

Features

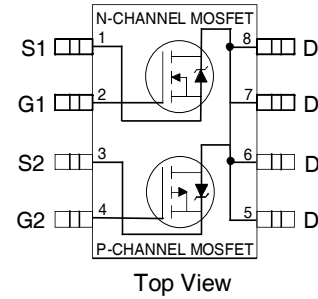
N-Ch:

- $V_{DS}(V)=30V$
- $R_{DS(ON)} < 29m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 46 m\Omega$ ($V_{GS} = 4.5V$)

P-Ch:

- $V_{DS}(V)=-30V$
- $R_{DS(ON)} < 58m\Omega$ ($V_{GS} = -10V$)
- $R_{DS(ON)} < 98 m\Omega$ ($V_{GS} = -4.5V$)

- Generation V Technology
- Ultra Low On-Resistance
- Complimentary Half Bridge
- Surface Mount
- Fully Avalanche Rated
- Lead-Free



Description

The SOP-8 has been modified through a customized eadframe 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 reduced board space. The package is designed for vapor phase, inra red, orwave soldering techniqgues

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}	± 20			
Continuous Drain Current [Ⓢ]	I_D	$T_A = 25^\circ C$	7.3	-5.3	A
		$T_A = 70^\circ C$	5.9	-4.2	
Pulsed Drain Current	I_{DM}	30	-30		
Continuous Source Current (Diode Conduction)	I_S	2.5	-2.5		
Maximum Power Dissipation [Ⓢ]	P_D	$T_A = 25^\circ C$	2.5		W
		$T_A = 70^\circ C$	1.6		
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 [Ⓢ]	dv/dt	3.8	-2.2	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 [Ⓢ]	$R_{\theta JA}$	50	$^\circ C/W$

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

Parameter	Min.	Typ.	Max.	Units	Conditions
V _{(BR)DSS}	N-Ch 30 P-Ch -30			V	V _{GS} = 0V, I _D = 250μA V _{GS} = 0V, I _D = -250μA
ΔV _{(BR)DSS} /ΔT _J	N-Ch P-Ch	0.022		V/°C	Reference to 25°C, I _D = 1mA Reference to 25°C, I _D = -1mA
R _{DS(ON)}	N-Ch P-Ch	23 32	29 46	mΩ	V _{GS} = 10V, I _D = 5.8A ④ V _{GS} = 4.5V, I _D = 4.7A ④ V _{GS} = -10V, I _D = -4.9A ④ V _{GS} = -4.5V, I _D = -3.6A ④
V _{GS(th)}	N-Ch 1.0 P-Ch -1.0			V	V _{DS} = V _{GS} , I _D = 250μA
g _{fs}	N-Ch P-Ch	— —	14 7.7	S	V _{DS} = V _{GS} , I _D = -250μA V _{DS} = 15V, I _D = 5.8A ④ V _{DS} = -15V, I _D = -4.9A ④
I _{DSS}	N-Ch P-Ch	— —	— —	μA	V _{DS} = 24V, V _{GS} = 0V V _{DS} = -24V, V _{GS} = 0V
I _{GSS}	N-Ch P-Ch	— —	— —	nA	V _{DS} = 24V, V _{GS} = 0V, T _J = 55°C V _{DS} = -24V, V _{GS} = 0V, T _J = 55°C
Q _g	N-P	—	—	±100	V _{GS} = ±20V
Q _{gs}	N-Ch P-Ch	— —	22 23	33 34	N-Channel I _D = 5.8A, V _{DS} = 15V, V _{GS} = 10V ④
Q _{gd}					P-Channel I _D = -4.9A, V _{DS} = -15V, V _{GS} = -10V ④
t _{d(on)}	N-Ch P-Ch	— —	8.1 13	12 19	N-Channel V _{DD} = 15V, I _D = 1.0A, R _G = 6.0Ω, R _D = 15Ω ④
t _r	N-Ch P-Ch	— —	8.9 13	13 20	
t _{d(off)}	N-Ch P-Ch	— —	26 34	39 51	P-Channel V _{DD} = -15V, I _D = -1.0A, R _G = 6.0Ω, R _D = 15Ω ④
t _f	N-Ch P-Ch	— —	17 32	26 48	
C _{iss}	N-Ch P-Ch	— —	650 710	— —	N-Channel V _{GS} = 0V, V _{DS} = 25V, f = 1.0MHz
C _{oss}	N-Ch P-Ch	— —	320 380	— —	P-Channel V _{GS} = 0V, V _{DS} = -25V, f = 1.0MHz
C _{rss}	N-Ch P-Ch	— —	130 180	— —	

Source-Drain Ratings and Characteristics

Parameter	Min.	Typ.	Max.	Units	Conditions	
I _S	N-Ch P-Ch	— —	— —	2.5 -2.5	A	
I _{SM}	N-Ch P-Ch	— —	— —	30 -30	A	
V _{SD}	N-Ch P-Ch	— —	0.78 -0.78	1.0 -1.0	V	T _J = 25°C, I _S = 1.7A, V _{GS} = 0V ③ T _J = 25°C, I _S = -1.7A, V _{GS} = 0V ③
t _{rr}	N-Ch P-Ch	— —	45 44	68 66	ns	N-Channel T _J = 25°C, I _F = 1.7A, di/dt = 100A/μs ④
Q _{rr}	N-Ch P-Ch	— —	58 42	87 63	nC	P-Channel T _J = 25°C, I _F = -1.7A, di/dt = 100A/μs ④

Notes:

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

N-Channel

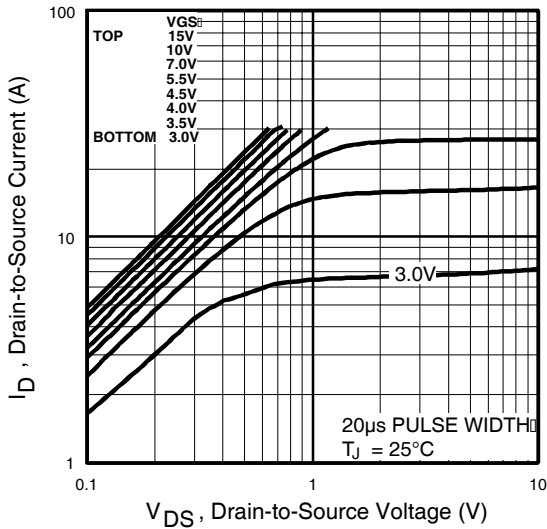


Fig 1. Typical Output Characteristics

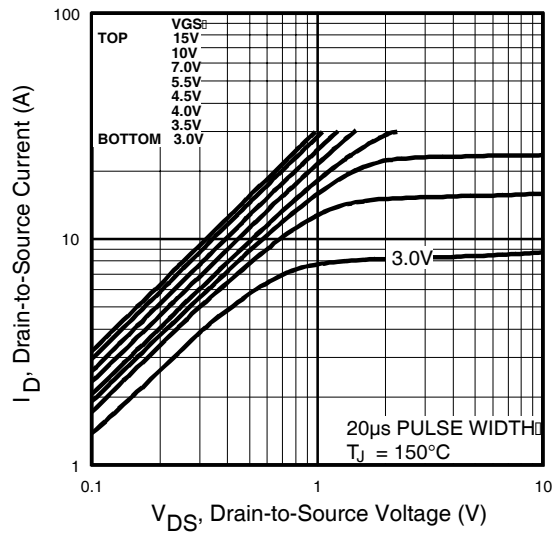


Fig 2. Typical Output Characteristics

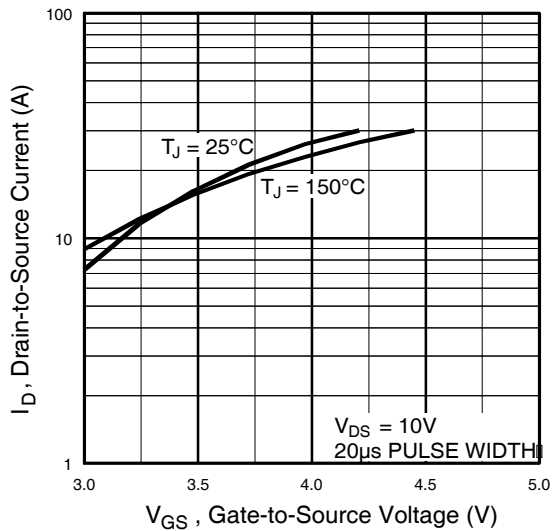


Fig 3. Typical Transfer Characteristics

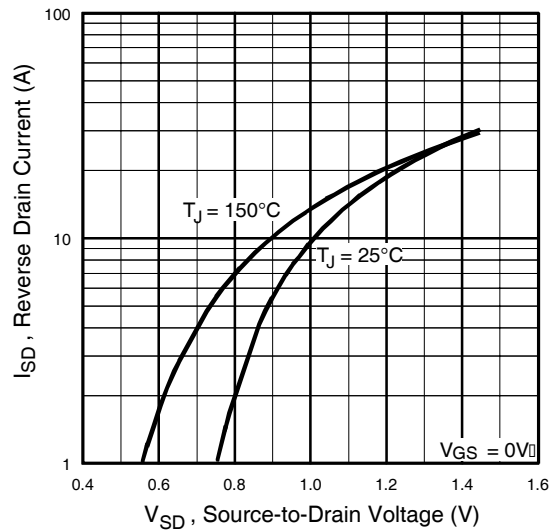


Fig 4. Typical Source-Drain Diode Forward Voltage

N-Channel

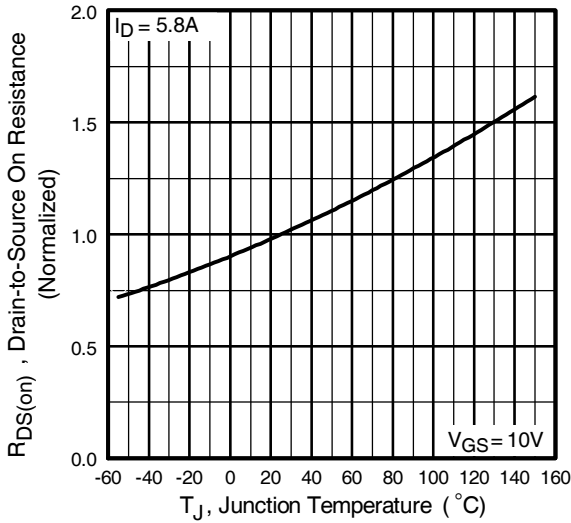


Fig 5. Normalized On-Resistance Vs. Temperature

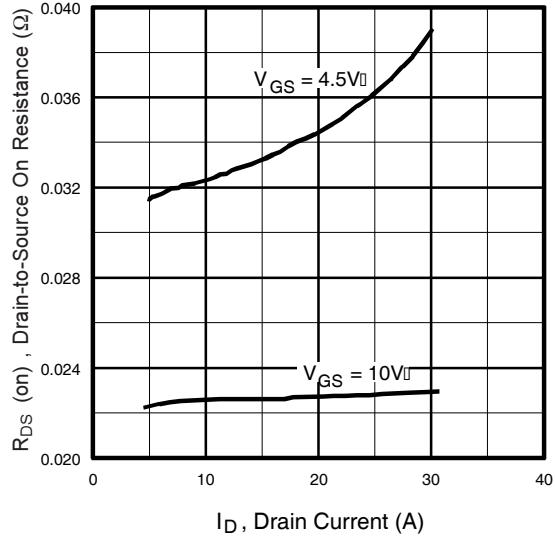


Fig 6. Typical On-Resistance Vs. Drain Current

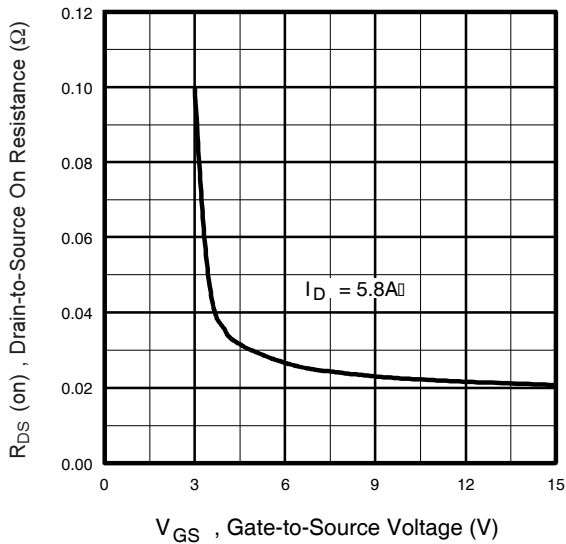


Fig 7. Typical On-Resistance Vs. Gate Voltage

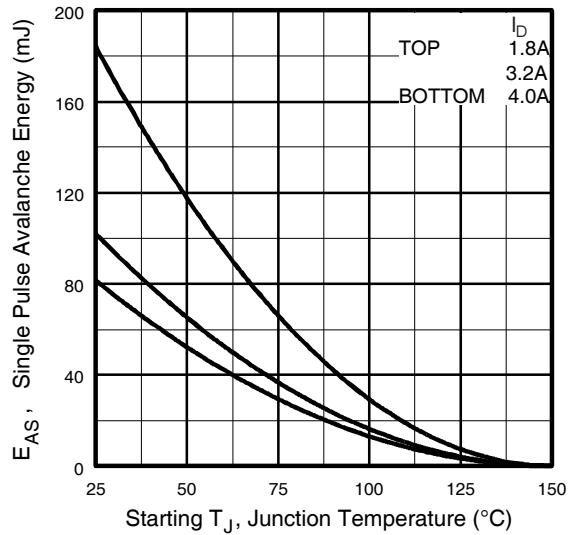


Fig 8. Maximum Avalanche Energy Vs. Drain Current

N-Channel

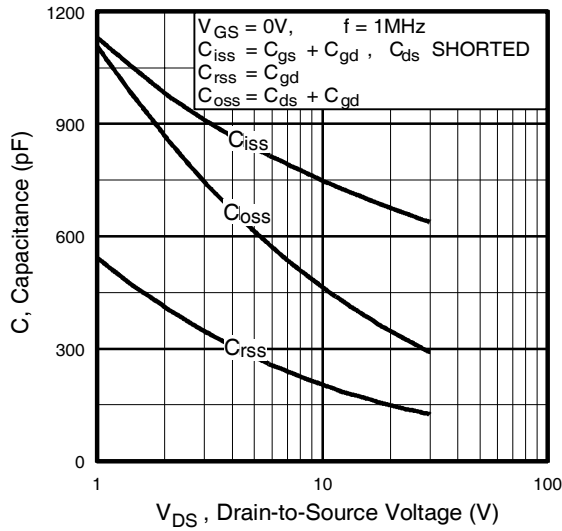


Fig 9. Typical Capacitance Vs. Drain-to-Source Voltage

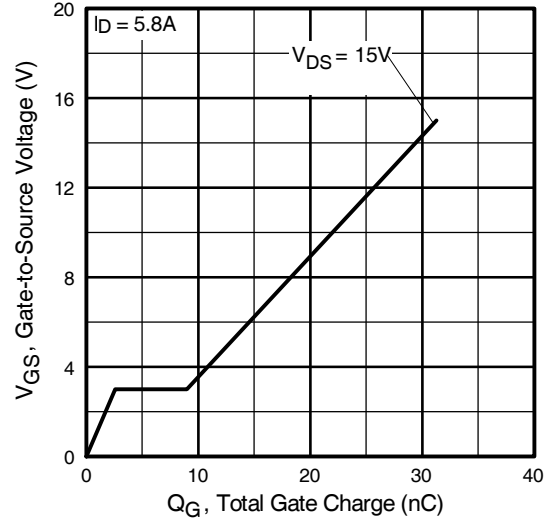


Fig 10. Typical Gate Charge Vs. Gate-to-Source Voltage

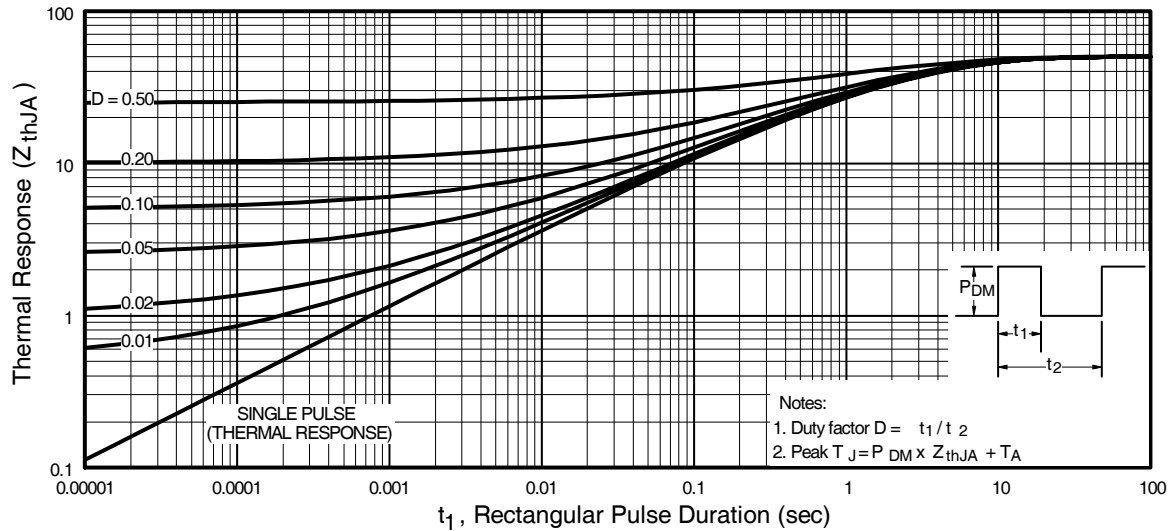


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

P-Channel

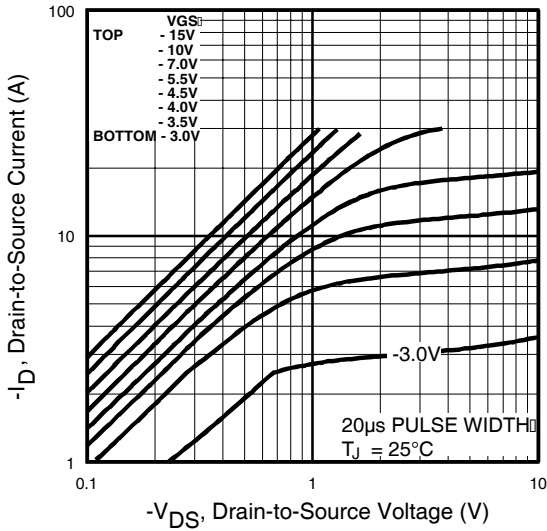


Fig 12. Typical Output Characteristics

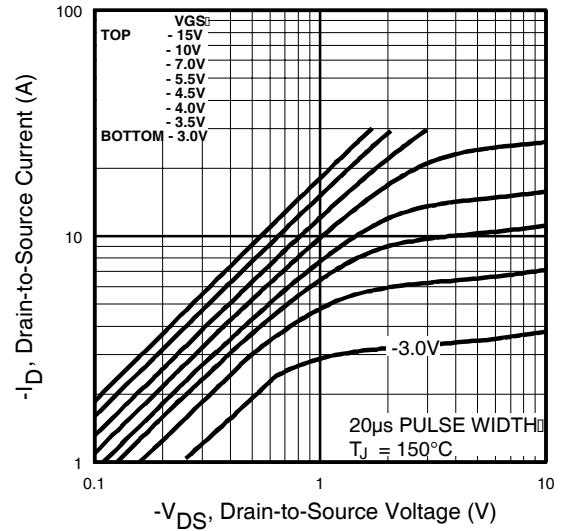


Fig 13. Typical Output Characteristics

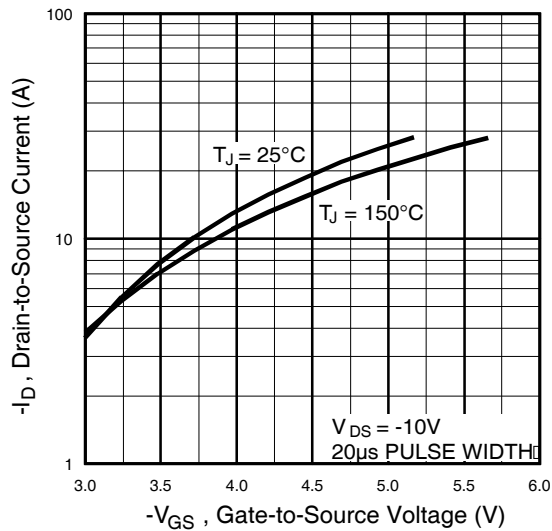


Fig 14. Typical Transfer Characteristics

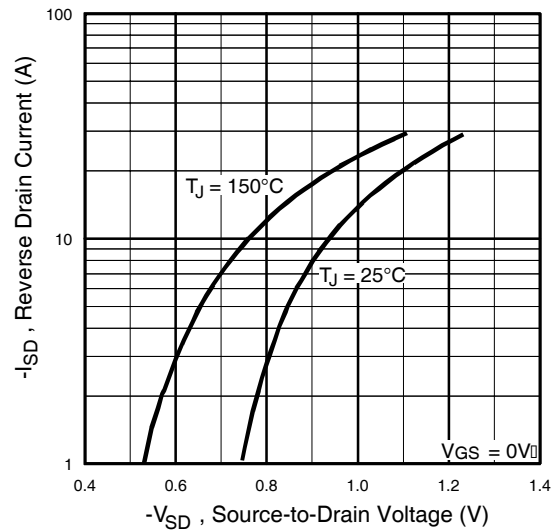


Fig 15. Typical Source-Drain Diode Forward Voltage

P-Channel

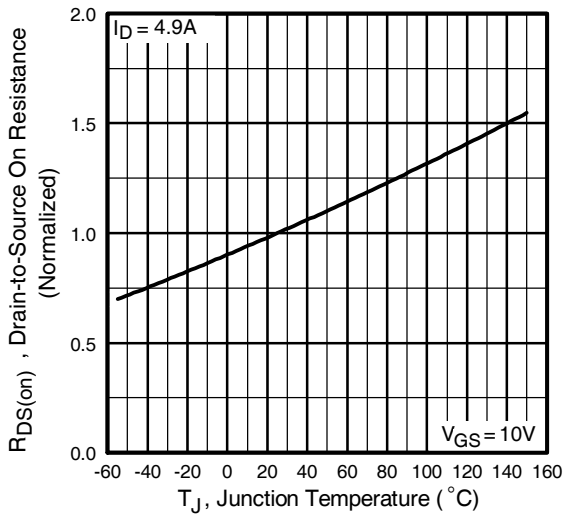


Fig 16. Normalized On-Resistance Vs. Temperature

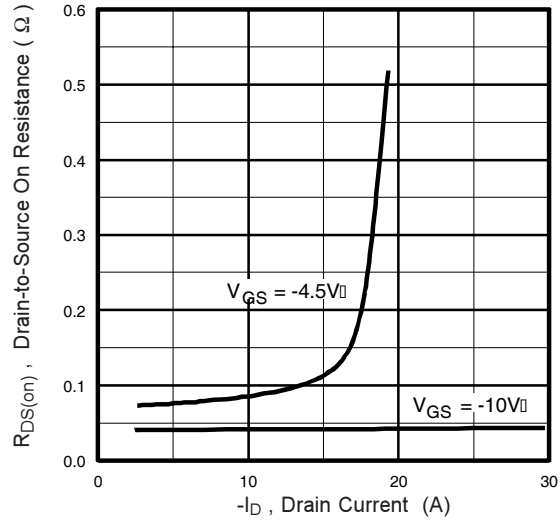


Fig 17. Typical On-Resistance Vs. Drain Current

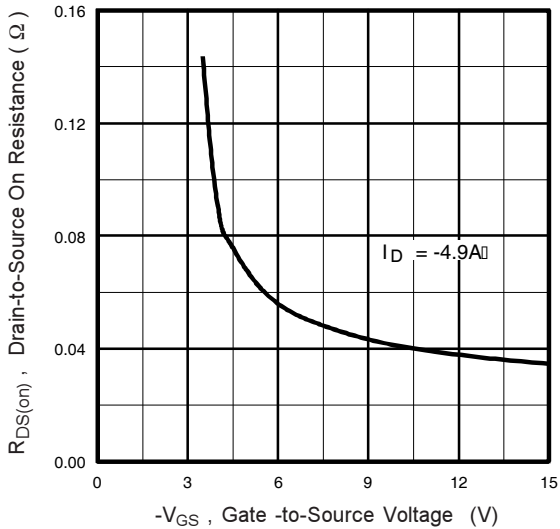


Fig 18. Typical On-Resistance Vs. Gate Voltage

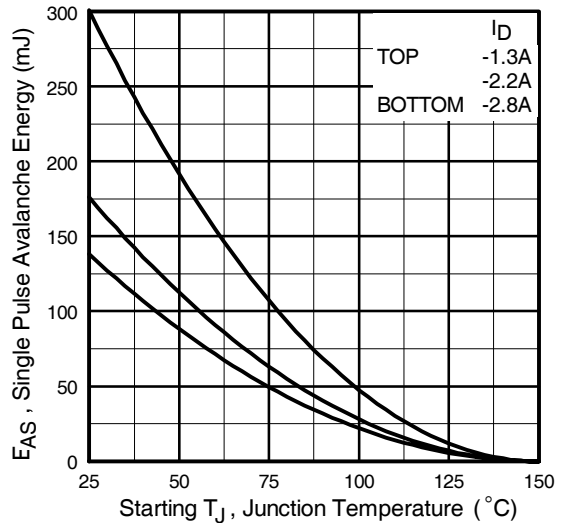


Fig 19. Maximum Avalanche Energy Vs. Drain Current

P-Channel

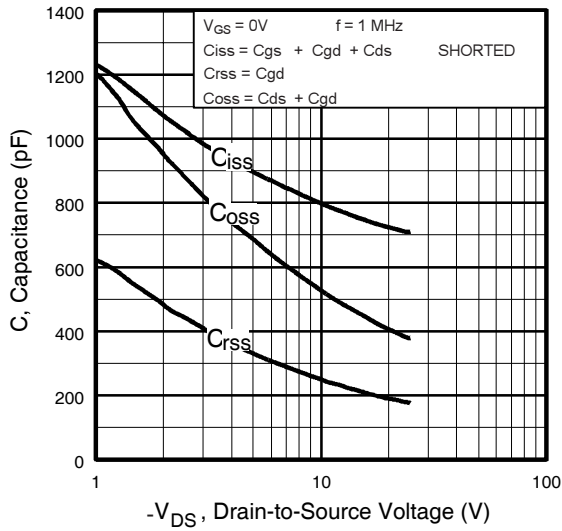


Fig 20. Typical Capacitance Vs. Drain-to-Source Voltage

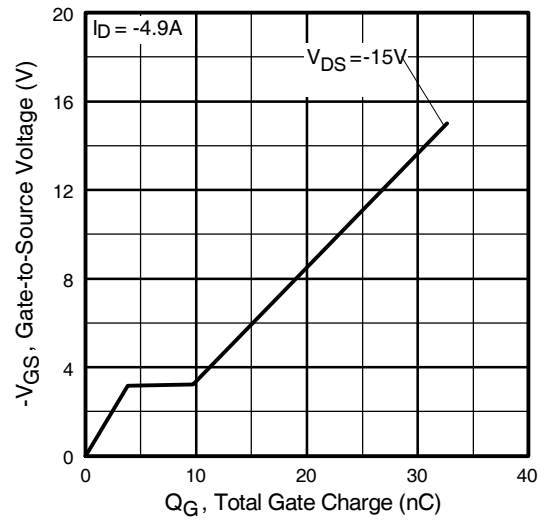


Fig 21. Typical Gate Charge Vs. Gate-to-Source Voltage

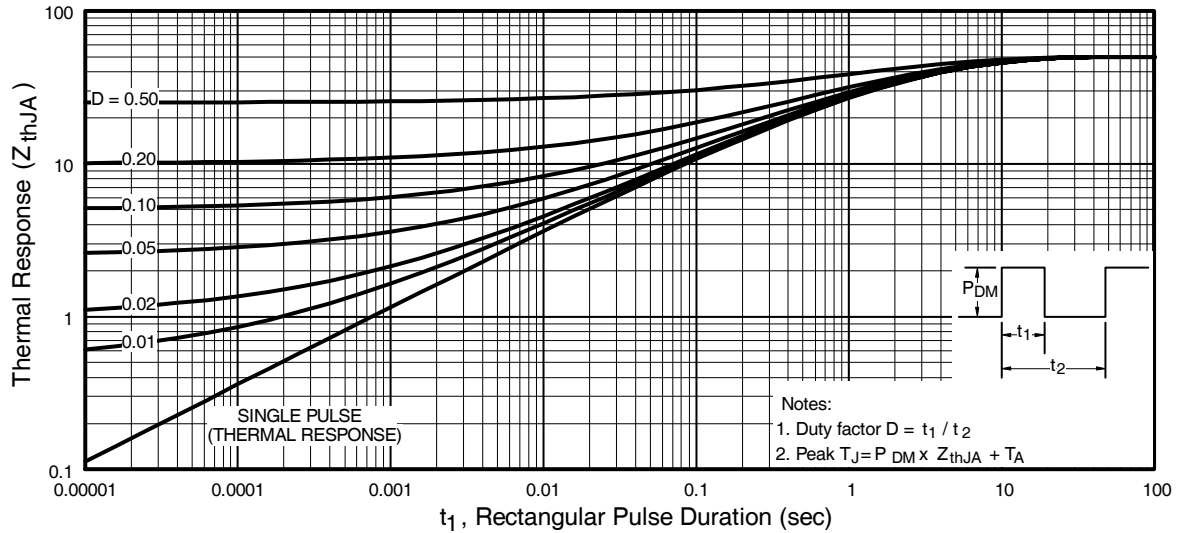
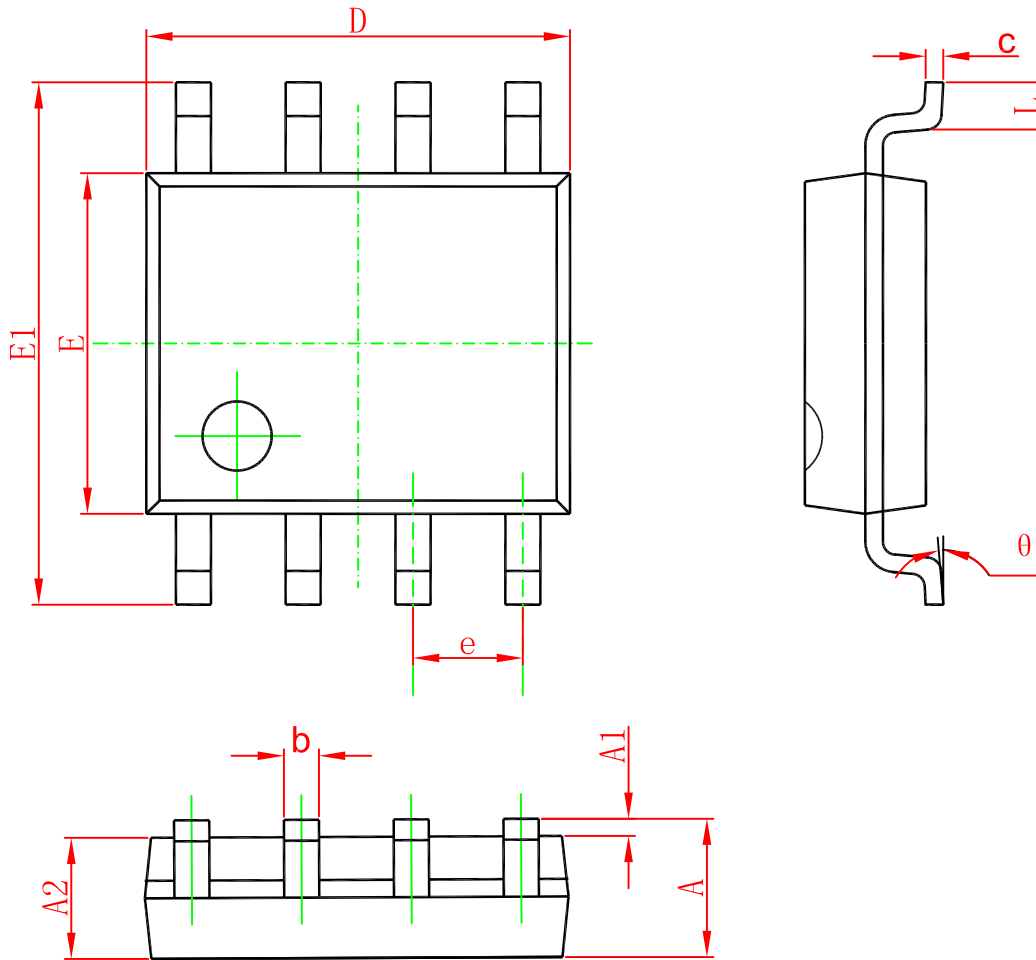


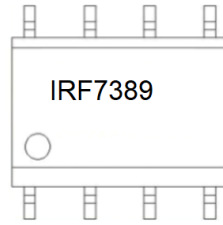
Fig 22. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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
IRF7389TR	SOP-8	3000	Tape and reel