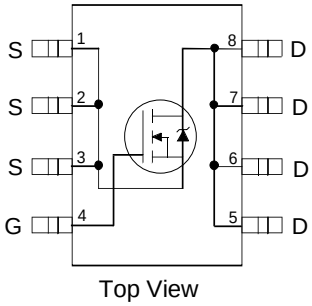
Features

- $V_{DS\ (V)}$=40V
- $R_{DS(ON)}$ < 17mΩ (V_{GS} = 10V)
- $R_{DS(ON)}$ < 21mΩ (V_{GS} = 4.5V)



Top View

Applications

- High Frequency Isolated DC-DC Converters with Synchronous Rectification for Telecom and Industrial Use
- High Frequency Buck Converters for Computer Processor Power
- Lead-Free

Benefits

- Ultra-Low Gate Impedance
- Very Low $R_{DS(on)}$
- Fully Characterized Avalanche Voltage and Current

Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	9.0	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	7.3	
I_{DM}	Pulsed Drain Current①	73	
P_D @T_A = 25°C	Maximum Power Dissipation③	2.5	W
P_D @T_A = 70°C	Maximum Power Dissipation③	1.6	W
	Linear Derating Factor	0.02	mW/°C
T_J , T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead		20	°C/W
$R_{\theta JA}$	Junction-to-Ambient ④		50	

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

② Starting T_J = 25°C, L = 8.1mH R_G = 25Ω, I_{AS} = 7.2A.

③ Pulse width ≤ 400μs; duty cycle ≤ 2%.

④ When mounted on 1 inch square copper board.

Static @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	40			V	V_{GS} = 0V, I_D = 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.04		V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		12	17	mΩ	V_{GS} = 10V, I_D = 9.0A ③
			15.5	21		V_{GS} = 4.5V, I_D = 7.2A ③
$V_{GS(th)}$	Gate Threshold Voltage	1.0		3.0	V	V_{DS} = V_{GS}, I_D = 250μA
I_{DSS}	Drain-to-Source Leakage Current			20	μA	V_{DS} = 32V, V_{GS} = 0V
				100		V_{DS} = 32V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage			200	nA	V_{GS} = 16V
	Gate-to-Source Reverse Leakage			-200		V_{GS} = -16V

Dynamic @ T_J = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	17			S	V_{DS} = 20V, I_D = 7.2A
Q_g	Total Gate Charge		15	23	nC	I_D = 7.2A
Q_{gs}	Gate-to-Source Charge		7.0	11		V_{DS} = 20V
Q_{gd}	Gate-to-Drain ("Miller") Charge		5.0	8.0		V_{GS} = 4.5V ③
Q_{oss}	Output Gate Charge		16	24		V_{GS} = 0V, V_{DS} = 16V
$t_{d(on)}$	Turn-On Delay Time		11		ns	V_{DD} = 20V
t_r	Rise Time		2.2			I_D = 7.2A
$t_{d(off)}$	Turn-Off Delay Time		14			R_G = 1.8Ω
t_f	Fall Time		3.5			V_{GS} = 4.5V ③
C_{iss}	Input Capacitance		2000		pF	V_{GS} = 0V
C_{oss}	Output Capacitance		480			V_{DS} = 20V
C_{rss}	Reverse Transfer Capacitance		28			f = 1.0MHz

Avalanche Characteristics

Symbol	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②		210	mJ
I_{AR}	Avalanche Current①		7.2	A

Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)			2.3	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①			73		
V_{SD}	Diode Forward Voltage		0.80	1.3	V	T_J = 25°C, I_S = 7.2A, V_{GS} = 0V ③
			0.65			T_J = 125°C, I_S = 7.2A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time		47	71	ns	T_J = 25°C, I_F = 7.2A, V_R=15V
Q_{rr}	Reverse Recovery Charge		91	140	nC	di/dt = 100A/μs ③
t_{rr}	Reverse Recovery Time		77	120	ns	T_J = 125°C, I_F = 7.2A, V_R=20V
Q_{rr}	Reverse Recovery Charge		150	230	nC	di/dt = 100A/μs ③

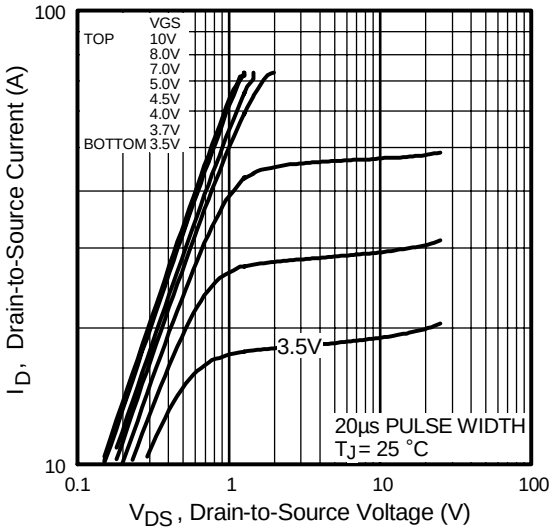


Fig 1. Typical Output Characteristics

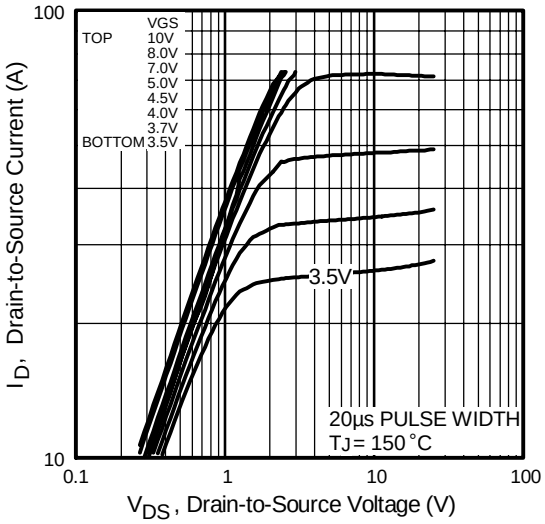


Fig 2. Typical Output Characteristics

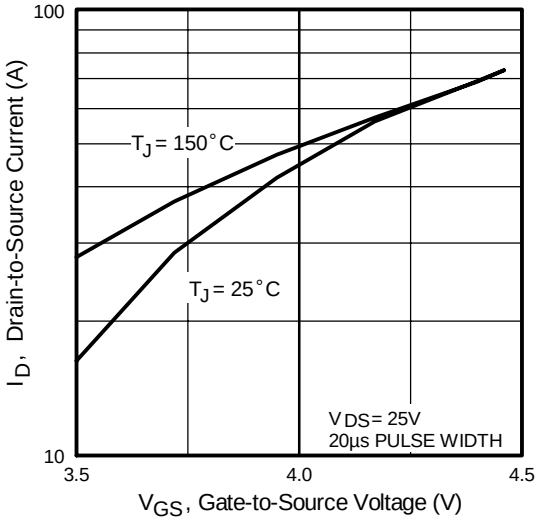


Fig 3. Typical Transfer Characteristics

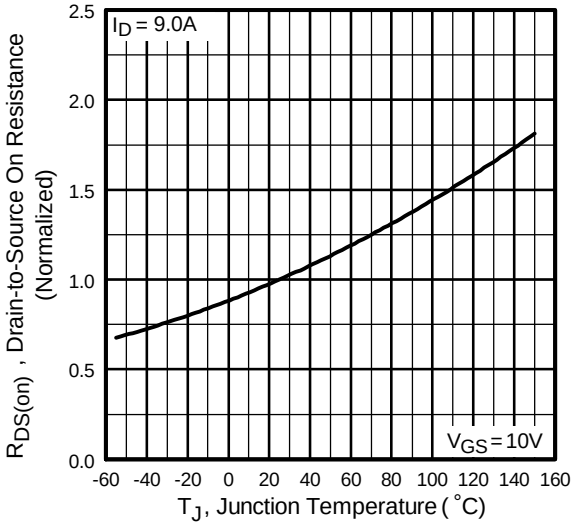


Fig 4. Normalized On-Resistance Vs. Temperature

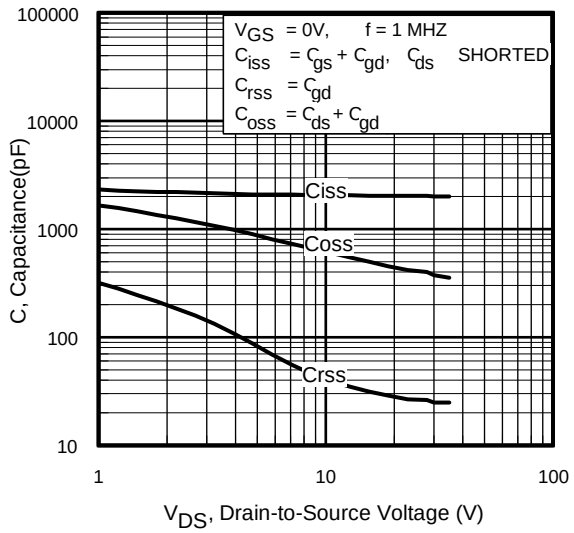


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

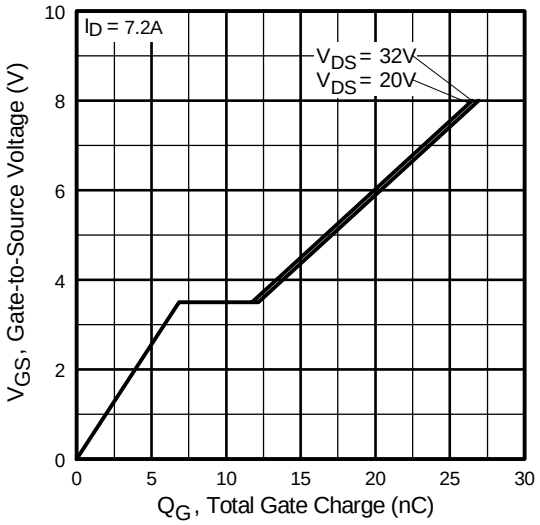


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

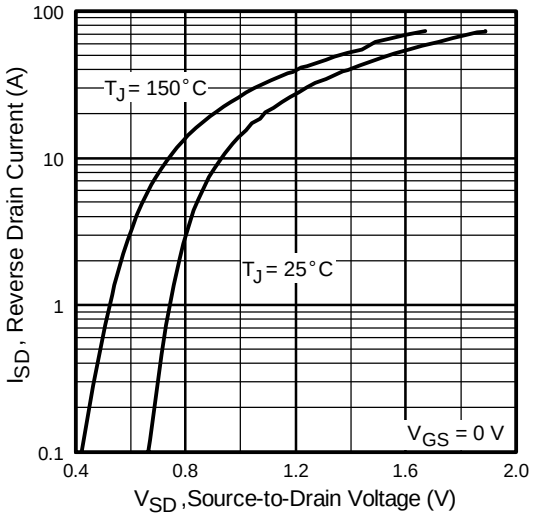


Fig 7. Typical Source-Drain Diode Forward Voltage

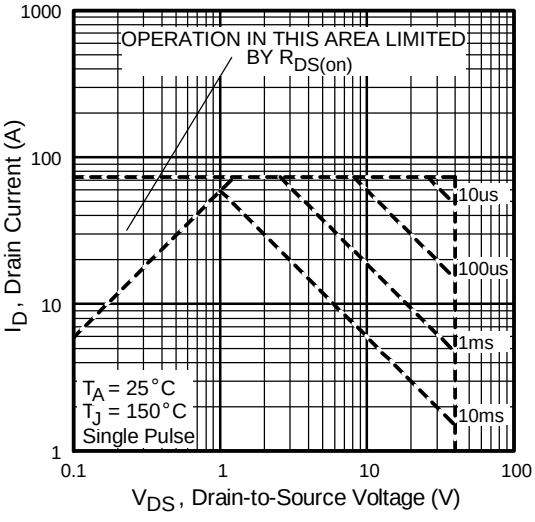
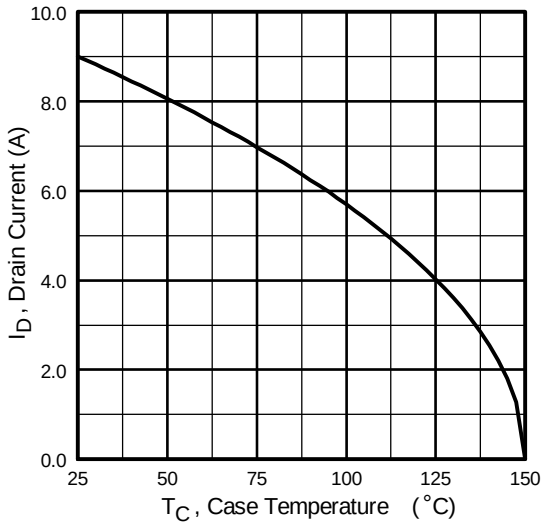


Fig 8. Maximum Safe Operating Area



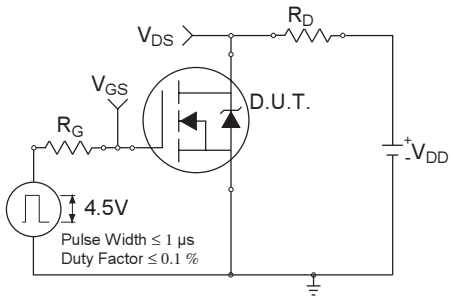


Fig 10a. Switching Time Test Circuit

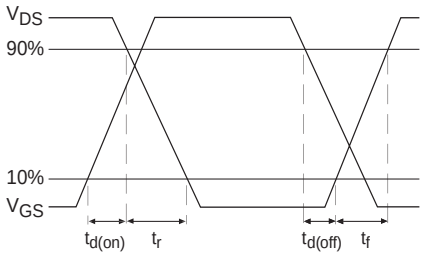


Fig 10b. Switching Time Waveforms

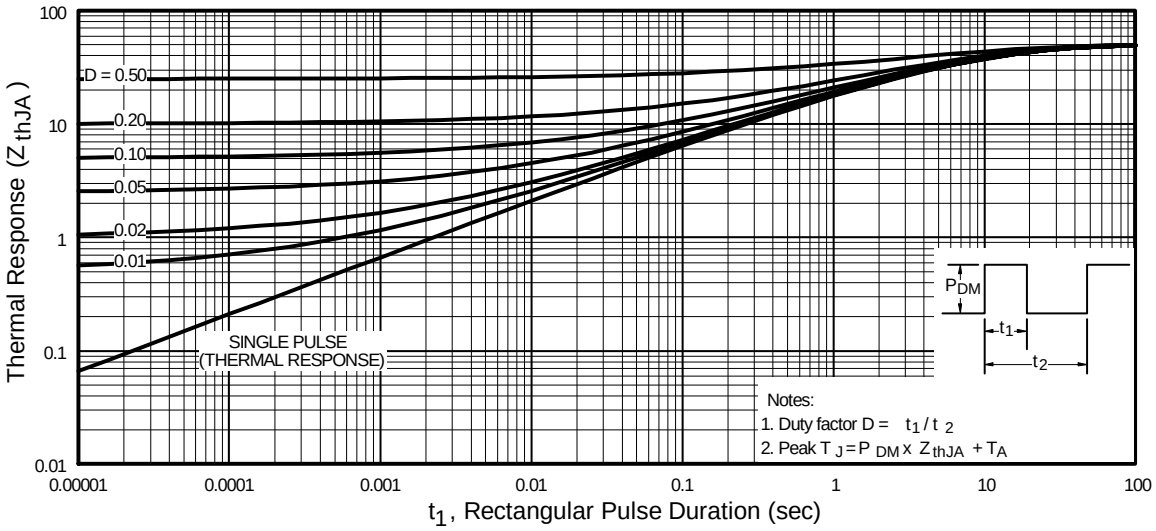


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

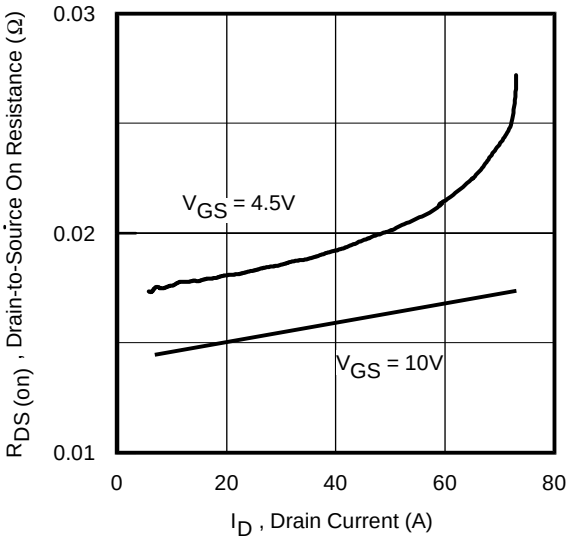


Fig 12. On-Resistance Vs. Drain Current

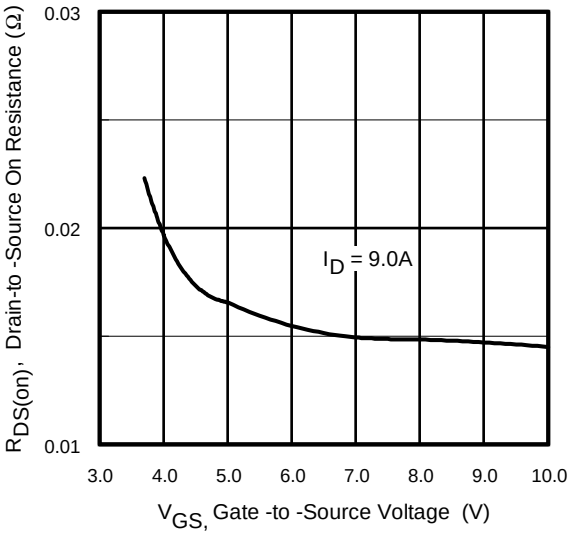


Fig 13. On-Resistance Vs. Gate Voltage

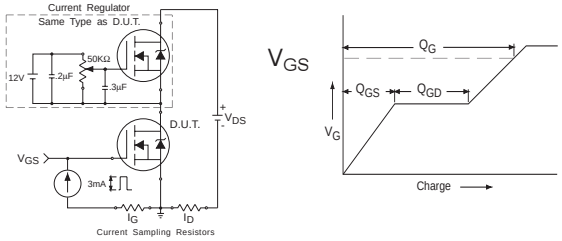


Fig 13a&b. Basic Gate Charge Test Circuit and Waveform

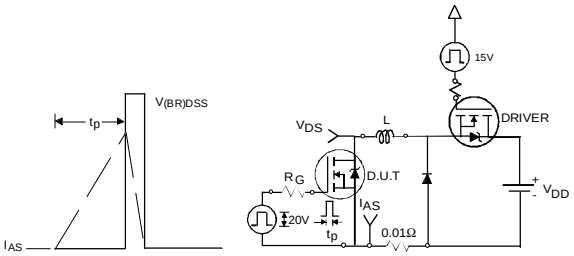


Fig 14a&b. Unclamped Inductive Test circuit and Waveforms

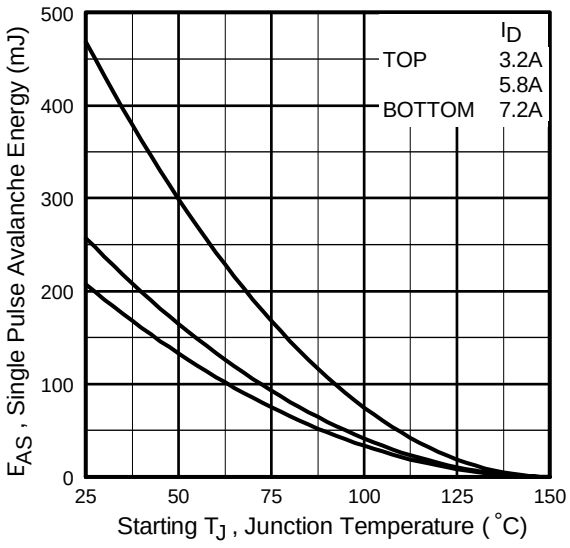
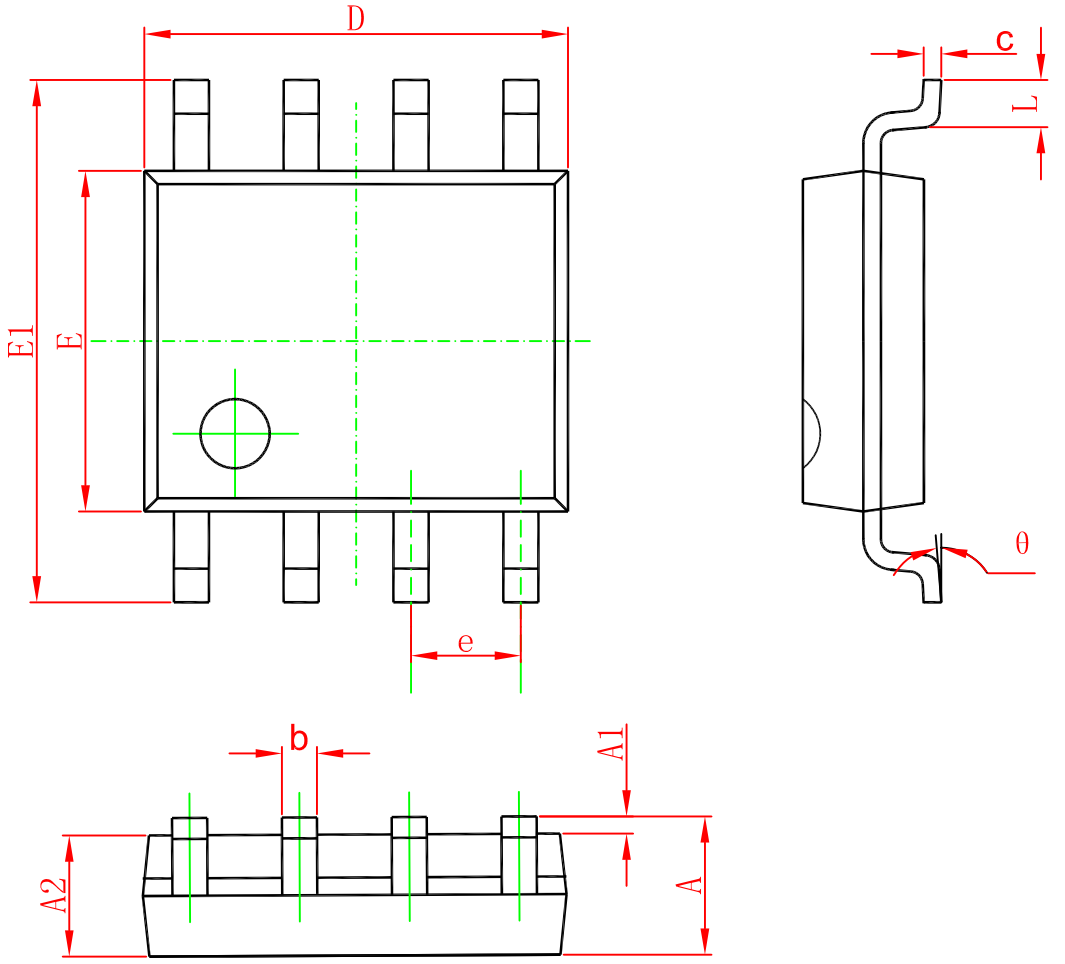


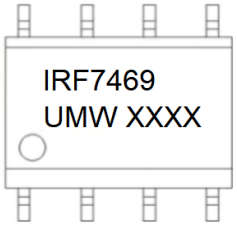
Fig 14c. Maximum Avalanche Energy Vs. Drain Current

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
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