Features

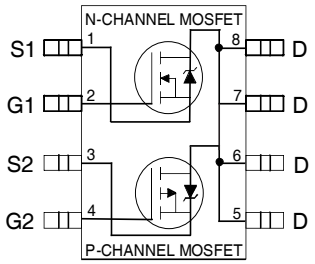
N-Ch:

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

P-Ch:

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

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



Top View

Description

The SOP-8 has been modfied 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 desianed for vapor phase, inra red, orwave soldering technigues

Absolute Maximum Ratings (T_A = 25°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 Current⑤	T_A = 25°C	I_D	7.3	-5.3	A
	T_A = 70°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 ⑤	T_A = 25°C	P_D	2.5		W
	T_A = 70°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 ②		dv/dt	3.8	-2.2	V/ ns
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to + 150 ℃		

Thermal Resistance Ratings

Parameter	Symbol	Limit	Units
Maximum Junction-to-Ambient ⑤	$R_{\theta JA}$	50	°C/W

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

	Parameter		Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	N-Ch	30			V	V_{GS} = 0V, I_D = 250μA
		P-Ch	-30				V_{GS} = 0V, I_D = -250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	N-Ch		0.022		V/°C	Reference to 25°C, I_D = 1mA
		P-Ch		0.022			Reference to 25°C, I_D = -1mA
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	N-Ch		23	29	mΩ	V_{GS} = 10V, I_D = 5.8A ④
				32	46		V_{GS} = 4.5V, I_D = 4.7A ④
		P-Ch		42	58		V_{GS} = -10V, I_D = -4.9A ④
				76	98		V_{GS} = -4.5V, I_D = -3.6A ④
$V_{GS(th)}$	Gate Threshold Voltage	N-Ch	1.0			V	V_{DS} = V_{GS}, I_D = 250μA
		P-Ch	-1.0				V_{DS} = V_{GS}, I_D = -250μA
g_{fs}	Forward Transconductance	N-Ch	—	14	—	S	V_{DS} = 15V, I_D = 5.8A ④
		P-Ch	—	7.7	—		V_{DS} = -15V, I_D = -4.9A ④
I_{DSS}	Drain-to-Source Leakage Current	N-Ch	—	—	1.0	μA	V_{DS} = 24V, V_{GS} = 0V
		P-Ch	—	—	-1.0		V_{DS} = -24V, V_{GS} = 0V
		N-Ch	—	—	25	nA	V_{DS} = 24V, V_{GS} = 0V, T_J = 55°C
		P-Ch	—	—	-25		V_{DS} = -24V, V_{GS} = 0V, T_J = 55°C
I_{GSS}	Gate-to-Source Forward Leakage	N-P	—	—	±100		V_{GS} = ±20V
Q_g	Total Gate Charge	N-Ch	—	22	33	nC	N-Channel I_D = 5.8A, V_{DS} = 15V, V_{GS} = 10V ④ P-Channel I_D = -4.9A, V_{DS} = -15V, V_{GS} = -10V
		P-Ch	—	23	34		
Q_{gs}	Gate-to-Source Charge						
Q_{gd}	Gate-to-Drain ("Miller") Charge						
$t_{d(on)}$	Turn-On Delay Time	N-Ch	—	8.1	12	ns	N-Channel V_{DD} = 15V, I_D = 1.0A, R_G = 6.0Ω, R_D = 15Ω ④ P-Channel V_{DD} = -15V, I_D = -1.0A, R_G = 6.0Ω, R_D = 15Ω
		P-Ch	—	13	19		
t_r	Rise Time	N-Ch	—	8.9	13		
		P-Ch	—	13	20		
$t_{d(off)}$	Turn-Off Delay Time	N-Ch	—	26	39		
		P-Ch	—	34	51		
t_f	Fall Time	N-Ch	—	17	26		
		P-Ch	—	32	48		
C_{iss}	Input Capacitance	N-Ch	—	650	—	pF	N-Channel V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz P-Channel V_{GS} = 0V, V_{DS} = -25V, f = 1.0MHz
		P-Ch	—	710	—		
C_{oss}	Output Capacitance	N-Ch	—	320	—		
		P-Ch	—	380	—		
C_{rss}	Reverse Transfer Capacitance	N-Ch	—	130	—		
		P-Ch	—	180	—		

Source-Drain Ratings and Characteristics

	Parameter		Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	N-Ch	—	—	2.5	A	
		P-Ch	—	—	-2.5		
I_{SM}	Pulsed Source Current (Body Diode) ①	N-Ch	—	—	30		
		P-Ch	—	—	-30		
V_{SD}	Diode Forward Voltage	N-Ch	—	0.78	1.0	V	T_J = 25°C, I_S = 1.7A, V_{GS} = 0V ③
		P-Ch	—	-0.78	-1.0		T_J = 25°C, I_S = -1.7A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	N-Ch	—	45	68	ns	N-Channel T_J = 25°C, I_F =1.7A, di/dt = 100A/μs P-Channel T_J = 25°C, I_F = -1.7A, di/dt = 100A/μs ④
		P-Ch	—	44	66		
Q_{rr}	Reverse Recovery Charge	N-Ch	—	58	87	nC	
		P-Ch	—	42	63		

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

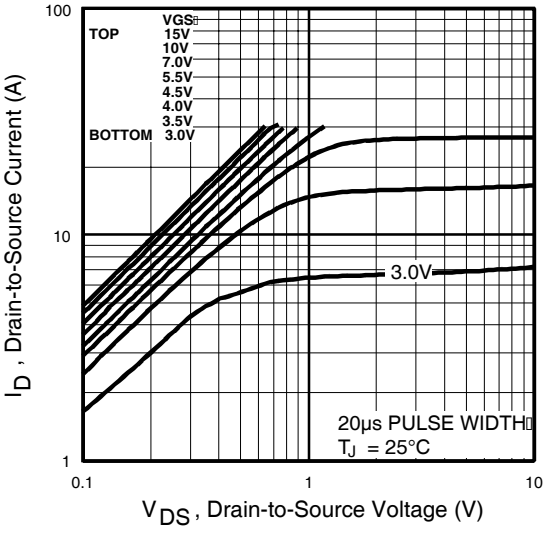


Fig 1. Typical Output Characteristics

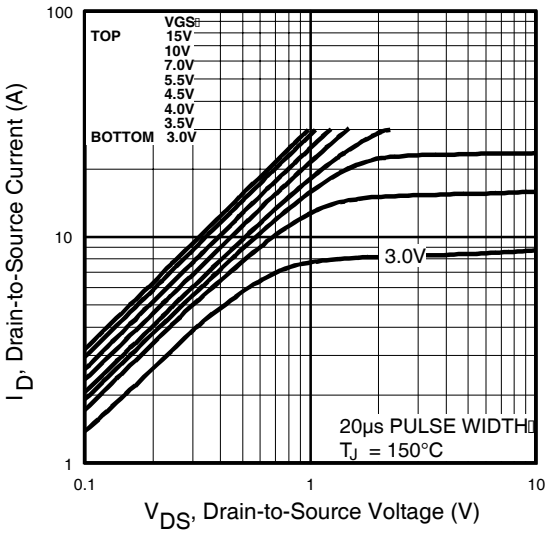


Fig 2. Typical Output Characteristics

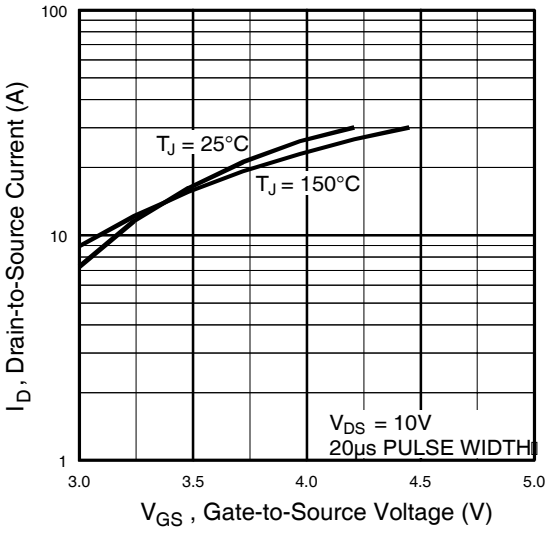


Fig 3. Typical Transfer Characteristics

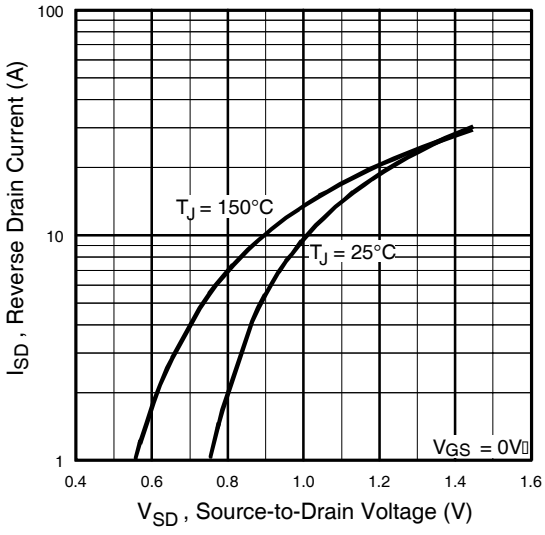


Fig 4. Typical Source-Drain Diode Forward Voltage

N-Channel

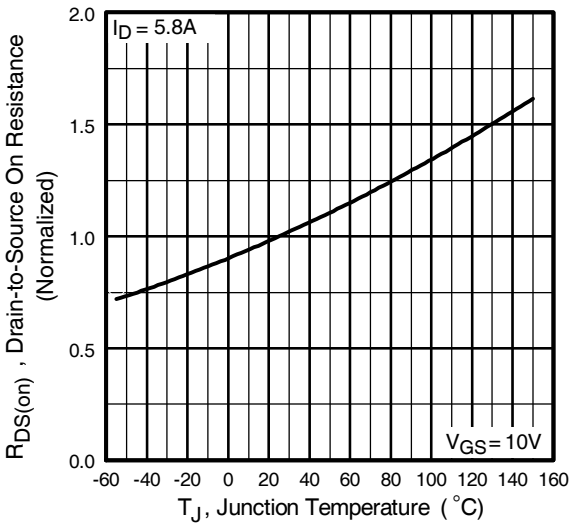


Fig 5. Normalized On-Resistance Vs. Temperature

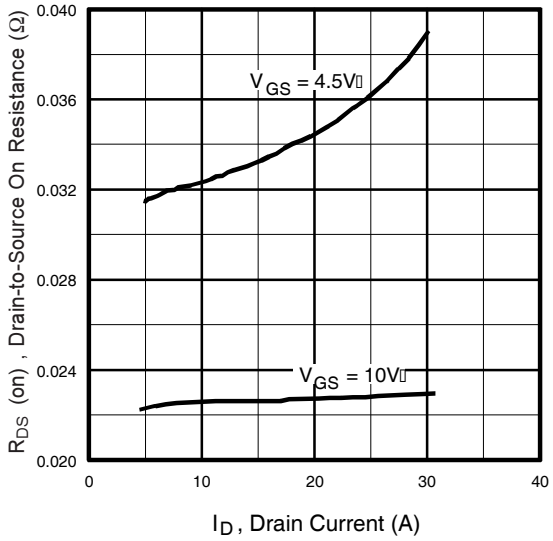


Fig 6. Typical On-Resistance Vs. Drain Current

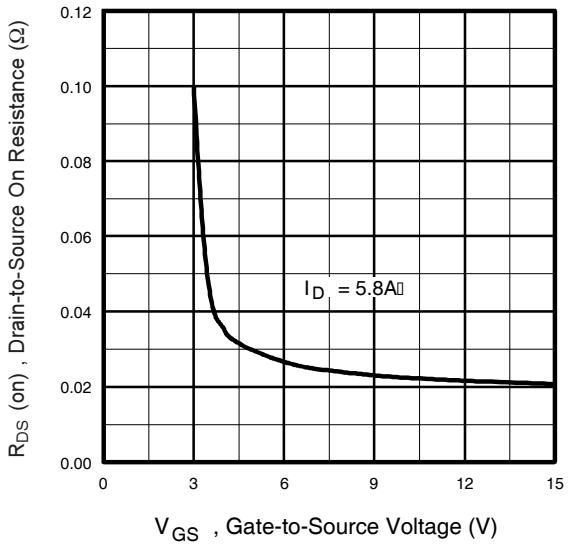


Fig 7. Typical On-Resistance Vs. Gate Voltage

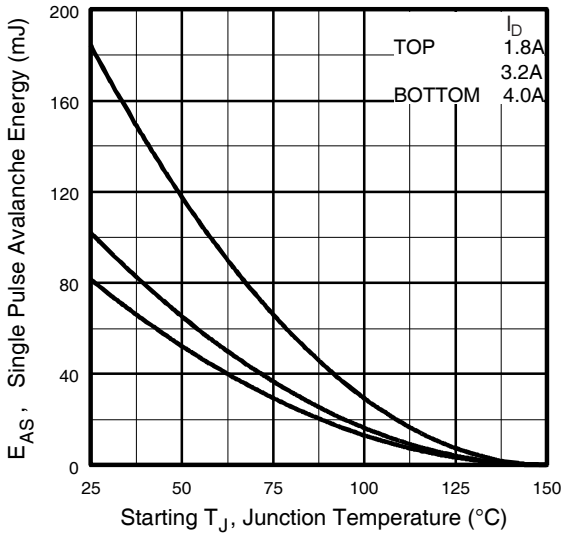


Fig 8. Maximum Avalanche Energy Vs. Drain Current

N-Channel

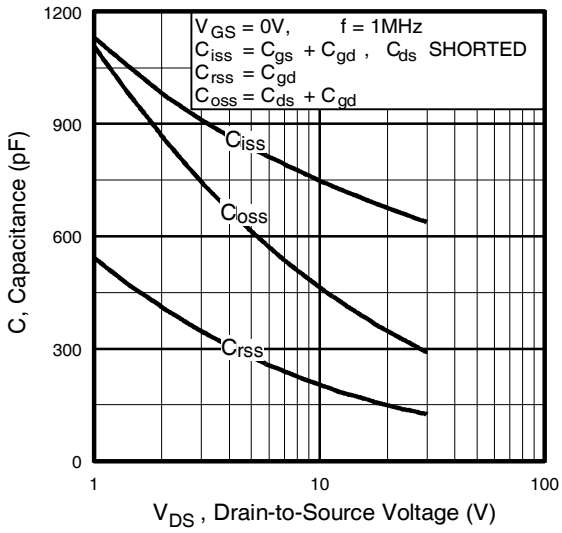


Fig 9. Typical Capacitance Vs. Drain-to-Source Voltage

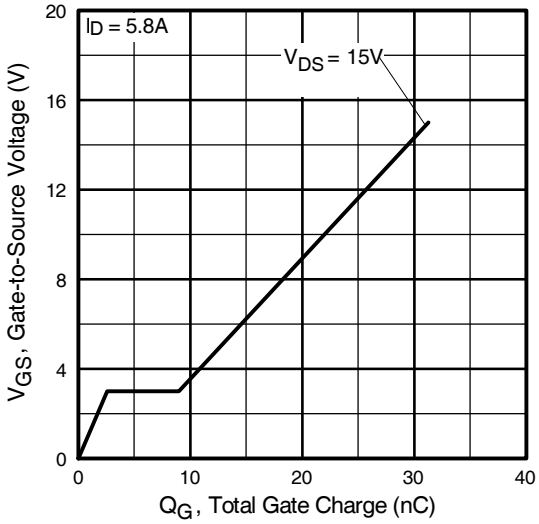


Fig 10. Typical Gate Charge Vs. Gate-to-Source Voltage

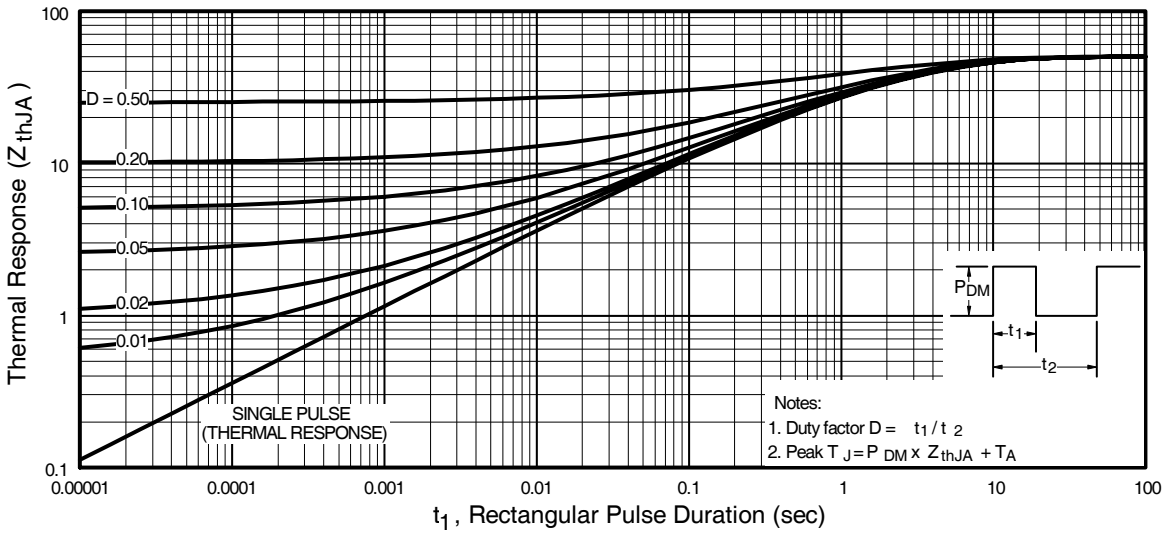


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

P-Channel

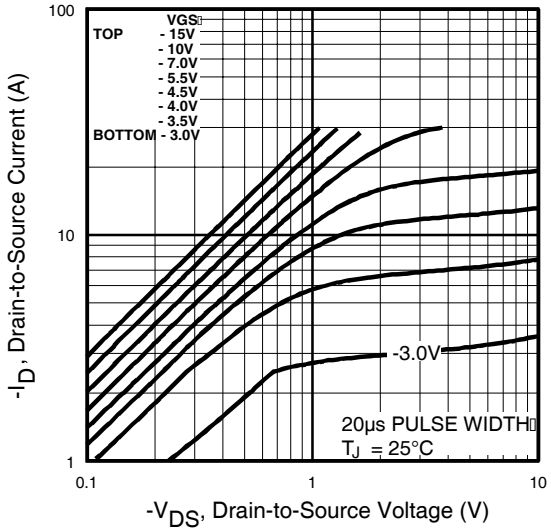


Fig 12. Typical Output Characteristics

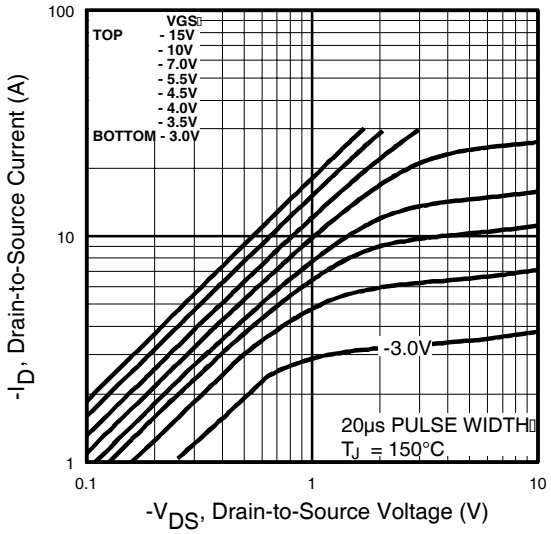


Fig 13. Typical Output Characteristics

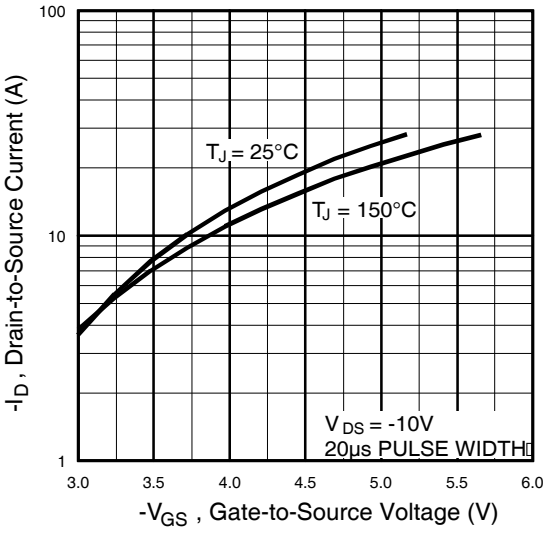


Fig 14. Typical Transfer Characteristics

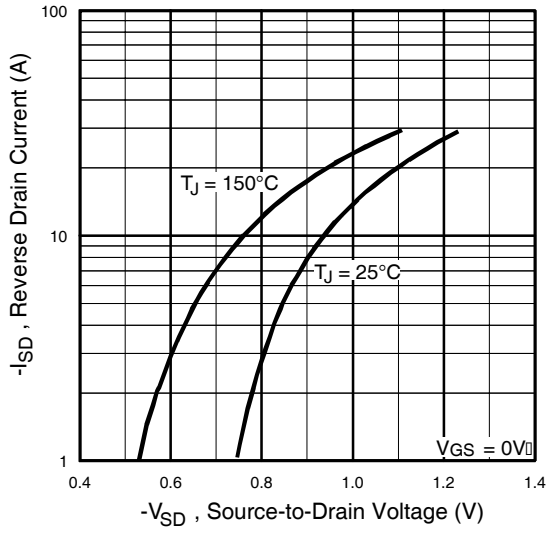


Fig 15. Typical Source-Drain Diode Forward Voltage

P-Channel

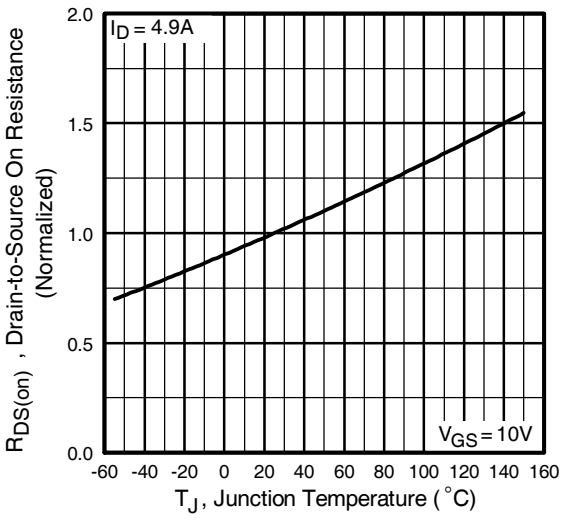


Fig 16. Normalized On-Resistance Vs. Temperature

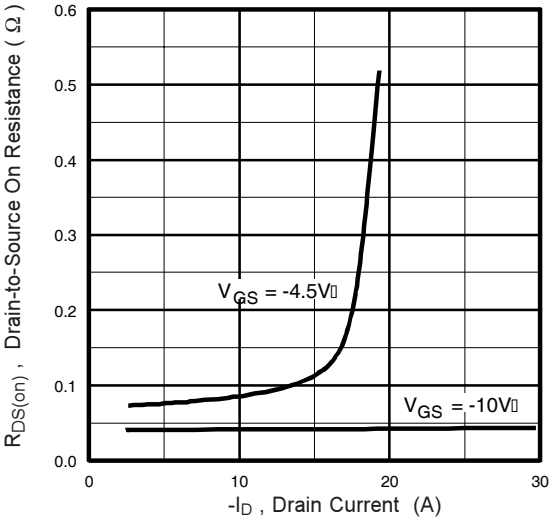


Fig 17. Typical On-Resistance Vs. Drain Current

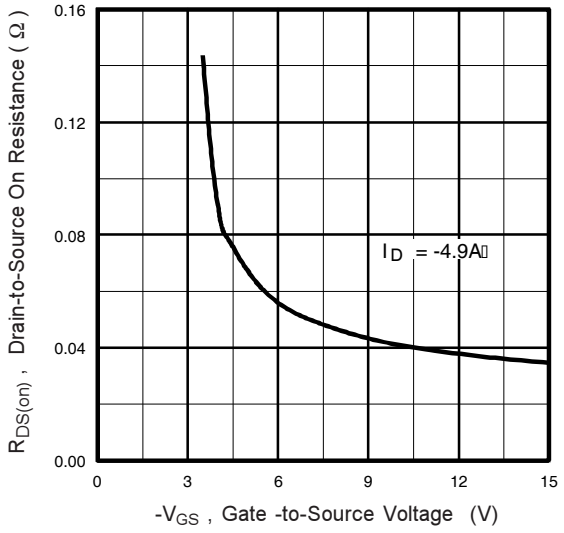


Fig 18. Typical On-Resistance Vs. Gate Voltage

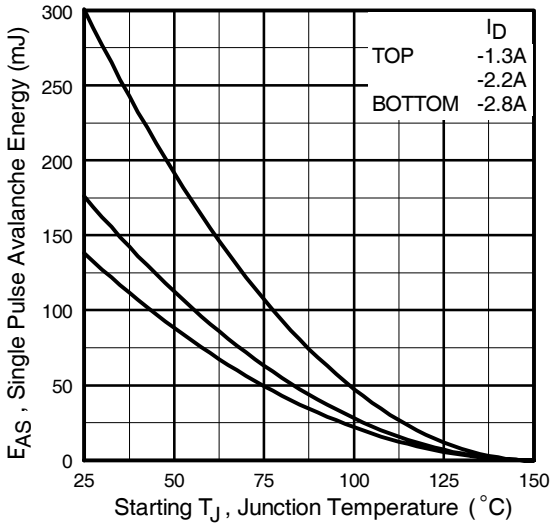


Fig 19. Maximum Avalanche Energy Vs. Drain Current

P-Channel

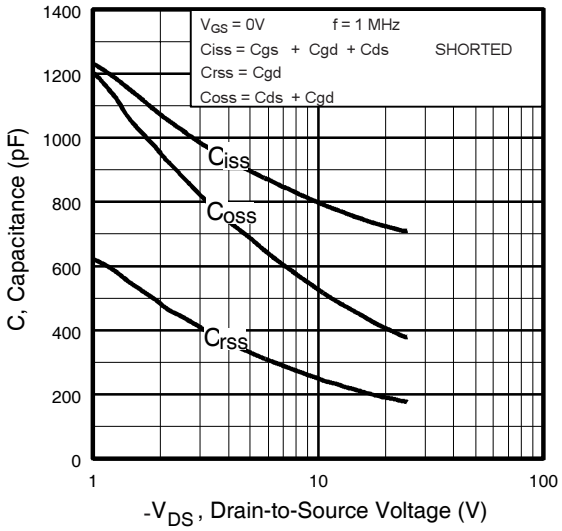


Fig 20. Typical Capacitance Vs. Drain-to-Source Voltage

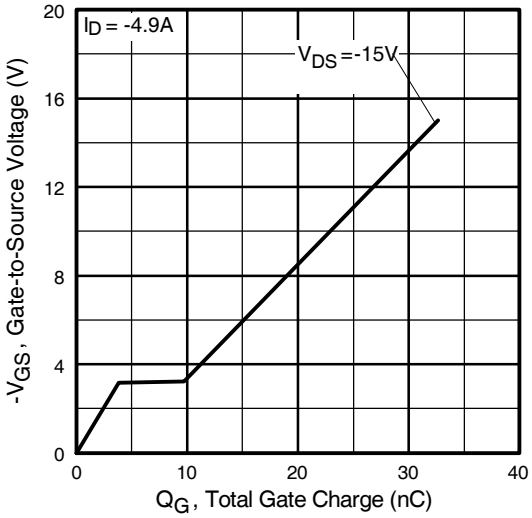


Fig 21. Typical Gate Charge Vs. Gate-to-Source Voltage

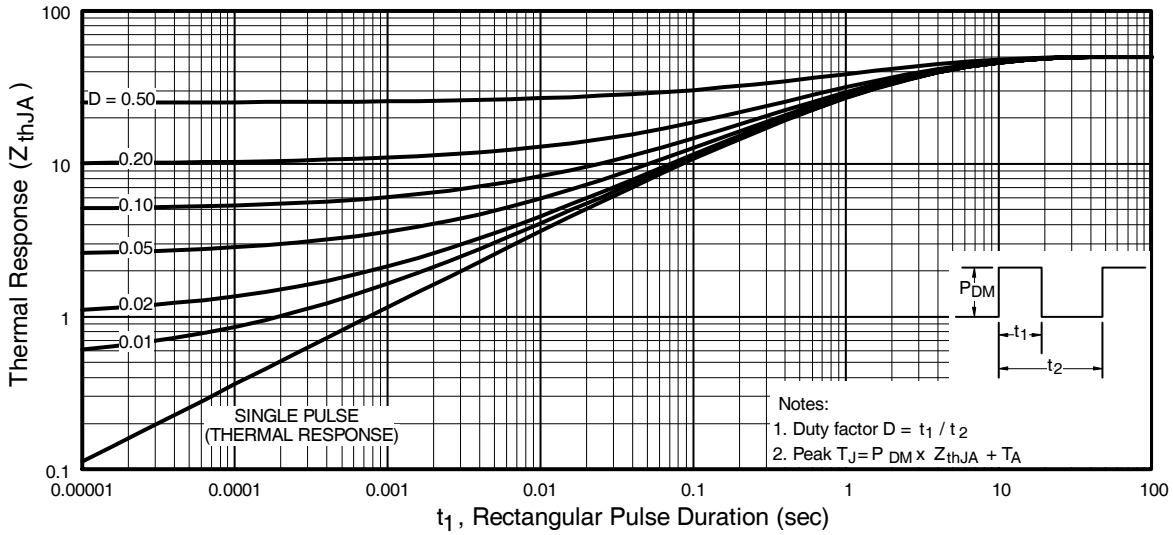
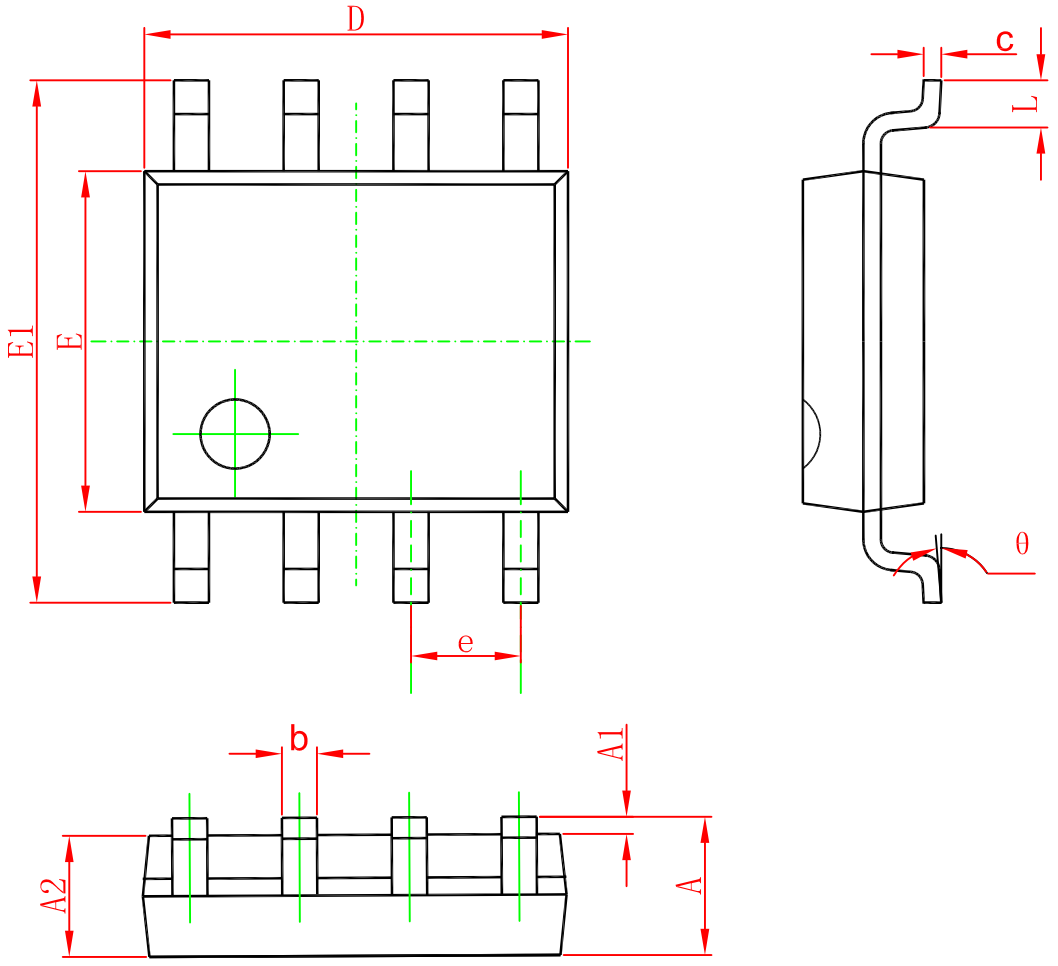


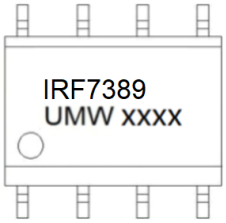
Fig 22. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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



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Order code	Package	Baseqty	Deliverymode
UMW IRF7389TR	SOP-8	3000	Tape and reel

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