

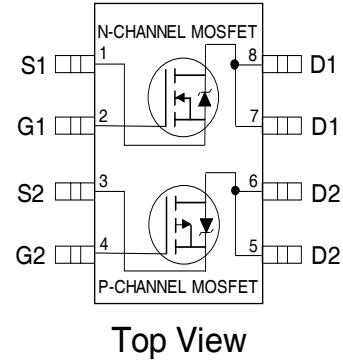
**Features**

**N-Ch:**

- $V_{DS} (V) = 25V$
- $R_{DS(ON)} < 100m\Omega$  ( $V_{GS} = 10V$ )
- $R_{DS(ON)} < 160 m\Omega$  ( $V_{GS} = 4.5V$ )

**P-Ch:**

- $V_{DS} (V) = -25V$
- $R_{DS(ON)} < 250m\Omega$  ( $V_{GS} = -10V$ )
- $R_{DS(ON)} < 400 m\Omega$  ( $V_{GS} = -4.5V$ )
- Advanced Process Technology Ultra
- Low On-Resistance
- Surface Mount
- Dynamic dv/dt Rating
- Fast Switching
- Lead-Free



**Description**

The SOP-8 has been modified through a customized eadframe "or enhanced therma 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, infra red, or wave solderino techniques. Power dissipation of greater than 0.8W is possible in a typical PCB mount application.

**Absolute Maximum Ratings**

	Parameter	Max.		Units
		N-Channel	P-Channel	
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	3.5	-2.3	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	2.8	-1.8	
$I_{DM}$	Pulsed Drain Current ①	14	-10	
$P_D @ T_C = 25^\circ C$	Power Dissipation	2.0		W
	Linear Derating Factor	0.016		W/°C
$V_{GS}$	Gate-to-Source Voltage	± 20		V
dv/dt	Peak Diode Recovery dv/dt ②	3.0	-3.0	V/nS
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to + 150		°C

**Thermal Resistance Ratings**

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ④			62.5	°C/W

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

Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	N-Ch 25 P-Ch -25			V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	N-Ch P-Ch	0.030 -0.015		V/°C	Reference to 25°C, I <sub>D</sub> = 1mA Reference to 25°C, I <sub>D</sub> = -1mA
R <sub>DS(ON)</sub>	N-Ch P-Ch	83 140 160 300	100 160 250 400	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.0A ③ V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.50A ③ V <sub>GS</sub> = -10V, I <sub>D</sub> = -1.0A ③ V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -0.50A ③
V <sub>GS(th)</sub>	N-Ch P-Ch	1.0 -1.0	3.0 -3.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
g <sub>fs</sub>	N-Ch P-Ch	4.3 3.1		S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 3.5A ③ V <sub>DS</sub> = -15V, I <sub>D</sub> = -3.5A ③
I <sub>DSS</sub>	N-Ch P-Ch		2.0 -2.0	μA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V
I <sub>GSS</sub>	N-P		±100		V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 55°C V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 55°C
Q <sub>g</sub>	N-Ch P-Ch	9.4 10	27 25	nC	N-Channel I <sub>D</sub> = 2.3A, V <sub>DS</sub> = 12.5V, V <sub>GS</sub> = 10V ③
Q <sub>gs</sub>	N-Ch P-Ch		1.7 1.9		P-Channel I <sub>D</sub> = -2.3A, V <sub>DS</sub> = -12.5V, V <sub>GS</sub> = -10V
Q <sub>gd</sub>	N-Ch P-Ch		3.1 2.8		
t <sub>d(on)</sub>	N-Ch P-Ch	7.0 12	20 40	ns	N-Channel V <sub>DD</sub> = 25V, I <sub>D</sub> = 1.0A, R <sub>G</sub> = 6.0Ω, R <sub>D</sub> = 25Ω ③
t <sub>r</sub>	N-Ch P-Ch	9.0 13	20 40		
t <sub>d(off)</sub>	N-Ch P-Ch	45 45	90 90		P-Channel V <sub>DD</sub> = -25V, I <sub>D</sub> = -1.0A, R <sub>G</sub> = 6.0Ω, R <sub>D</sub> = 25Ω ③
t <sub>f</sub>	N-Ch P-Ch	25 37	50 50		
L <sub>S</sub>	N-P	4.0		nH	Between lead, 6mm (0.25in.) from package and center of die contact
L <sub>P</sub>	N-P	6.0			
C <sub>iss</sub>	N-Ch P-Ch	330 290		pF	N-Channel V <sub>GS</sub> = 0V, V <sub>DS</sub> = 15V, f = 1.0MHz
C <sub>oss</sub>	N-Ch P-Ch	250 210			
C <sub>rss</sub>	N-Ch P-Ch	61 67			P-Channel V <sub>GS</sub> = 0V, V <sub>DS</sub> = -15V, f = 1.0MHz

**Source-Drain Ratings and Characteristics**

Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	N-Ch P-Ch		2.0 -2.0	A	
I <sub>SM</sub>	N-Ch P-Ch		14 -9.2		
V <sub>SD</sub>	N-Ch P-Ch		1.2 -1.2	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 1.3A, V <sub>GS</sub> = 0V ③ T <sub>J</sub> = 25°C, I <sub>S</sub> = -1.3A, V <sub>GS</sub> = 0V ③
t <sub>rr</sub>	N-Ch P-Ch	36 69	54 100	ns	N-Channel T <sub>J</sub> = 25°C, I <sub>F</sub> = 1.3A, di/dt = 100A/μs P-Channel T <sub>J</sub> = 25°C, I <sub>F</sub> = -1.3A, di/dt = 100A/μs ③
Q <sub>rr</sub>	N-Ch P-Ch	41 90	75 180	nC	
t <sub>on</sub>	N-P	Intrinsic turn-on time is negligible (turn-on is dominated by L <sub>S</sub> +L <sub>D</sub> )			

**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② N-Channel I<sub>SD</sub> ≤ 3.5A, di/dt ≤ 90A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C  
P-Channel I<sub>SD</sub> ≤ -2.3A, di/dt ≤ 90A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C
- ③ Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ④ Surface mounted on FR-4 board, t ≤ 10sec.

N-Channel

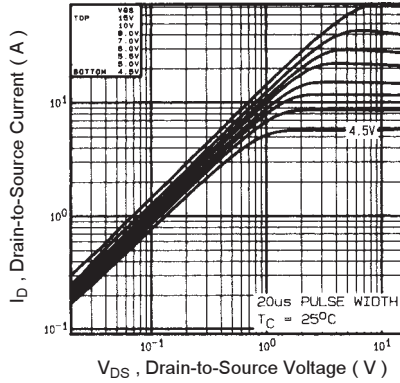


Fig 1. Typical Output Characteristics

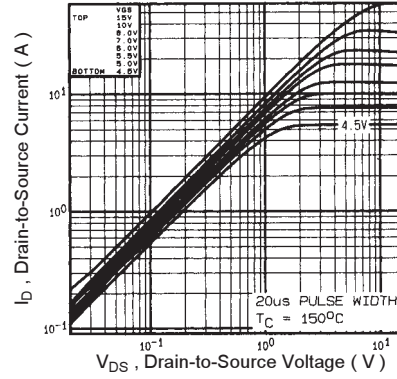


Fig 2. Typical Output Characteristics

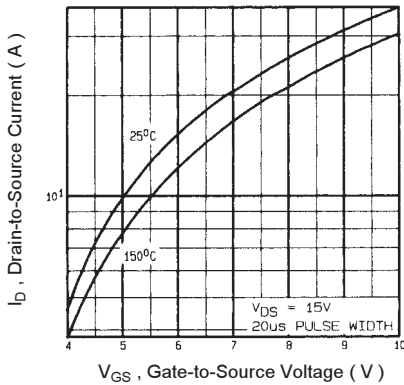


Fig 3. Typical Transfer Characteristics

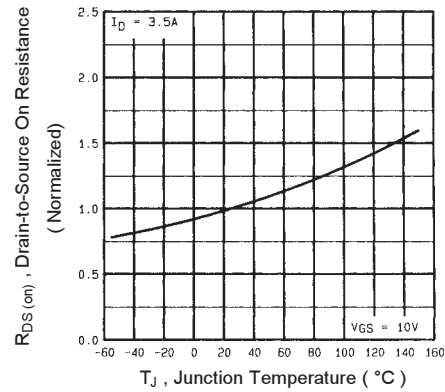


Fig 4. Normalized On-Resistance Vs. Temperature

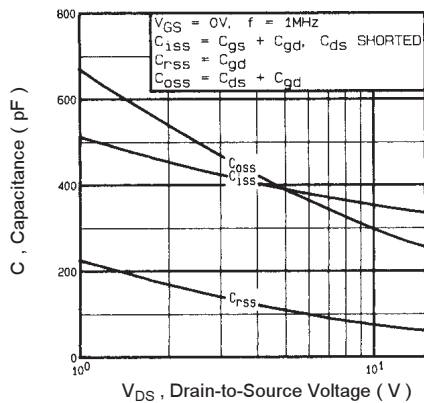


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

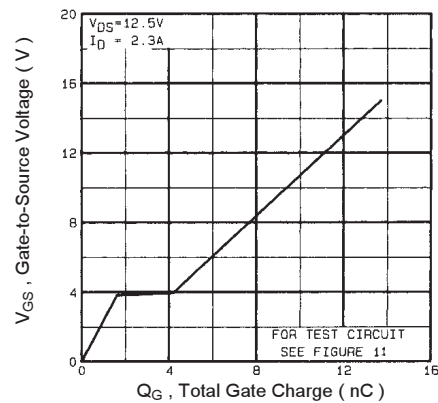


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

N-Channel

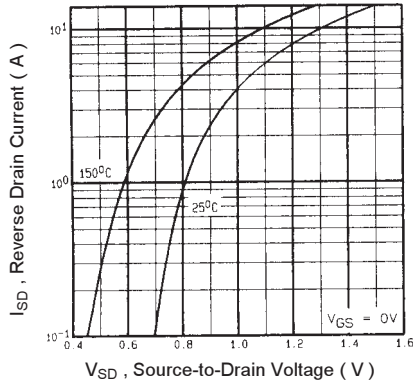


Fig 7. Typical Source-Drain Diode Forward Voltage

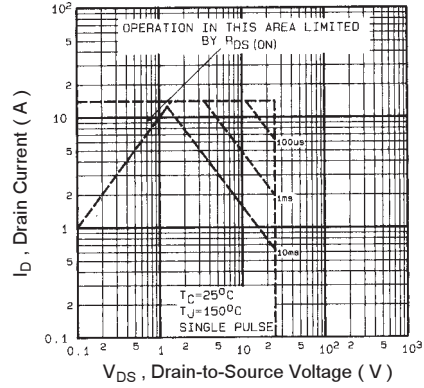


Fig 8. Maximum Safe Operating Area

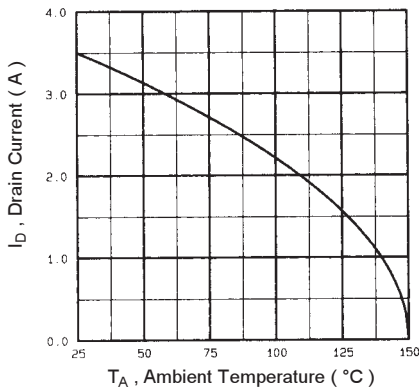


Fig 9. Maximum Drain Current Vs. Ambient Temperature

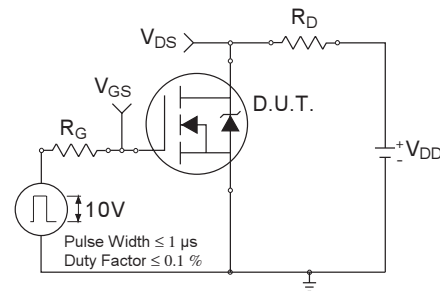


Fig 10a. Switching Time Test Circuit

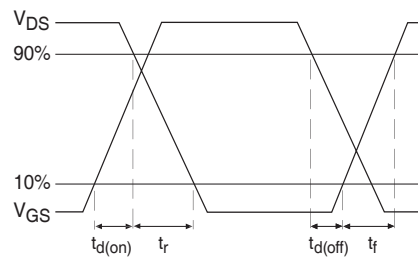


Fig 10b. Switching Time Waveforms

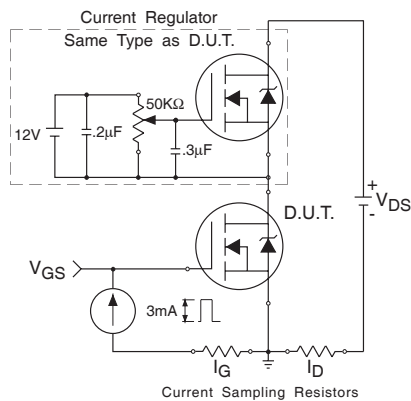


Fig 11a. Gate Charge Test Circuit

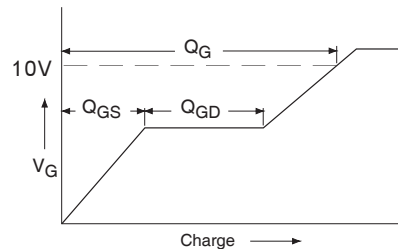


Fig 11b. Basic Gate Charge Waveform

P-Channel

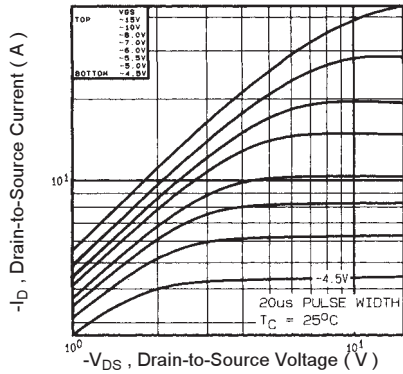


Fig 12. Typical Output Characteristics

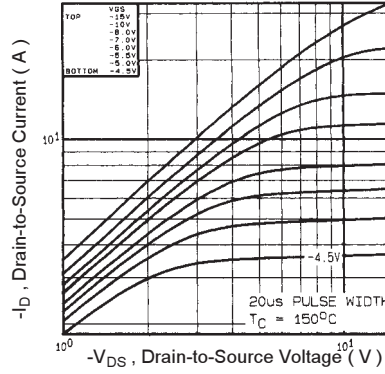


Fig 13. Typical Output Characteristics

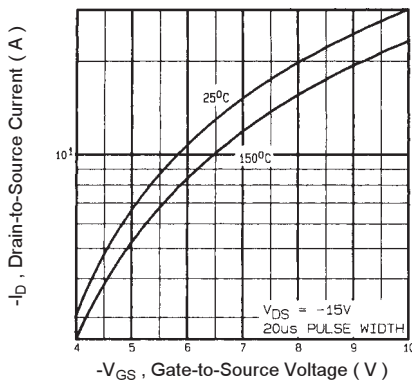


Fig 14. Typical Transfer Characteristics

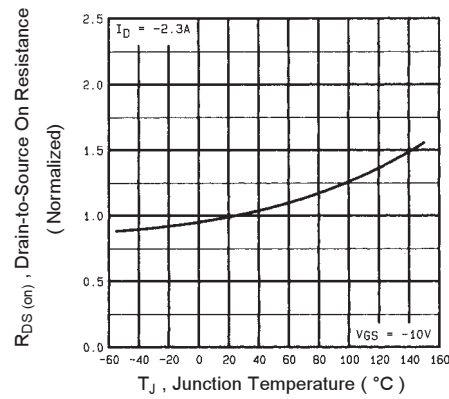


Fig 15. Normalized On-Resistance Vs. Temperature

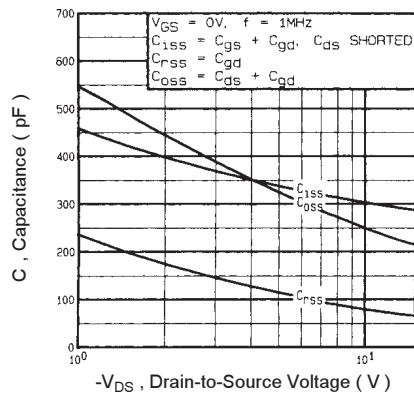


Fig 16. Typical Capacitance Vs. Drain-to-Source Voltage

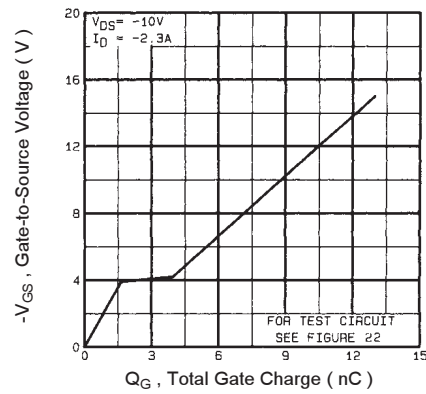


Fig 17. Typical Gate Charge Vs. Gate-to-Source Voltage

P-Channel

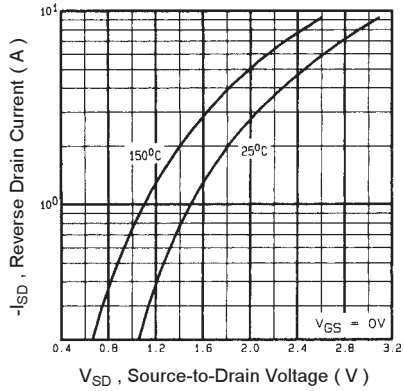


Fig 18. Typical Source-Drain Diode Forward Voltage

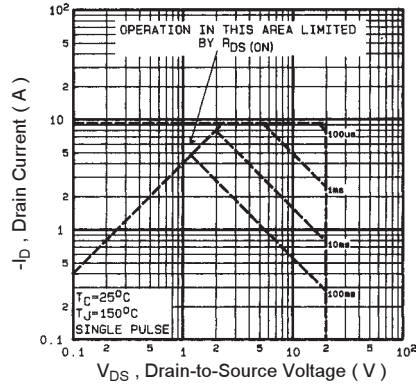


Fig 19. Maximum Safe Operating Area

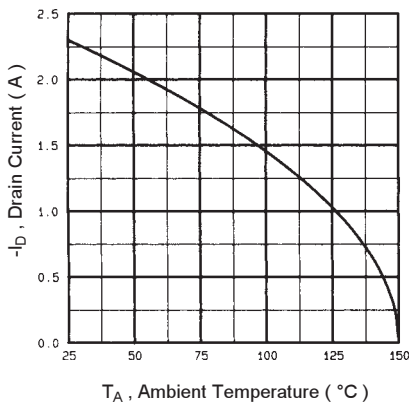


Fig 20. Maximum Drain Current Vs. Ambient Temperature

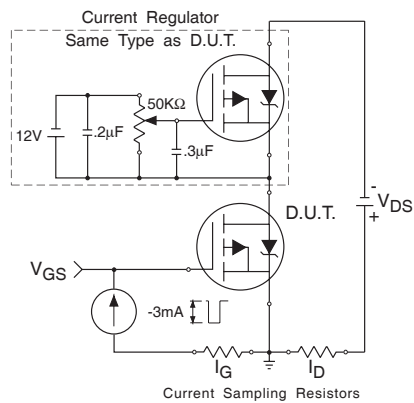


Fig 22a. Gate Charge Test Circuit

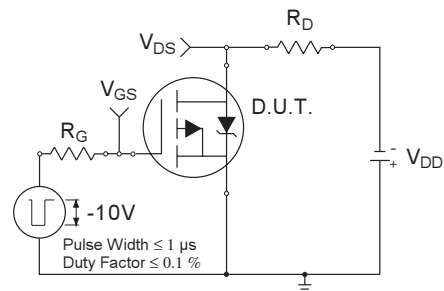


Fig 21a. Switching Time Test Circuit

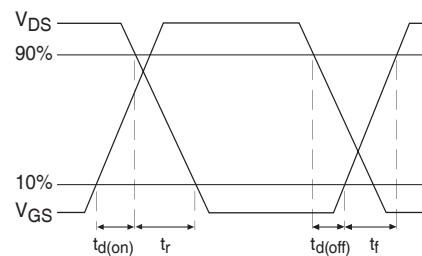


Fig 21b. Switching Time Waveforms

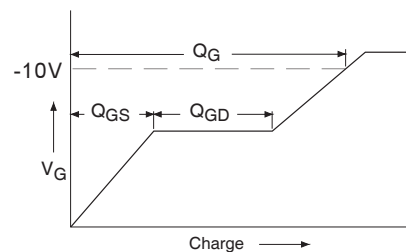


Fig 22b. Basic Gate Charge Waveform

N & P-Channel

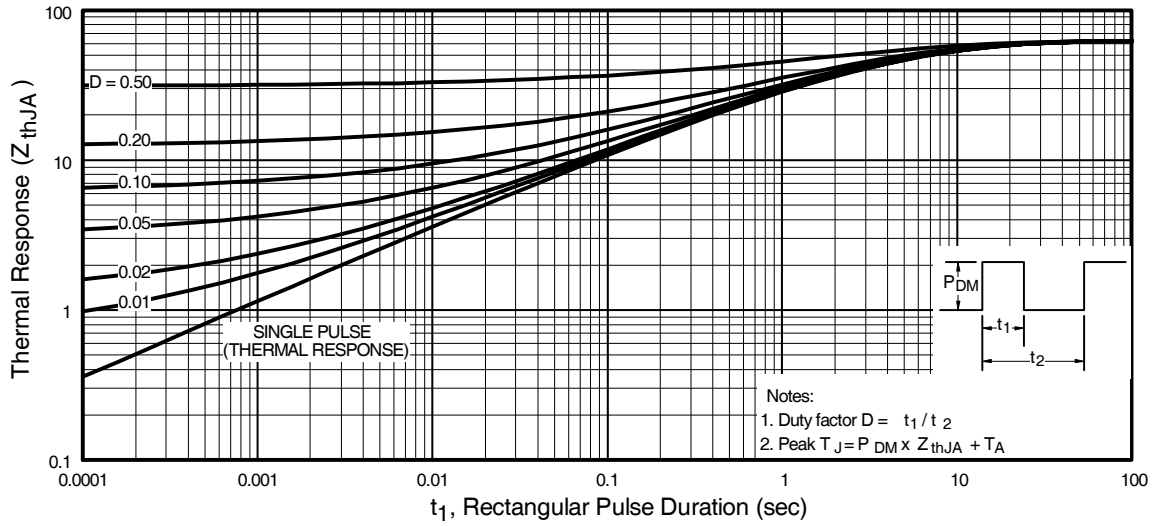
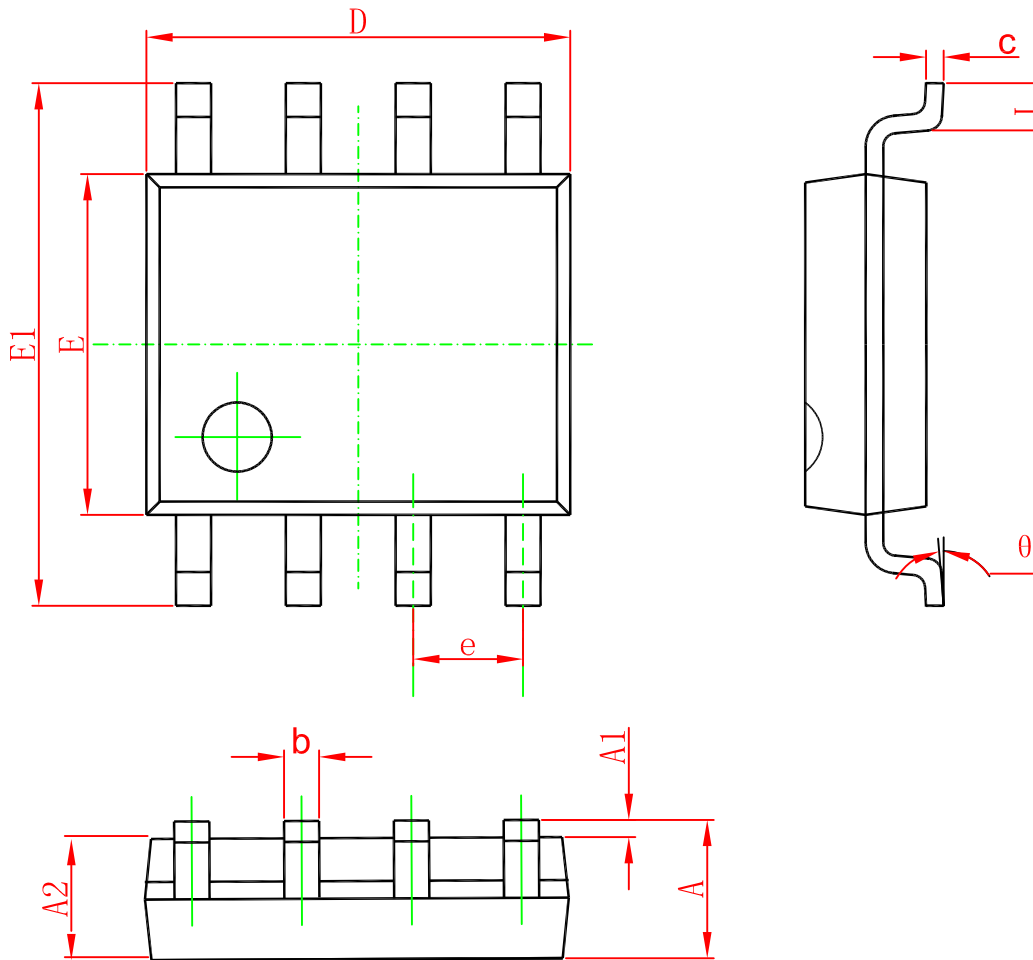


Fig 23. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

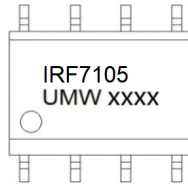
SOP-8



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 IRF7105TR	SOP-8	3000	Tape and reel