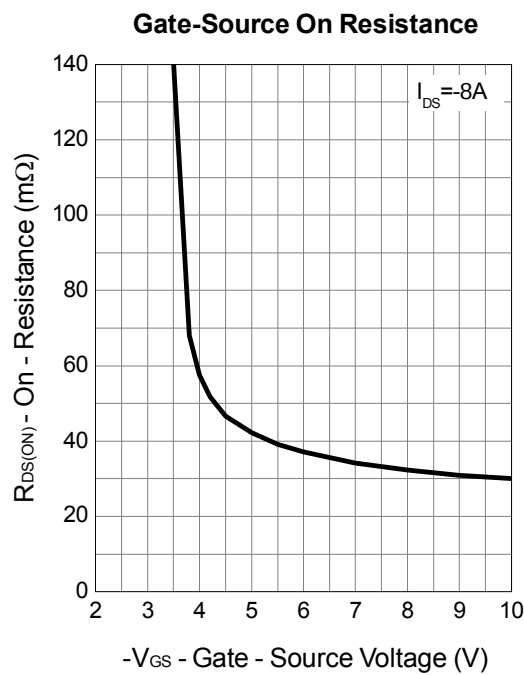
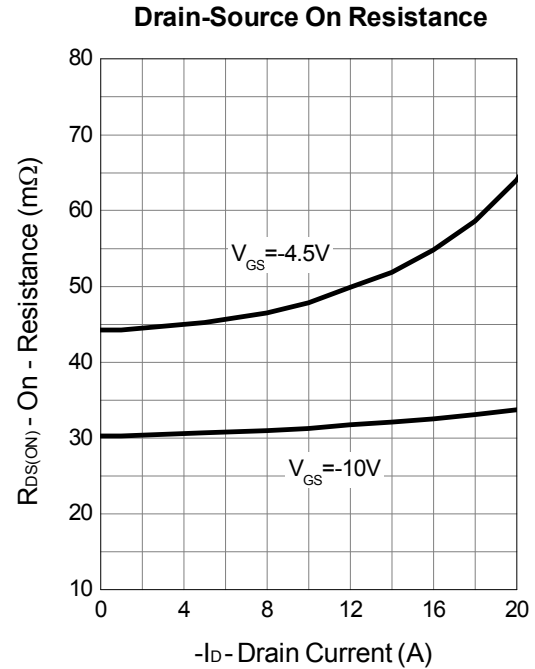
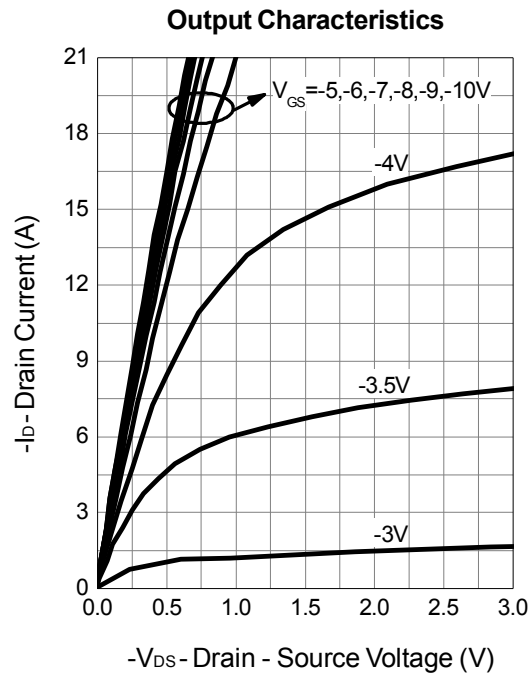
N Channel Typical Operating Characteristics (Cont.)

Drain-Source On Resistance

Source-Drain Diode Forward

Capacitance

Gate Charge


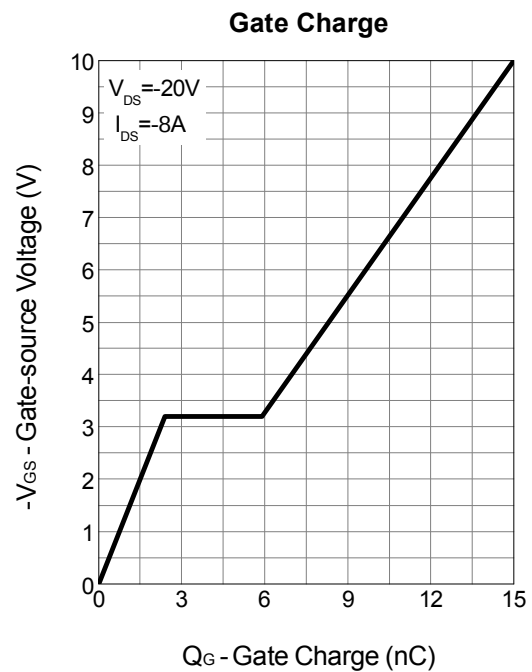
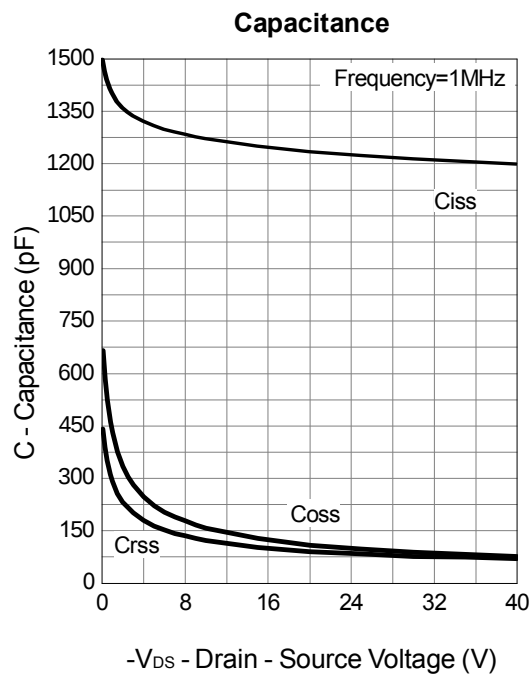
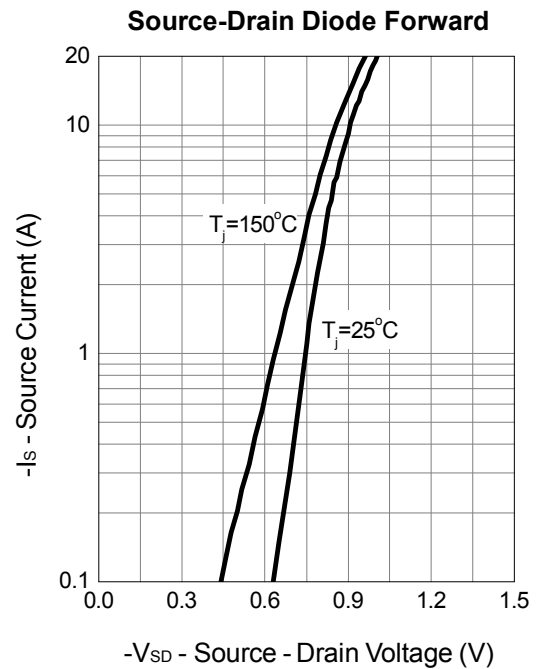
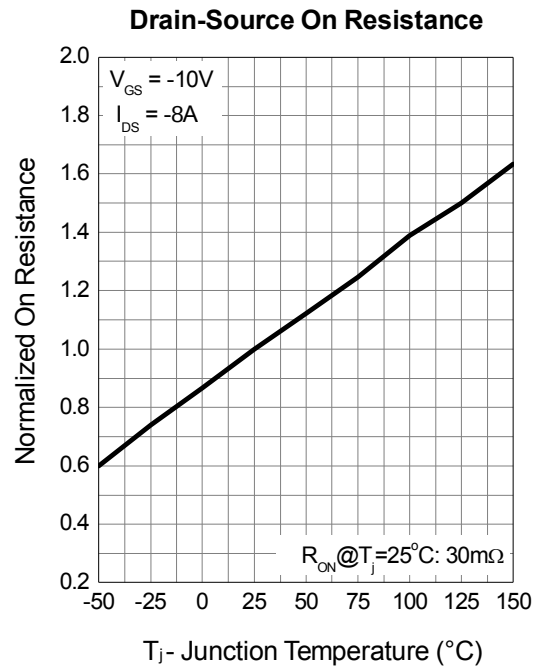
P Channel Typical Operating Characteristics



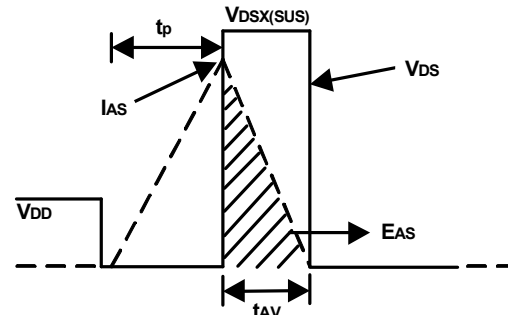
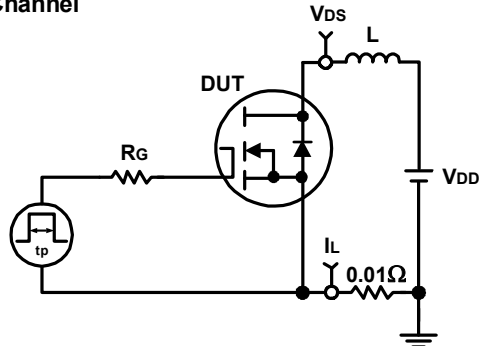
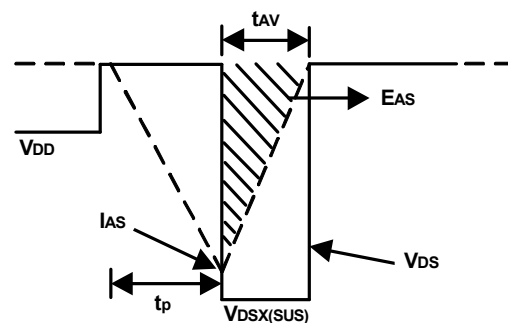
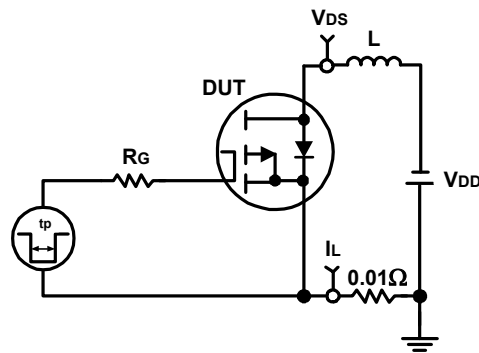
P Channel Typical Operating Characteristics (Cont.)



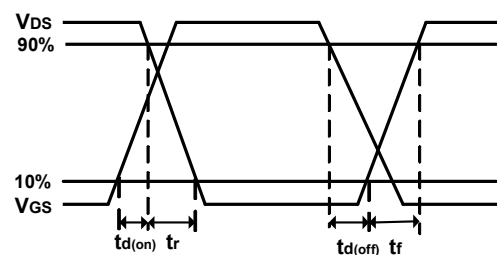
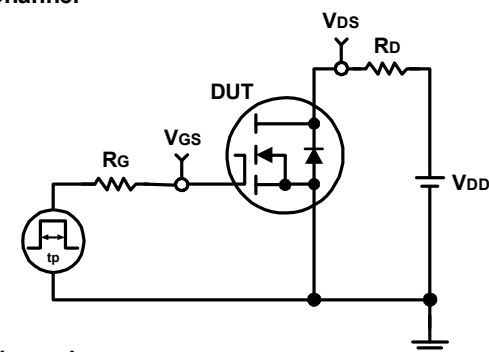
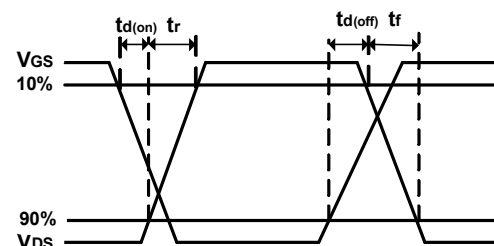
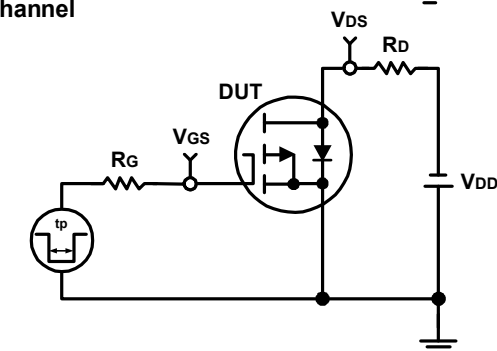
P Channel Typical Operating Characteristics (Cont.)



Avalanche Test Circuit and Waveforms

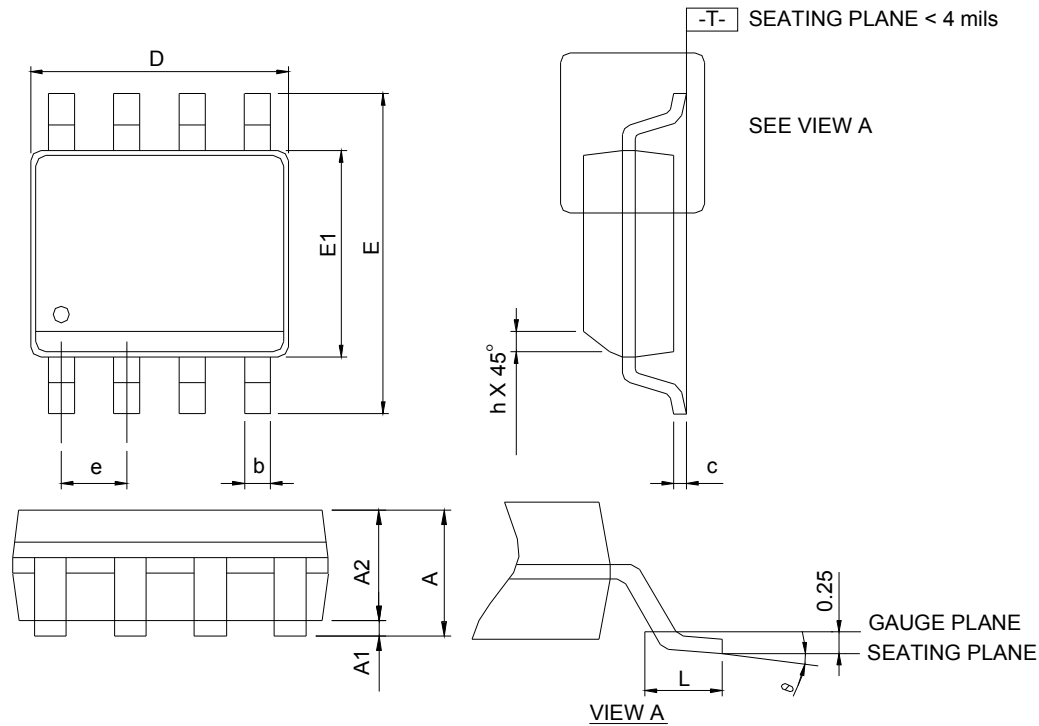
N Channel

P Channel


Switching Time Test Circuit and Waveforms

N Channel

P Channel


Package Information

SOP-8



SOP-8	SOP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	-	1.75	-	0.069
A1	0.10	0.25	0.004	0.010
A2	1.25	-	0.049	-
b	0.31	0.51	0.012	0.020
c	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

Note: 1. Follow JEDEC MS-012 AA.

2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.

3. Dimension "E" does not include inter-lead flash or protrusions. Inter-lead flash and protrusions shall not exceed 10 mil per side.

RECOMMENDED LAND PATTERN

