EVVOSEMI®
THINK CHANGE DO

ESD TVS MOS LDO Diode Sensor DC-DC

Product Specification

Domestic Part Number	IRF7307
Overseas Part Number	IRF7307
Equivalent Part Number	IRF7307

Features

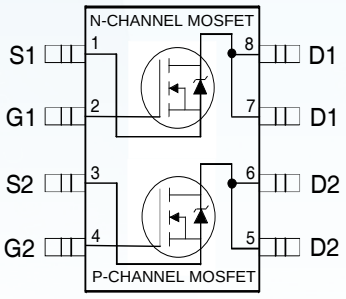
N-Ch：

- $V_{DS\ (V)}$ = 20V
- $R_{DS(ON)}$ < 53mΩ (V_{GS} = 4.5V)
- $R_{DS(ON)}$ < 70mΩ (V_{GS} = 2.7V)

P-Ch：

- $V_{DS\ (V)}$ = -20V
- $R_{DS(ON)}$ < 100mΩ (V_{GS} = -4.5V)
- $R_{DS(ON)}$ < 140mΩ (V_{GS} = -2.7V)

- Generation V Technology Ultra
- Low On-Resistance
- Dual N and P Channel Mosfet
- Surface Mount
- Dynamic dv/dt Rating
- Fast Switching
- Lead-Free



SOP-8

Description

The so-8 has been modified through a customized leadtrame for enhanced thermal characteristics and multiple die capability making it ideal in a varietyof power applications. Withtheseimprovements. multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase. infra red. or wave soldering technigues. 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°C	10 Sec. Pulse Drain Current, V_{GS} @ 4.5V	5.7	-4.7	A
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 4.5V	5.2	-4.3	
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 4.5V	4.1	-3.4	
I_{DM}	Pulsed Drain Current ①	21	-17	
P_D @T_A = 25°C	Power Dissipation	2.0		W
	Linear Derating Factor	0.016		W/°C
V_{GS}	Gate-to-Source Voltage	± 12		V
dv/dt	Peak Diode Recovery dv/dt ②	5.0	-5.0	V/ns
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150		℃

Thermal Resistance Ratings

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient④		62.5	°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	20			V	V_{GS} = 0V, I_D = 250μA
		P-Ch	-20				V_{GS} = 0V, I_D = -250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	N-Ch		0.044		V/°C	Reference to 25°C, I_D = 1mA
		P-Ch		-0.012			Reference to 25°C, I_D = -1mA
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	N-Ch			53	mΩ	V_{GS} = 4.5V, I_D = 2.6A ③
					70		V_{GS} = 2.7V, I_D = 2.2A ③
		P-Ch			100		V_{GS} = -4.5V, I_D = -2.2A ③
					140		V_{GS} = -2.7V, I_D = -1.8A ③
$V_{GS(th)}$	Gate Threshold Voltage	N-Ch	0.70			V	V_{DS} = V_{GS}, I_D = 250μA
		P-Ch	-0.70				V_{DS} = V_{GS}, I_D = -250μA
g_{fs}	Forward Transconductance	N-Ch	8.30			S	V_{DS} = 15V, I_D = 2.6A ③
		P-Ch	4.00				V_{DS} = -15V, I_D = -2.2A ③
I_{DSS}	Drain-to-Source Leakage Current	N-Ch			1.0	μA	V_{DS} = 16V, V_{GS} = 0V
		P-Ch			-1.0		V_{DS} = -16V, V_{GS} = 0V,
		N-Ch			25		V_{DS} = 16V, V_{GS} = 0V, T_J = 125°C
		P-Ch			-25		V_{DS} = -16V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	N-P			±100		V_{GS} = ± 12V
Q_g	Total Gate Charge	N-Ch			20	nC	N-Channel I_D = 2.6A, V_{DS} = 16V, V_{GS} = 4.5V ③ P-Channel I_D = -2.2A, V_{DS} = -16V, V_{GS} = -4.5V
		P-Ch			22		
Q_{gs}	Gate-to-Source Charge	N-Ch			2.2		
		P-Ch			3.3		
Q_{gd}	Gate-to-Drain ("Miller") Charge	N-Ch			8.0		
		P-Ch			9.0		
$t_{d(on)}$	Turn-On Delay Time	N-Ch		9.0		ns	N-Channel V_{DD} = 10V, I_D = 2.6A, R_G = 6.0Ω, R_D = 3.8Ω ③ P-Channel V_{DD} = -10V, I_D = -2.2A, R_G = 6.0Ω, R_D = 4.5Ω
		P-Ch		8.4			
t_r	Rise Time	N-Ch		42			
		P-Ch		26			
$t_{d(off)}$	Turn-Off Delay Time	N-Ch		32			
		P-Ch		51			
t_f	Fall Time	N-Ch		51			
		P-Ch		33			
L_D	Internal Drain Inductace	N-P		4.0		nH	Between lead tip and center of die contact
L_S	Internal Source Inductance	N-P		6.0			
C_{iss}	Input Capacitance	N-Ch		660		pF	N-Channel V_{GS} = 0V, V_{DS} = 15V, f = 1.0MHz ③ P-Channel V_{GS} = 0V, V_{DS} = -15V, f = 1.0MHz
		P-Ch		610			
C_{oss}	Output Capacitance	N-Ch		280			
		P-Ch		310			
C_{rss}	Reverse Transfer Capacitance	N-Ch		140			
		P-Ch		170			

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			21		
		P-Ch			-17		
V_{SD}	Diode Forward Voltage	N-Ch			1.0	V	T_J = 25°C, I_S = 1.8A, V_{GS} = 0V ③
		P-Ch			-1.0		T_J = 25°C, I_S = -1.8A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	N-Ch		29	44	ns	N-Channel T_J = 25°C, I_F = 2.6A, di/dt = 100A/μs P-Channel T_J = 25°C, I_F = -2.2A, di/dt = 100A/μs ③
		P-Ch		56	84		
Q_{rr}	Reverse Recovery Charge	N-Ch		22	33	nC	
		P-Ch		71	110		
t_{on}	Forward Turn-On Time	N-P	Intrinsic turn-on time is neglegible (turn-on is dominated by L_S+L_D)				

Notes:

① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 23)

② N-Channel I_{SD} ≤ 2.6A, di/dt ≤ 100A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C
P-Channel I_{SD} ≤ -2.2A, di/dt ≤ 50A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C

③ Pulse width ≤ 300μs; duty cycle ≤ 2%.

④ Surface mounted on FR-4 board, t ≤ 10sec.

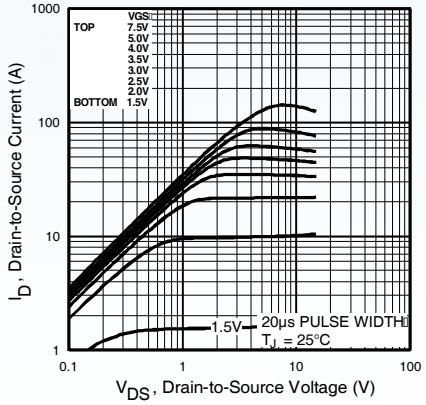


Fig 1. Typical Output Characteristics

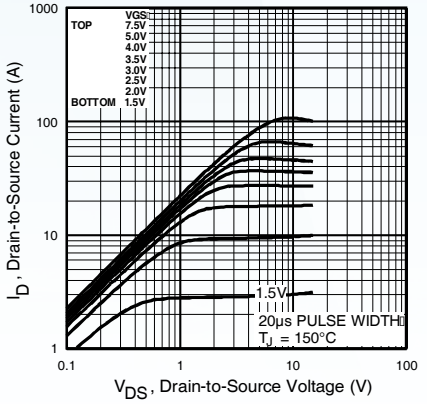


Fig 2. Typical Output Characteristics

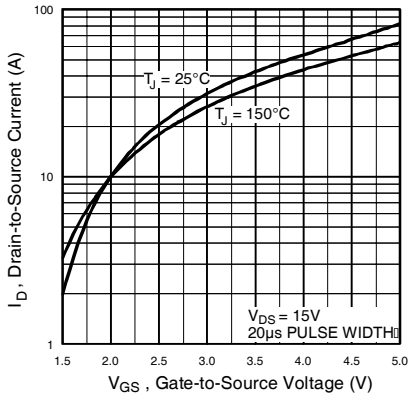


Fig 3. Typical Transfer Characteristics

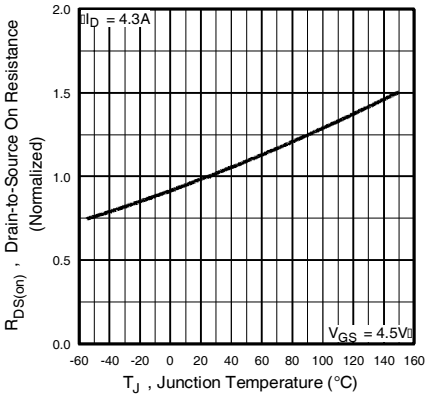


Fig 4. Normalized On-Resistance Vs. Temperature

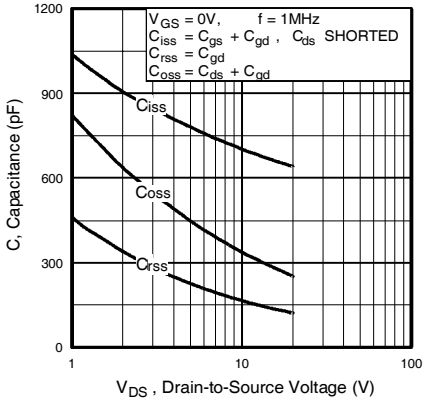


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

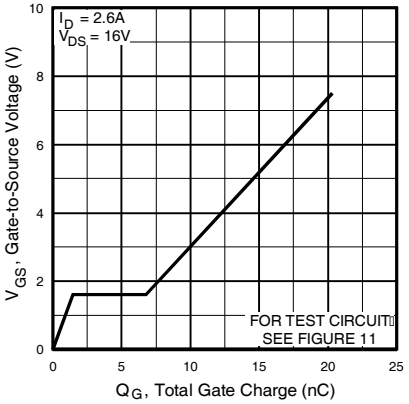


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

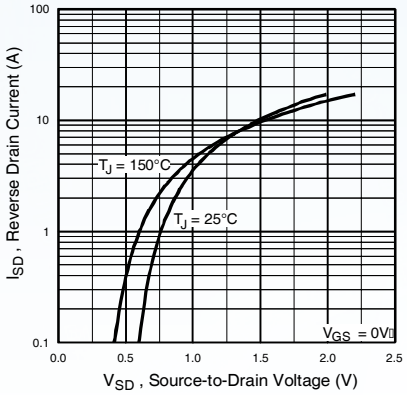


Fig 7. Typical Source-Drain Diode Forward Voltage

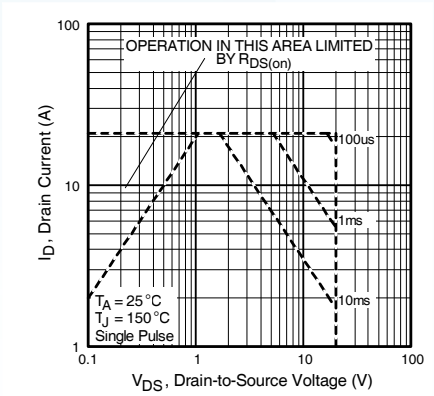


Fig 8. Maximum Safe Operating Area

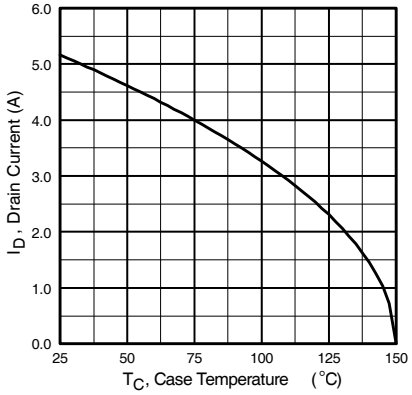


Fig 9. Maximum Drain Current Vs. Ambient Temperature

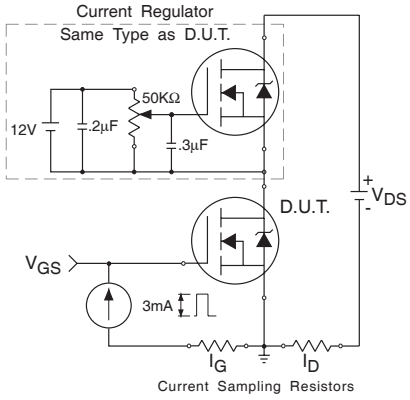


Fig 11a. Gate Charge Test Circuit

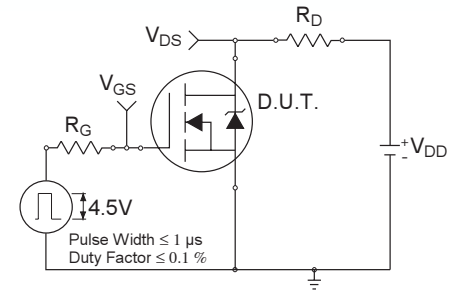


Fig 10a. Switching Time Test Circuit

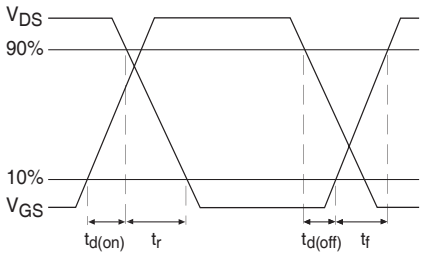


Fig 10b. Switching Time Waveforms

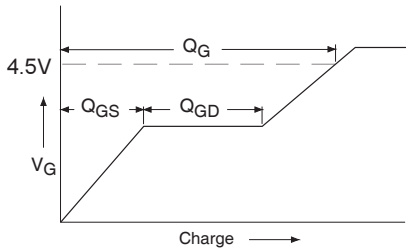


Fig 11b. Basic Gate Charge Waveform

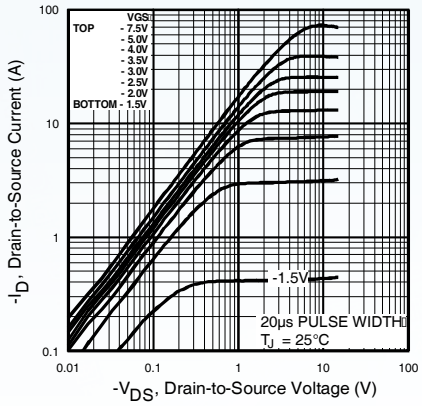


Fig 12. Typical Output Characteristics

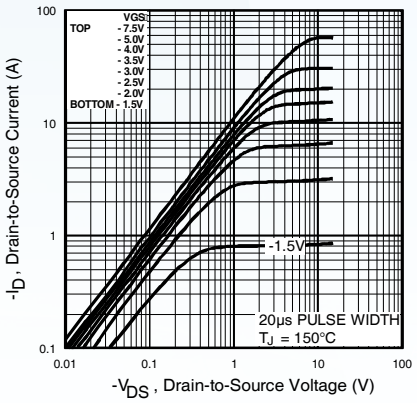


Fig 13. Typical Output Characteristics

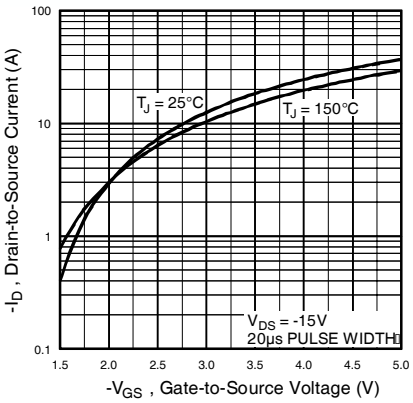


Fig 14. Typical Transfer Characteristics

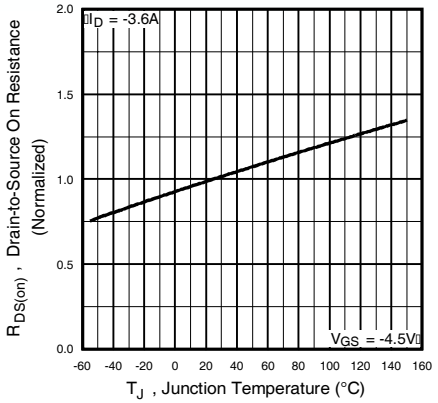


Fig 15. Normalized On-Resistance Vs. Temperature

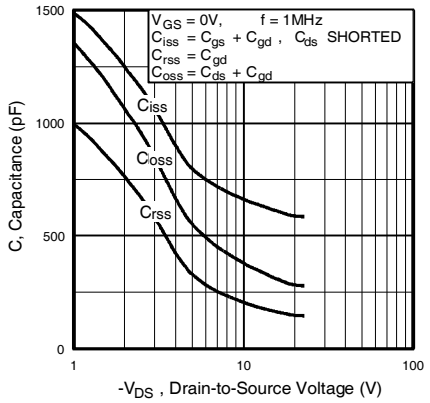


Fig 16. Typical Capacitance Vs. Drain-to-Source Voltage

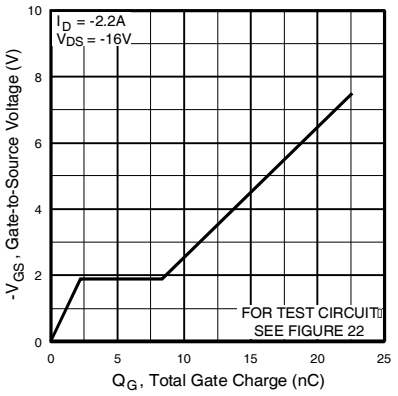


Fig 17. Typical Gate Charge Vs. Gate-to-Source Voltage

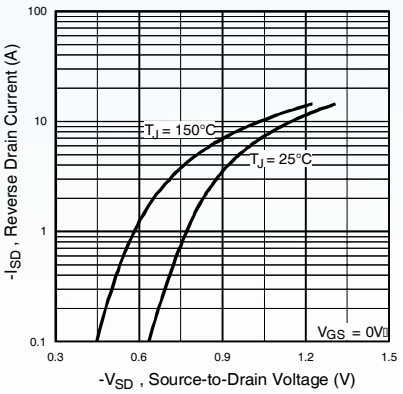


Fig 18. Typical Source-Drain Diode Forward Voltage

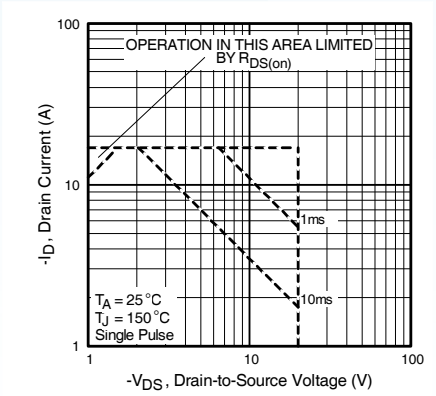


Fig 19. Maximum Safe Operating Area

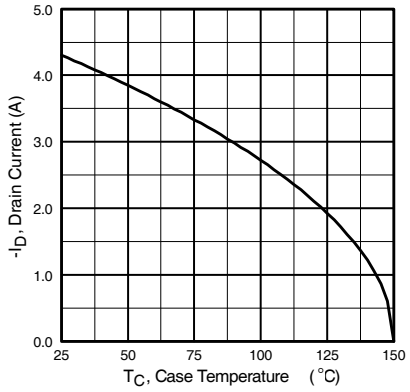


Fig 20. Maximum Drain Current Vs. Ambient Temperature

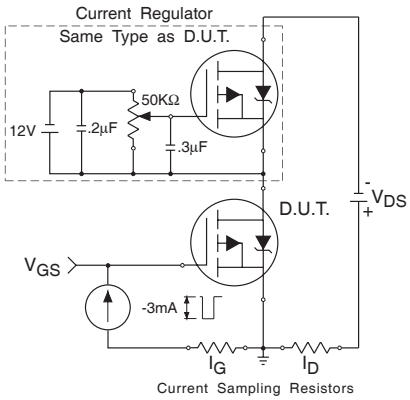


Fig 22a. Gate Charge Test Circuit

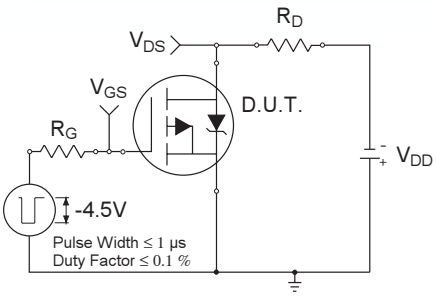


Fig 21a. Switching Time Test Circuit

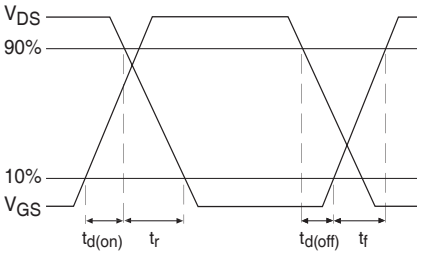


Fig 21b. Switching Time Waveforms

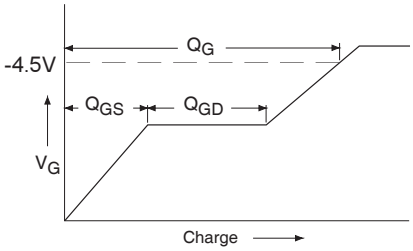


Fig 22b. Basic Gate Charge Waveform

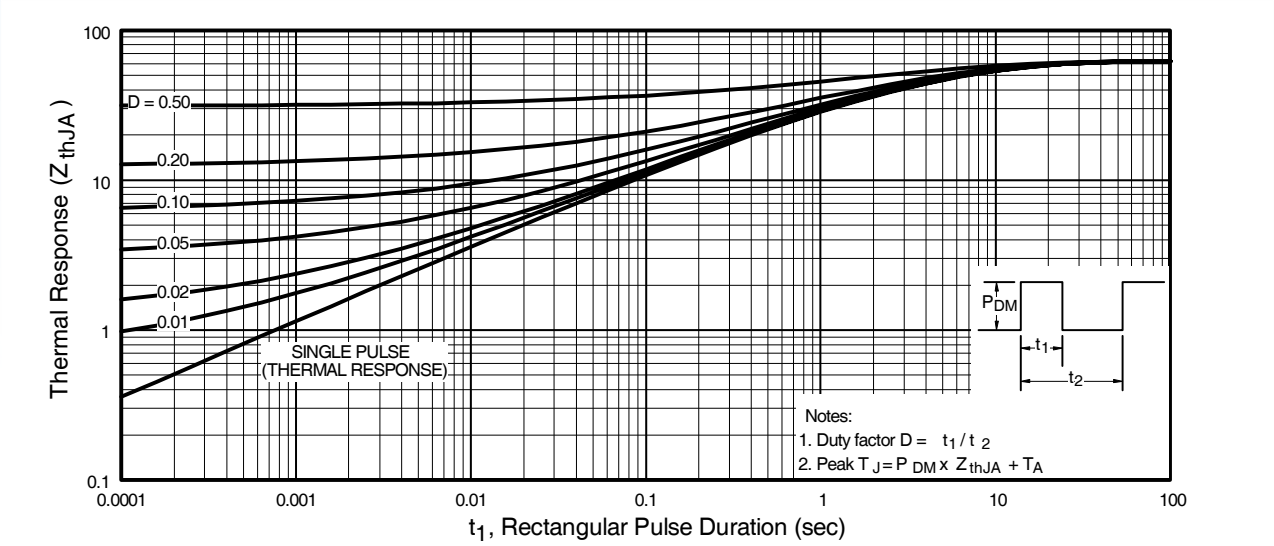
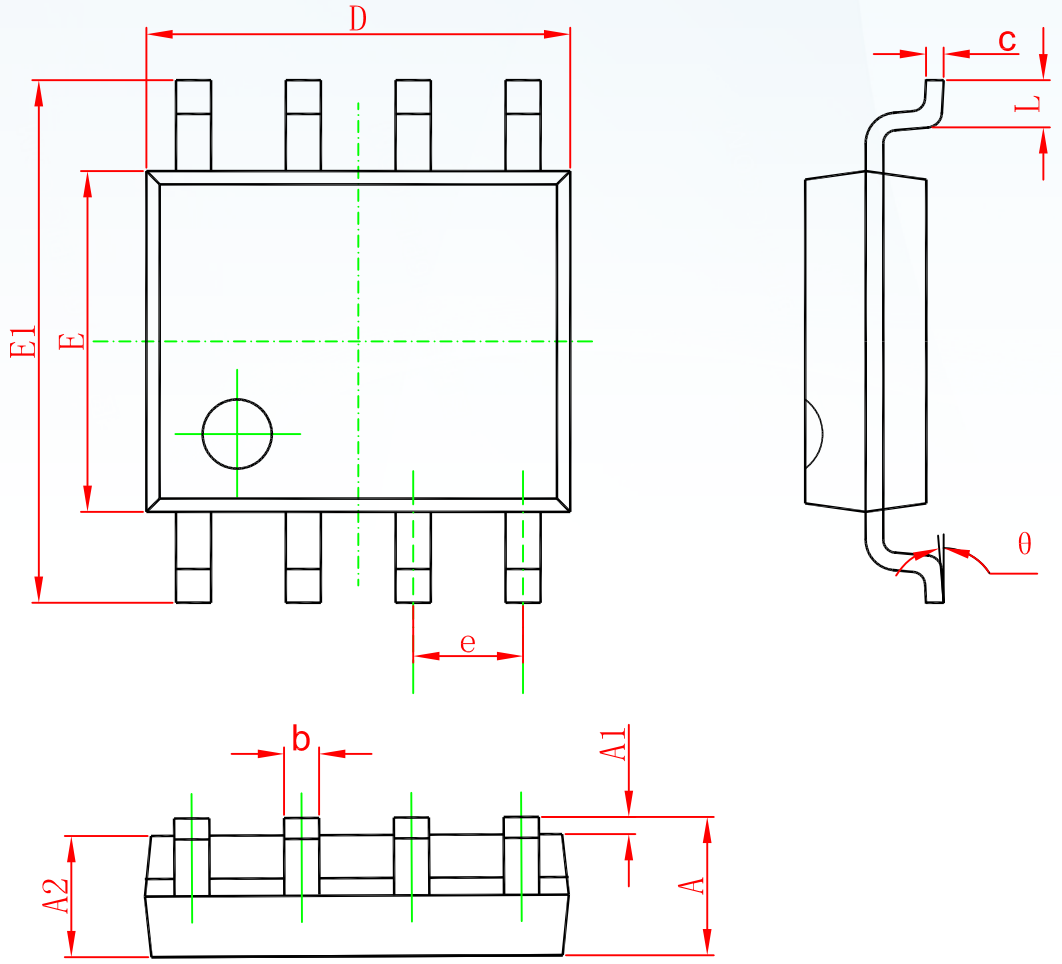


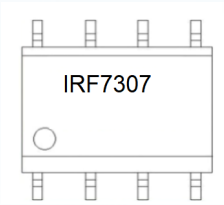
Fig 23. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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
IRF7307	SOP-8	3000	Tape and reel

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