

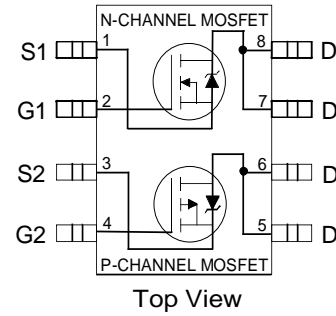
**Features**

**N-Ch:**

- $V_{DS} (V) = 30V$
- $R_{DS(ON)} < 31m\Omega$  ( $V_{GS} = 10V$ )
- $R_{DS(ON)} < 48m\Omega$  ( $V_{GS} = 4.5V$ )

**P-Ch:**

- $V_{DS} (V) = -30V$
- $R_{DS(ON)} < 60m\Omega$  ( $V_{GS} = -10V$ )
- $R_{DS(ON)} < 100m\Omega$  ( $V_{GS} = -4.5V$ )
- Generation V Technology
- Ultra Low On-Resistance
- Dual N and P Channel MOSFET
- Surface Mount
- Fully Avalanche Rated
- Lead-Free



**Description**

The SOP-8 has been modified through a customized leadframe for enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications. With these improvements, multiple devices can be used in an application with dramatically reduce board space. The package is designed for vapor phase, infra red, or wave soldering techniques.

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

	Symbol	Maximum		Units	
		N-Channel	P-Channel		
Drain-Source Voltage	$V_{DS}$	30	-30	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$			
Continuous Drain Current <sup>⑤</sup>	$I_D$	$T_A = 25^\circ C$	6.5	-4.9	A
		$T_A = 70^\circ C$	5.2	-3.9	
Pulsed Drain Current	$I_{DM}$	30	-30		
Continuous Source Current (Diode Conduction)	$I_S$	2.5	-2.5		
Maximum Power Dissipation <sup>⑤</sup>	$P_D$	$T_A = 25^\circ C$	2.0		W
		$T_A = 70^\circ C$	1.3		
Single Pulse Avalanche Energy	$E_{AS}$	82	140	mJ	
Avalanche Current	$I_{AR}$	4.0	-2.8	A	
Repetitive Avalanche Energy	$E_{AR}$	0.20		mJ	
Peak Diode Recovery $dv/dt$ <sup>②</sup>	$dv/dt$	5.0	-5.0	V/ ns	
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to + 150 °C			

**Thermal Resistance Ratings**

Parameter	Symbol	Limit	Units
Maximum Junction-to-Ambient <sup>⑤</sup>	$R_{\theta JA}$	62.5	$^\circ C/W$

**Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

Parameter	Parameter		Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	N-Ch	30			V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
		P-Ch	-30				V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	N-Ch	0.022			V/°C	Reference to 25°C, I <sub>D</sub> = 1mA
		P-Ch	0.022				Reference to 25°C, I <sub>D</sub> = -1mA
R <sub>DS(ON)</sub>	Static Drain-to-Source On-Resistance	N-Ch		23	31	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 5.8A ④
				32	48		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4.7A ④
		P-Ch		42	60		V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.9A ④
				76	100		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3.6A ④
V <sub>GS(th)</sub>	Gate Threshold Voltage	N-Ch	1.0			V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
		P-Ch	-1.0				V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
g <sub>fs</sub>	Forward Transconductance	N-Ch		14		S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 5.8A ④
		P-Ch		7.7			V <sub>DS</sub> = -15V, I <sub>D</sub> = -4.9A ④
I <sub>DSS</sub>	Drain-to-Source Leakage Current	N-Ch			1.0	μA	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V
		P-Ch			-1.0		V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V
		N-Ch			25		V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 55°C
		P-Ch			-25		V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 55°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	N-P			±100	nA	V <sub>DS</sub> = ±20V
Q <sub>g</sub>	Total Gate Charge	N-Ch		22	33		N-Channel I <sub>D</sub> = 5.8A, V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V ④
		P-Ch		23	34		
Q <sub>gs</sub>	Gate-to-Source Charge						
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge						
t <sub>d(on)</sub>	Turn-On Delay Time	N-Ch		8.1	12		N-Channel V <sub>DD</sub> = 15V, I <sub>D</sub> = 1.0A, R <sub>G</sub> = 6.0Ω, R <sub>D</sub> = 15Ω ④
		P-Ch		13	19		
t <sub>r</sub>	Rise Time	N-Ch		8.9	13		P-Channel V <sub>DD</sub> = -15V, I <sub>D</sub> = -1.0A, R <sub>G</sub> = 6.0Ω, R <sub>D</sub> = 15Ω ④
		P-Ch		13	20		
t <sub>d(off)</sub>	Turn-Off Delay Time	N-Ch		26	39		
		P-Ch		34	51		
t <sub>f</sub>	Fall Time	N-Ch		17	26		
		P-Ch		32	48		
C <sub>iss</sub>	Input Capacitance	N-Ch		650			N-Channel V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1.0MHz
		P-Ch		710			
C <sub>oss</sub>	Output Capacitance	N-Ch		320			P-Channel V <sub>GS</sub> = 0V, V <sub>DS</sub> = -25V, f = 1.0MHz
		P-Ch		380			
C <sub>rss</sub>	Reverse Transfer Capacitance	N-Ch		130			
		P-Ch		180			

**Source-Drain Ratings and Characteristics**

Parameter	Parameter		Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	N-Ch			2.5	A	
		P-Ch			-2.5		
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	N-Ch			30		
		P-Ch			-30		
V <sub>SD</sub>	Diode Forward Voltage	N-Ch	0.78		1.0	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 1.7A, V <sub>GS</sub> = 0V ③
		P-Ch	-0.78		-1.0		T <sub>J</sub> = 25°C, I <sub>S</sub> = -1.7A, V <sub>GS</sub> = 0V ③
t <sub>rr</sub>	Reverse Recovery Time	N-Ch		45	68	ns	N-Channel T <sub>J</sub> = 25°C, I <sub>F</sub> = 1.7A, di/dt = 100A/μs
		P-Ch		44	66		
Q <sub>rr</sub>	Reverse Recovery Charge	N-Ch		58	87	nC	P-Channel T <sub>J</sub> = 25°C, I <sub>F</sub> = -1.7A, di/dt = 100A/μs ④
		P-Ch		42	63		

**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 22 )
- ② N-Channel I<sub>SD</sub> ≤ 4.0A, di/dt ≤ 74A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C  
P-Channel I<sub>SD</sub> ≤ -2.8A, di/dt ≤ 150A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C
- ③ N-Channel Starting T<sub>J</sub> = 25°C, L = 10mH R<sub>G</sub> = 25Ω, I<sub>AS</sub> = 4.0A. (See Figure 12)  
P-Channel Starting T<sub>J</sub> = 25°C, L = 35mH R<sub>G</sub> = 25Ω, I<sub>AS</sub> = -2.8A.
- ④ Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ⑤ Surface mounted on FR-4 board, t ≤ 10sec.

N-Channel

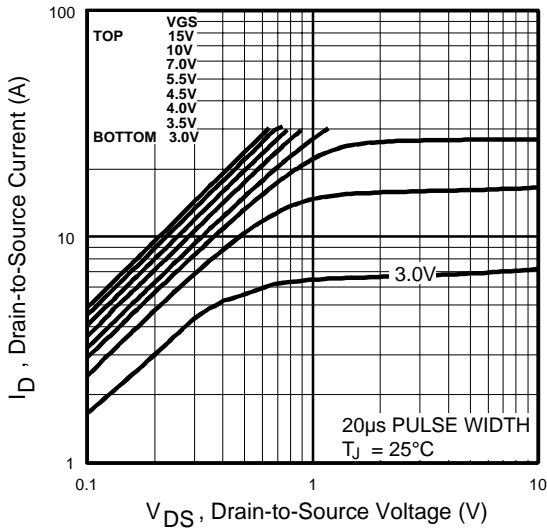


Fig 1. Typical Output Characteristics

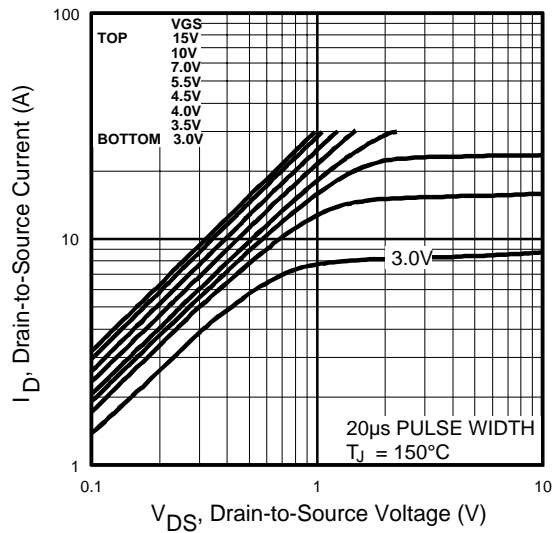


Fig 2. Typical Output Characteristics

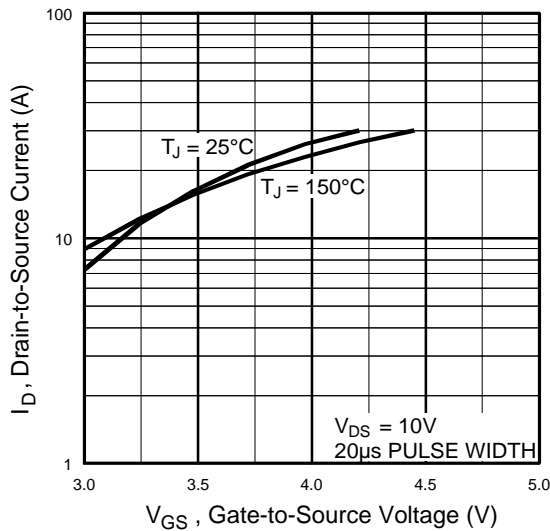


Fig 3. Typical Transfer Characteristics

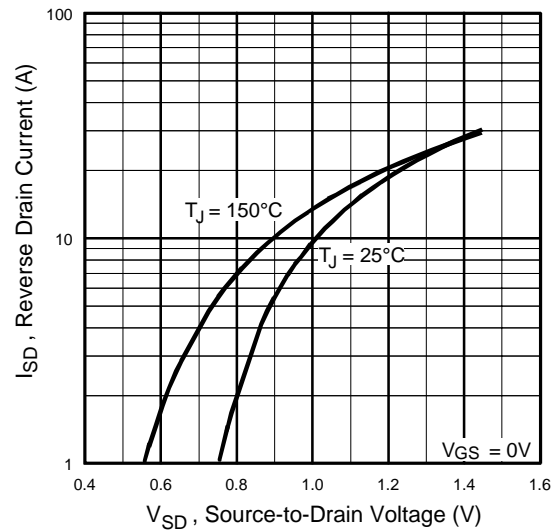


Fig 4. Typical Source-Drain Diode Forward Voltage

N-Channel

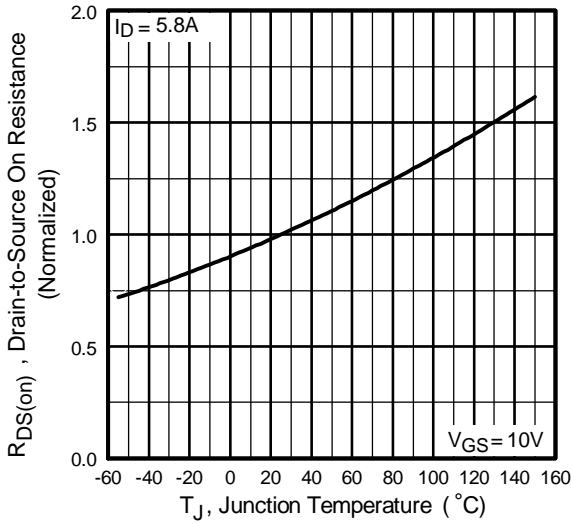


Fig 5. Normalized On-Resistance Vs. Temperature

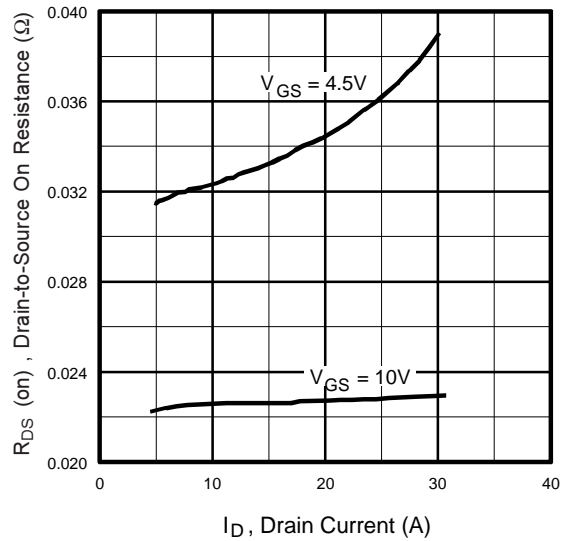


Fig 6. Typical On-Resistance Vs. Drain Current

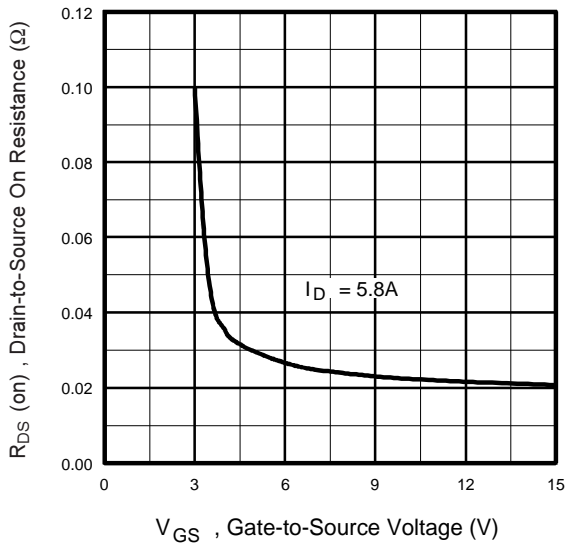


Fig 7. Typical On-Resistance Vs. Gate Voltage

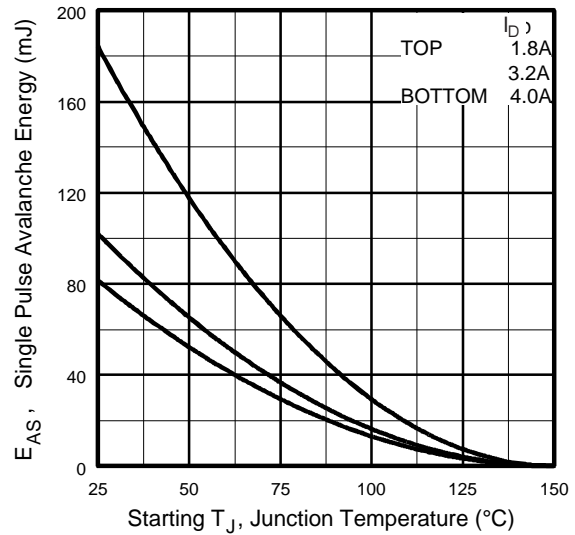


Fig 8. Maximum Avalanche Energy Vs. Drain Current

N-Channel

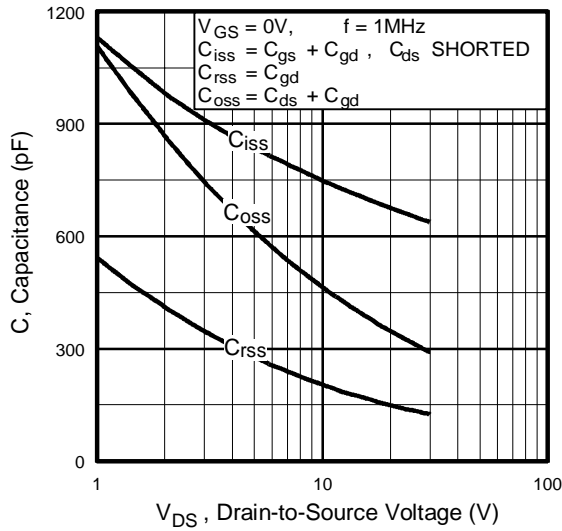


Fig 9. Typical Capacitance Vs. Drain-to-Source Voltage

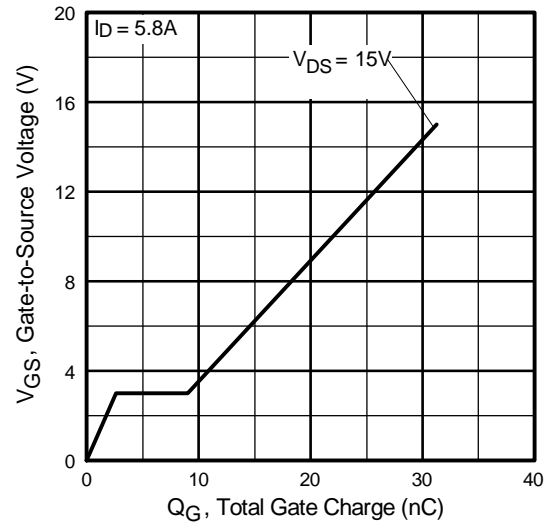


Fig 10. Typical Gate Charge Vs. Gate-to-Source Voltage

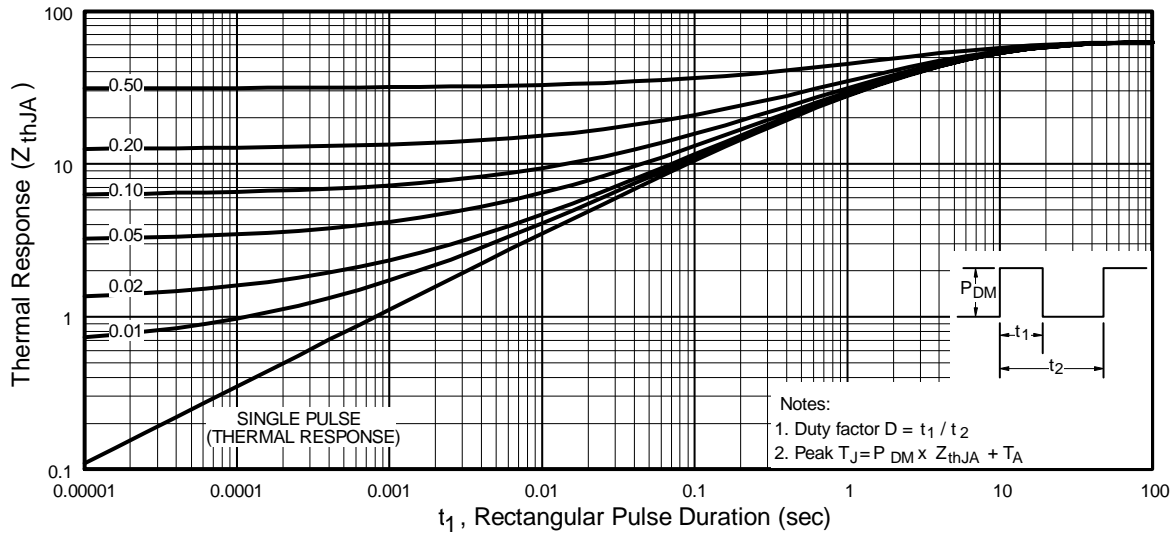


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

P-Channel

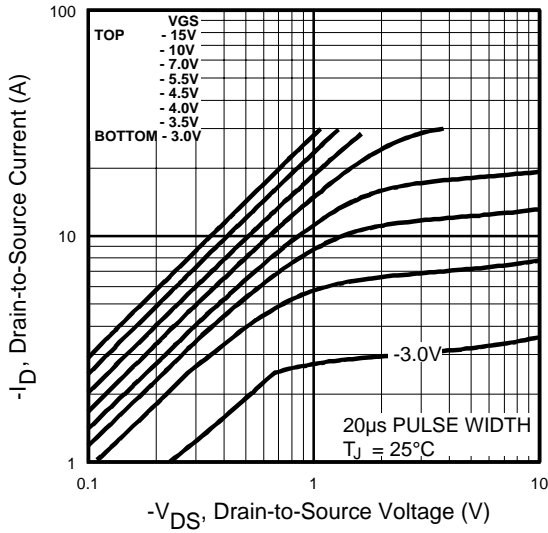


Fig 12. Typical Output Characteristics

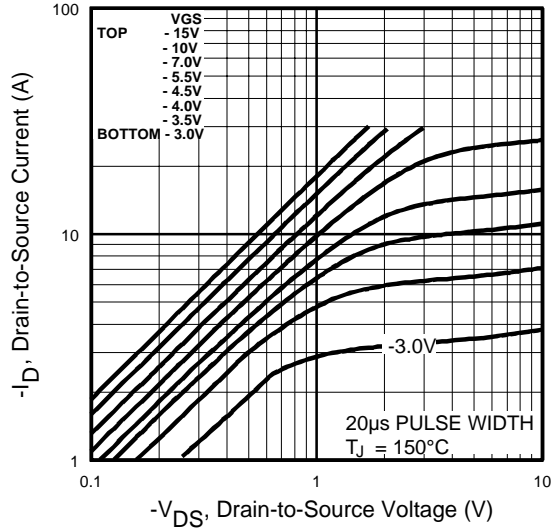


Fig 13. Typical Output Characteristics

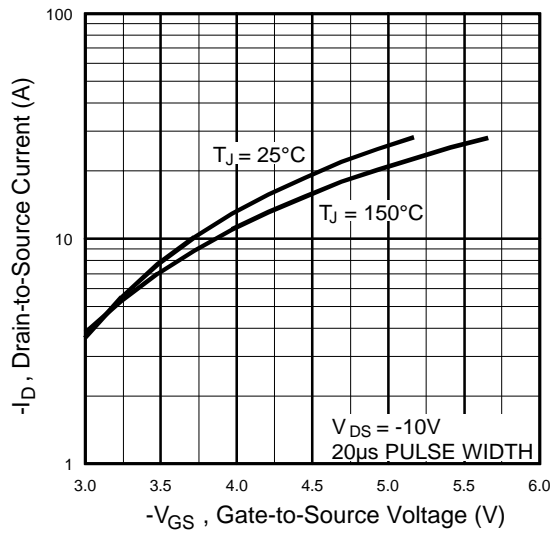


Fig 14. Typical Transfer Characteristics

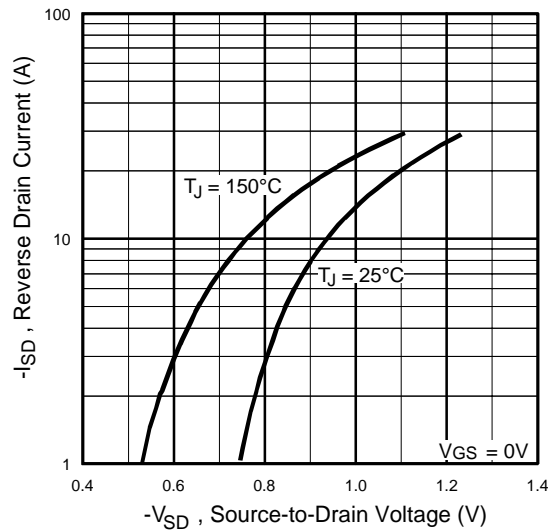


Fig 15. Typical Source-Drain Diode Forward Voltage

P-Channel

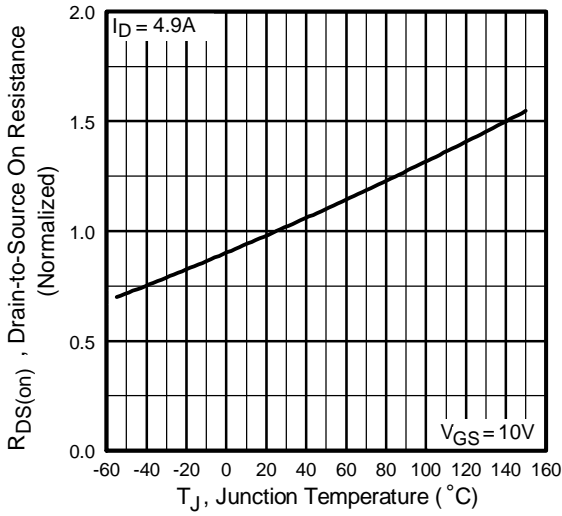


Fig 16. Normalized On-Resistance Vs. Temperature

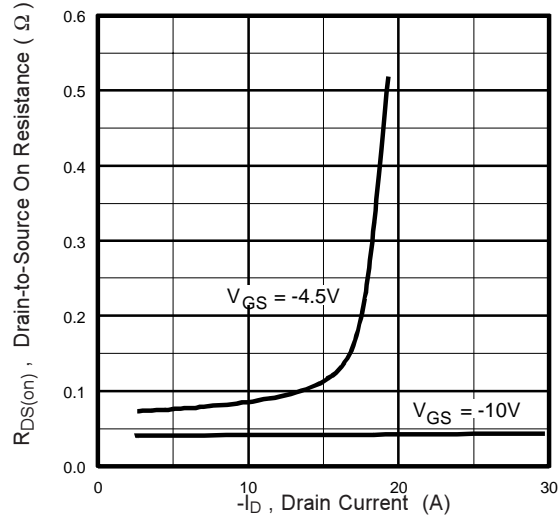


Fig 17. Typical On-Resistance Vs. Drain Current

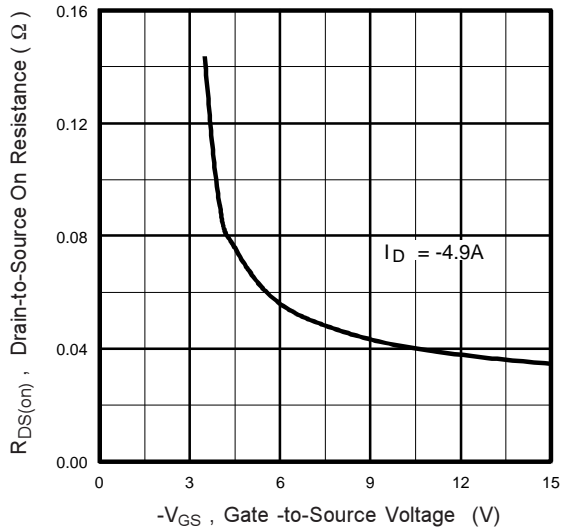


Fig 18. Typical On-Resistance Vs. Gate Voltage

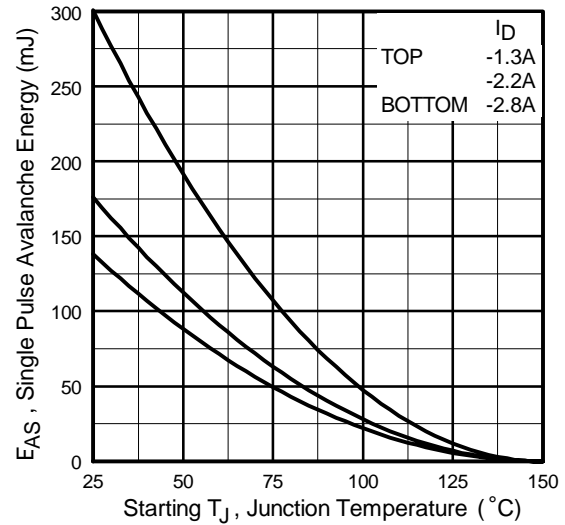


Fig 19. Maximum Avalanche Energy Vs. Drain Current

P-Channel

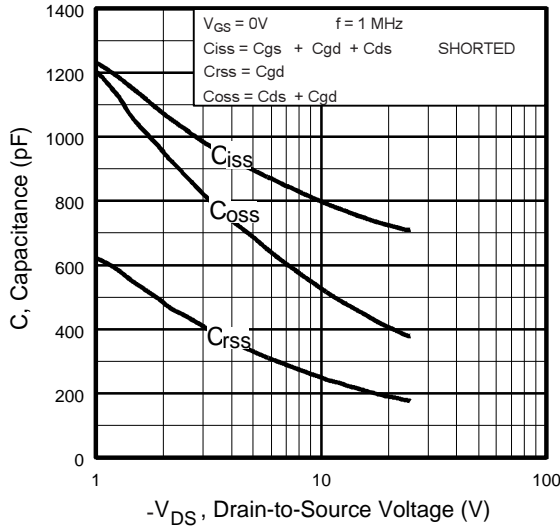


Fig 20. Typical Capacitance Vs. Drain-to-Source Voltage

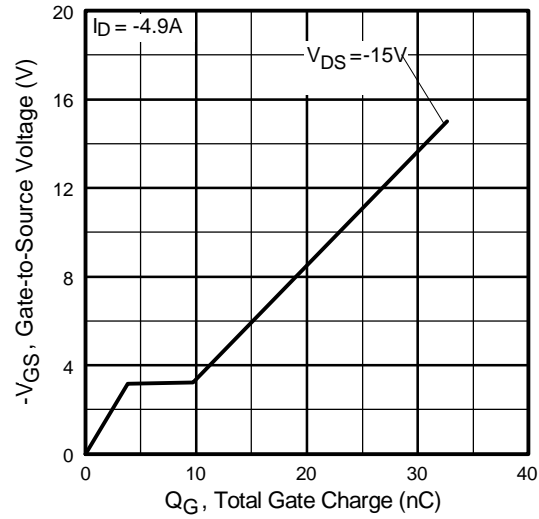


Fig 21. Typical Gate Charge Vs. Gate-to-Source Voltage

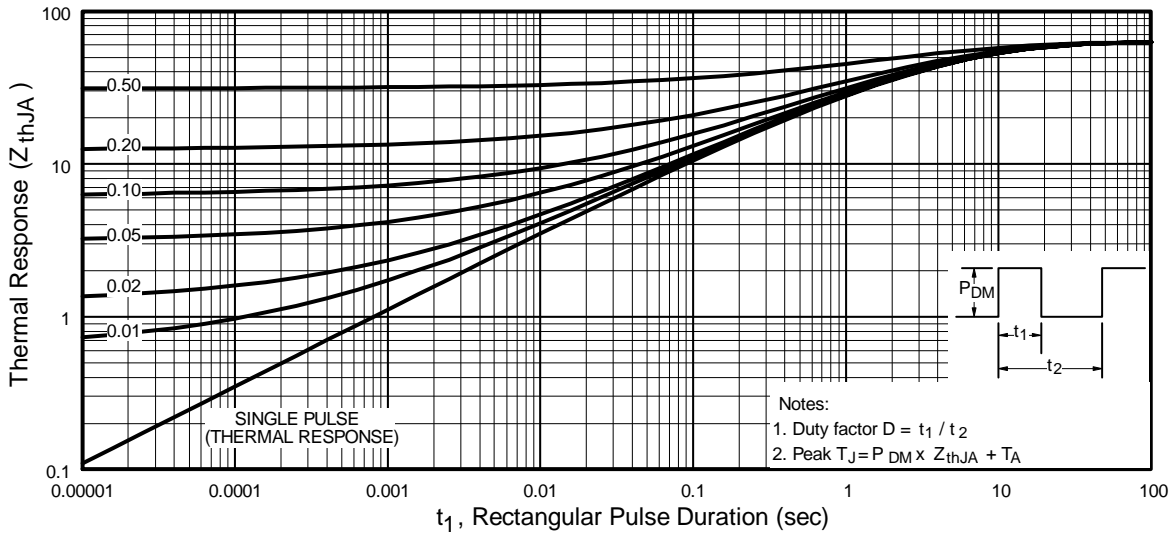
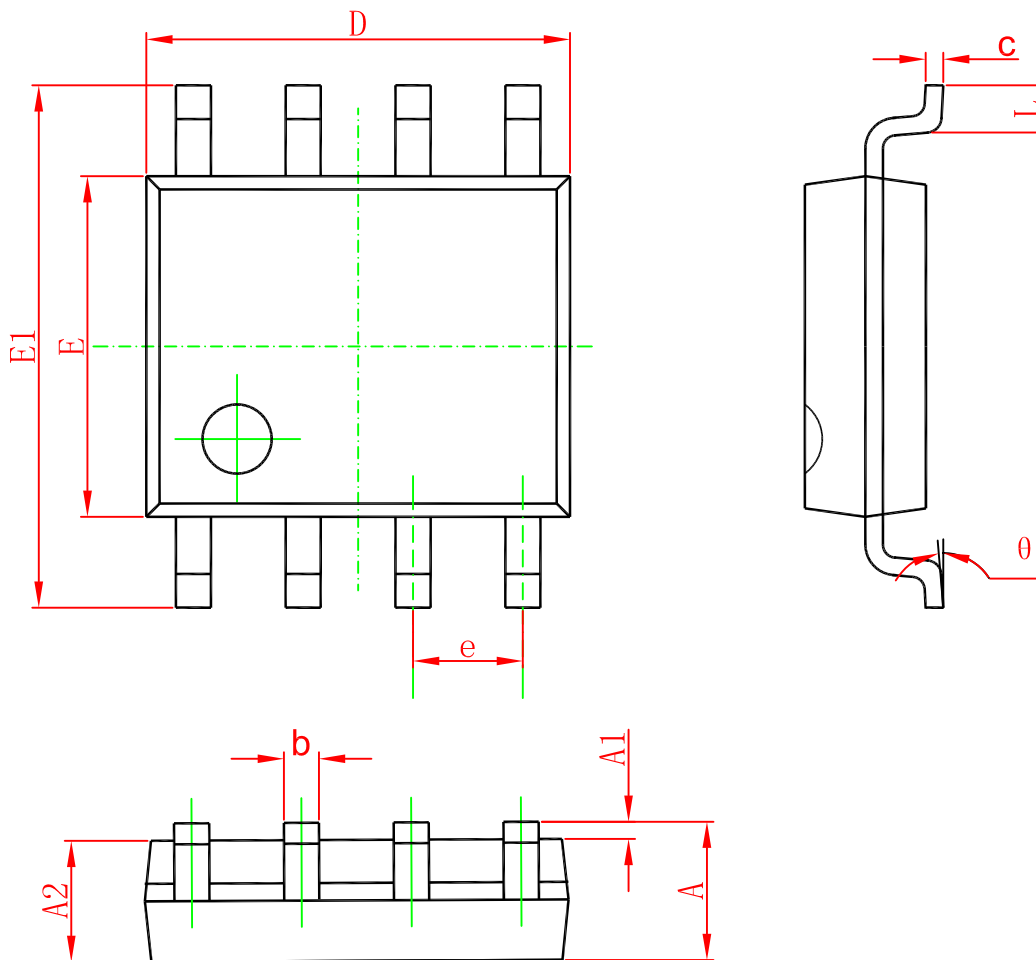


Fig 22. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

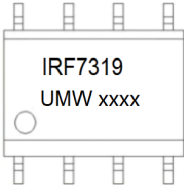


SOP-8



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°

**Marking**



**Ordering information**

Order code	Package	Baseqty	Deliverymode
UMW IRF7319TR	SOP-8	3000	Tape and reel