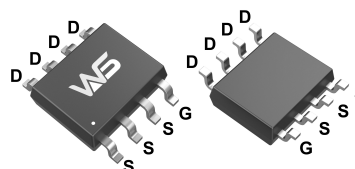


## Features

- 40V/11A,  
 $R_{DS(ON)} = 13m\Omega$  (Max.) @  $V_{GS} = 10V$   
 $R_{DS(ON)} = 16m\Omega$  (Max.) @  $V_{GS} = 4.5V$
- Reliable and Rugged
- Lead Free and Green Devices Available  
(RoHS Compliant)

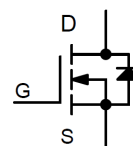
## Pin Description



Top View of SOP-8

## Applications

- Power Management in Desktop Computer or DC/DC Converters.



N-Channel MOSFET

## Absolute Maximum Ratings ( $T_A = 25^\circ C$ Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V <sub>DSS</sub>	Drain-Source Voltage		40	V
V <sub>GSS</sub>	Gate-Source Voltage		±20	
T <sub>J</sub>	Maximum Junction Temperature		150	°C
T <sub>STG</sub>	Storage Temperature Range		-55 to 150	
I <sub>S</sub>	Diode Continuous Forward Current	T <sub>A</sub> =25°C	2	A
I <sub>D</sub>	Continuous Drain Current	T <sub>A</sub> =25°C	11	A
		T <sub>A</sub> =70°C	8.4	
I <sub>DM</sub> <sup>a</sup>	Pulsed Drain Current	T <sub>A</sub> =25°C	30	
P <sub>D</sub>	Maximum Power Dissipation	T <sub>A</sub> =25°C	2.08	W
		T <sub>A</sub> =70°C	1.3	
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient	t ≤ 10s	30	°C/W
		Steady State	60	
R <sub>θJL</sub>	Thermal Resistance-Junction to Lead	Steady State	20	
I <sub>AS</sub> <sup>b</sup>	Avalanche Current, Single pulse	L=0.1mH	23	A
E <sub>AS</sub> <sup>b</sup>	Avalanche Energy, Single pulse	L=0.1mH	26	mJ

Note a : Max. current is limited by bonding wire.

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

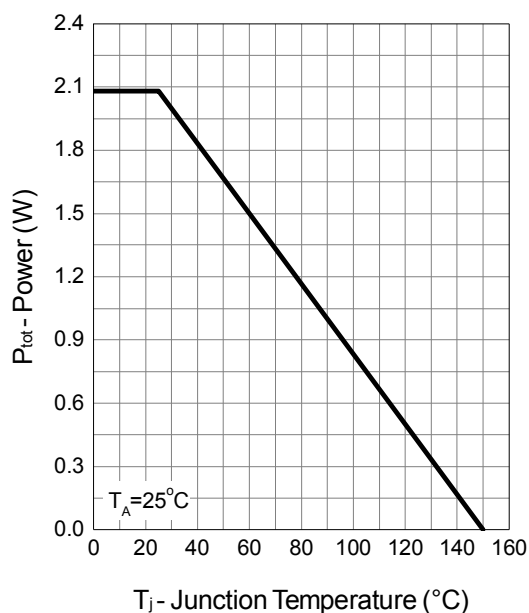
## Electrical Characteristics (T<sub>A</sub> = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA	40	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =32V, V <sub>GS</sub> =0V T <sub>J</sub> =85°C	- -	- -	1 30	μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA	1.5	1.8	2.5	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
R <sub>DS(ON)</sub> <sup>c</sup>	Drain-Source On-state Resistance	V <sub>GS</sub> =10V, I <sub>DS</sub> =7A T <sub>J</sub> =125°C V <sub>GS</sub> =4.5V, I <sub>DS</sub> =5A	- - -	10.5 15.75 12	13 - 16	mΩ
Gfs	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>DS</sub> =15A	-	31	-	S
Diode Characteristics						
V <sub>SD</sub> <sup>c</sup>	Diode Forward Voltage	I <sub>SD</sub> =10A, V <sub>GS</sub> =0V	-	0.9	1.1	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>DD</sub> =20V, I <sub>SD</sub> =10A, dl <sub>SD</sub> /dt=100A/μs	-	15.2	-	ns
t <sub>a</sub>	Charge Time		-	9.4	-	
t <sub>b</sub>	Discharge Time		-	5.8	-	
Q <sub>rr</sub>	Reverse Recovery Charge		-	9.5	-	nC
Dynamic Characteristics <sup>d</sup>						
R <sub>G</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	0.7	1.1	1.8	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =20V, Frequency=1.0MHz	-	1125	-	pF
C <sub>oss</sub>	Output Capacitance		-	132	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	70	-	
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =20V, R <sub>L</sub> =20Ω, I <sub>DS</sub> =1A, V <sub>GEN</sub> =10V, R <sub>G</sub> =1Ω	-	12.6	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	10	-	
t <sub>d(OFF)</sub>	Turn-off Delay Time		-	23.6	-	
t <sub>f</sub>	Turn-off Fall Time		-	6	-	
Gate Charge Characteristics <sup>d</sup>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =20V, V <sub>GS</sub> =4.5V, I <sub>DS</sub> =7A	-	9.4	-	nC
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =20V, V <sub>GS</sub> =10V, I <sub>DS</sub> =7A	-	20	28	
Q <sub>gth</sub>	Threshold Gate Charge		-	2	-	
Q <sub>gs</sub>	Gate-Source Charge		-	3.9	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	3	-	

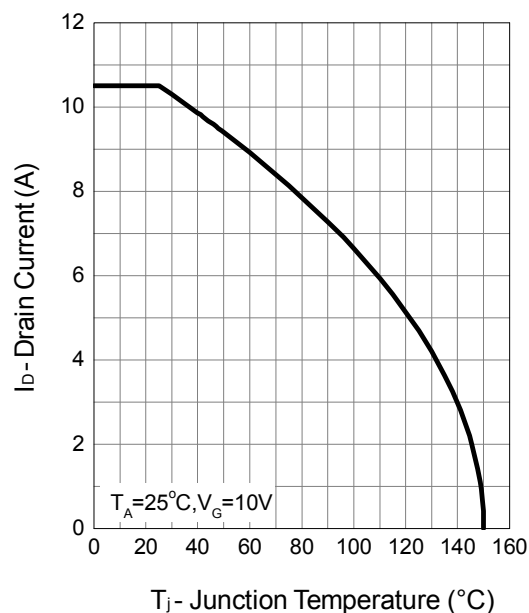
Note c : Pulse test ; pulse width≤300μs, duty cycle≤2%.

## Typical Operating Characteristics

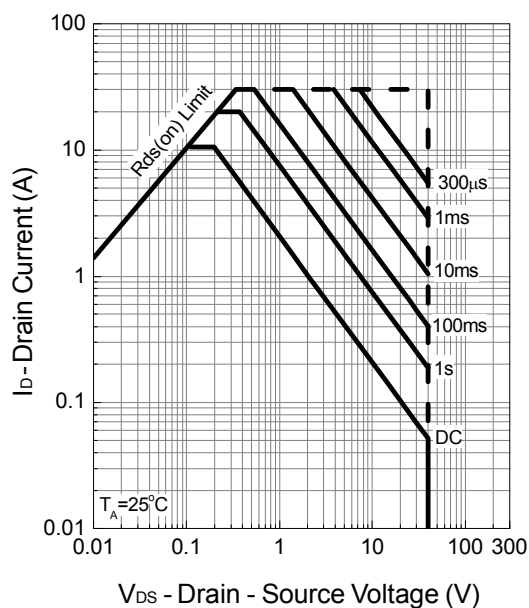
**Power Dissipation**



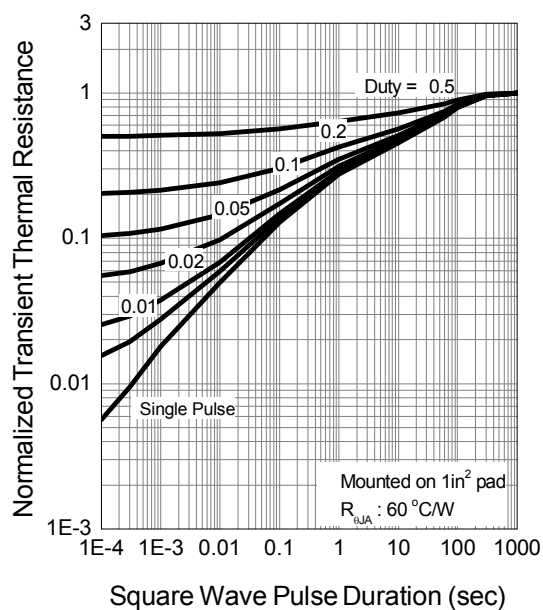
**Drain Current**



**Safe Operation Area**

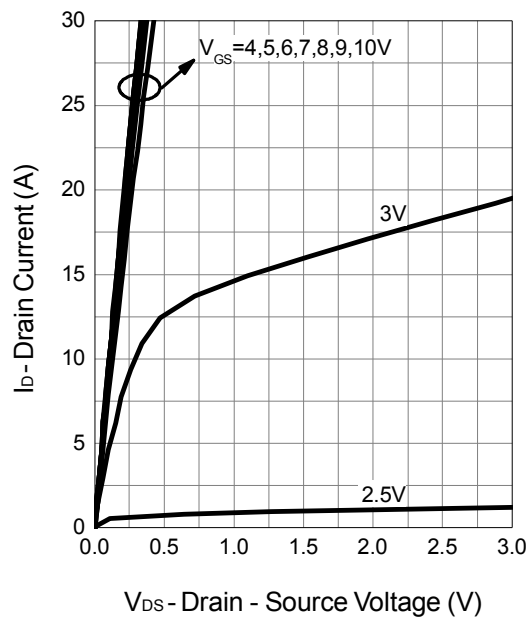


**Thermal Transient Impedance**

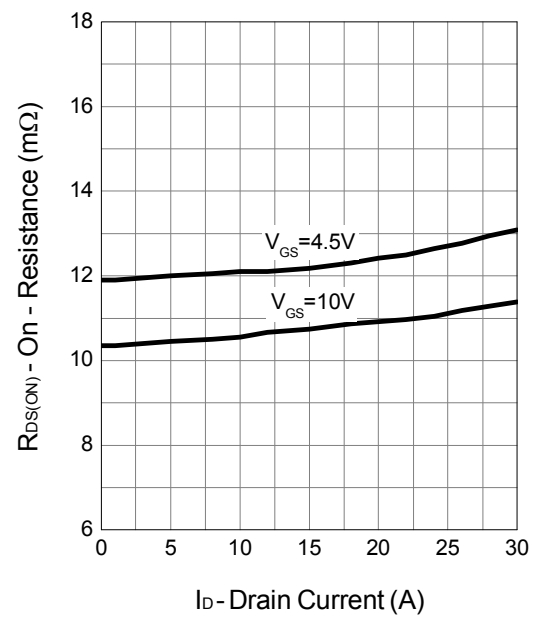


## Typical Operating Characteristics (Cont.)

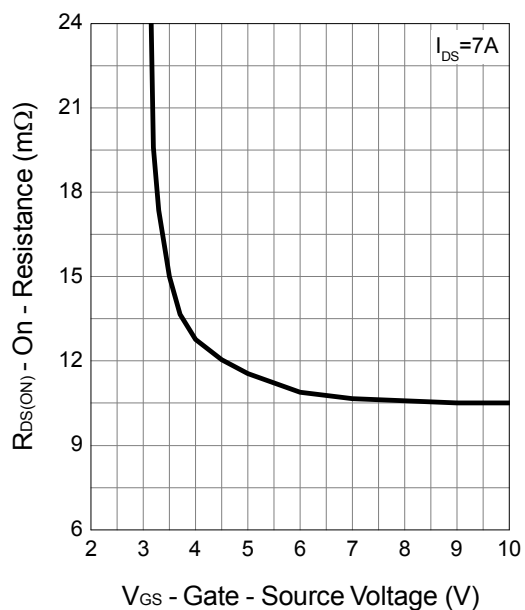
**Output Characteristics**



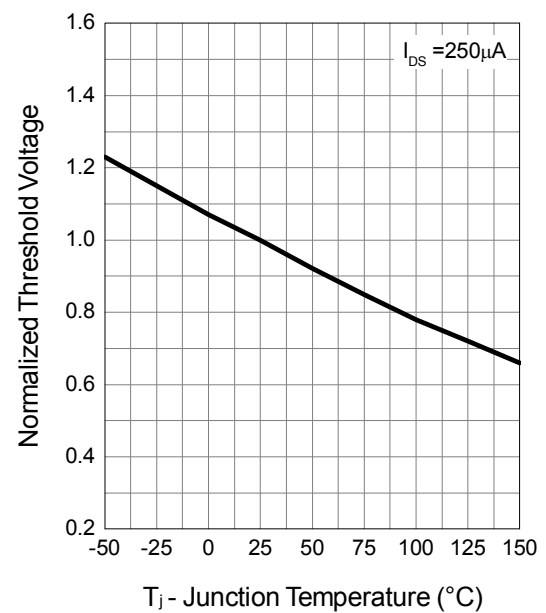
**Drain-Source On Resistance**



**Gate-Source On Resistance**

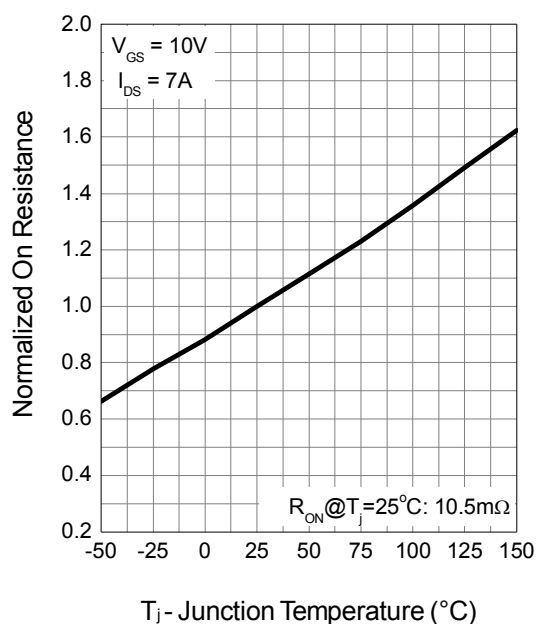


**Gate Threshold Voltage**

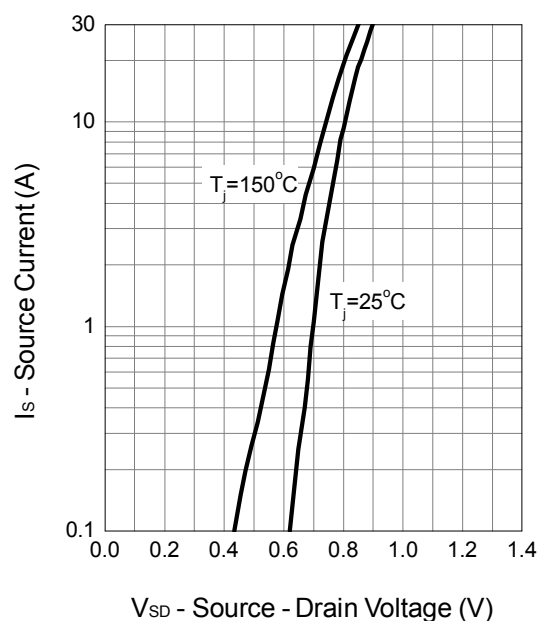


## Typical Operating Characteristics (Cont.)

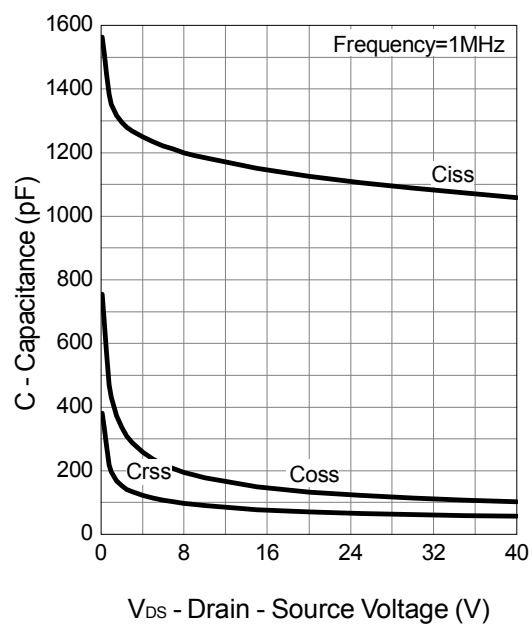
**Drain-Source On Resistance**



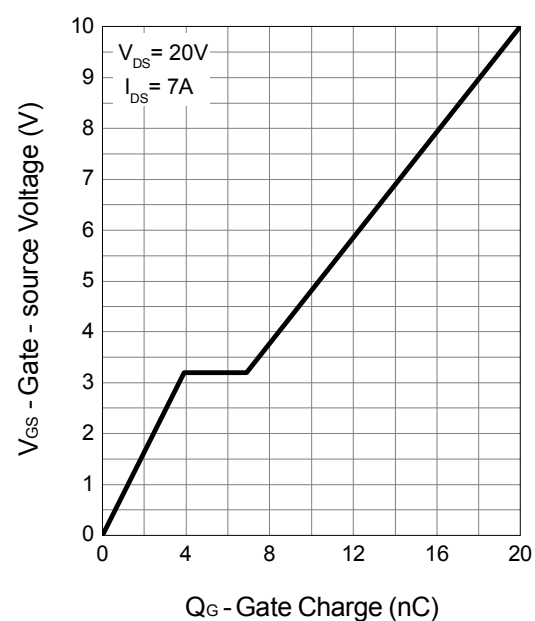
**Source-Drain Diode Forward**



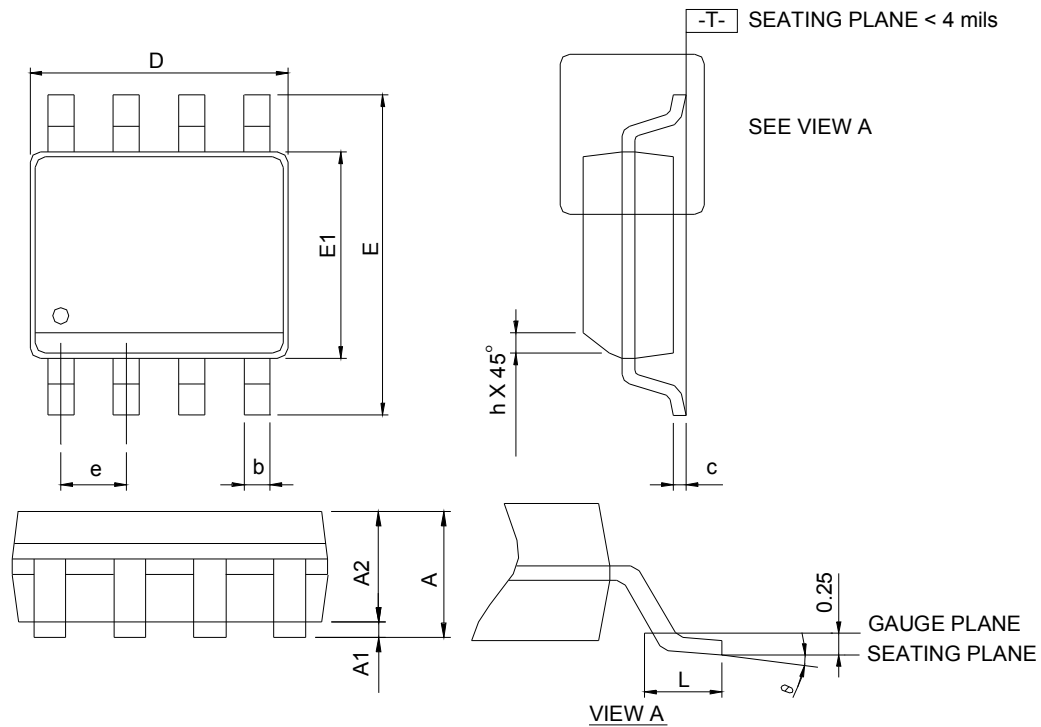
**Capacitance**



**Gate Charge**

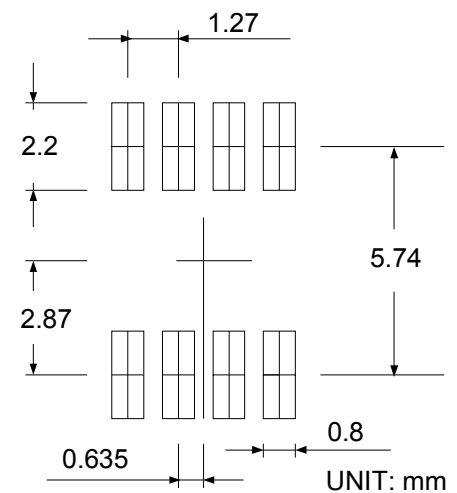


## Package Information:SOP-8



S O P - 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°

### RECOMMENDED LAND PATTERN



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.

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