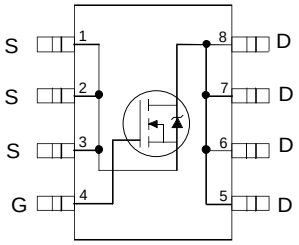
Features

- $V_{DS\ (V)}$ = 40V
- $R_{DS(ON)}$ < 7.5mΩ (VGS = 10V)
- $R_{DS(ON)}$ < 9 mΩ (VGS = 4.5V)



Top View

Applications

- High Frequency DC-DC Converters with Synchronous Rectification
- Lead-Free

Benefits

- Ultra-Low Gate Impedance
- Very Low $R_{DS(on)}$ at 4.5V V_{GS}
- Fully Characterized Avalanche Voltage and Current

Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 12	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	15	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	12	
I_{DM}	Pulsed Drain Current①	120	
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	W/°C
T_J , T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

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

Notes:

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

② Starting T_J = 25°C, L = 9.4mH R_G = 25Ω, I_{AS} = 8.0A.

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

④ When mounted on 1 inch square copper board, t<10 sec

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	30			V	V_{GS} = 0V, I_D = 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.029		V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		6.0	7.5	mΩ	V_{GS} = 10V, I_D = 15A ④
			6.9	9		V_{GS} = 4.5V, I_D = 12A ④
			10	2		V_{GS} = 2.8V, I_D = 3.5A ④
$V_{GS(th)}$	Gate Threshold Voltage	0.6		2.0	V	V_{DS} = V_{GS}, I_D = 250μA
I_{DSS}	Drain-to-Source Leakage Current			20	μA	V_{DS} = 24V, V_{GS} = 0V
				100		V_{DS} = 24V, V_{GS} = 0V, T_J = 125C
I_{GSS}	Gate-to-Source Forward Leakage			200	nA	V_{GS} = 12V
	Gate-to-Source Reverse Leakage			-200		V_{GS} = -12V

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	44			S	V_{DS} = 10V, I_D = 15A
Q_g	Total Gate Charge		37	56	nC	I_D = 15A
Q_{gs}	Gate-to-Source Charge		8.9	13		V_{DS} = 24V
Q_{gd}	Gate-to-Drain ("Miller") Charge		13	20		V_{GS} = 5.0V ③
Q_{oss}	Output Gate Charge		23	35		V_{GS} = 0V, V_{DS} = 16V
$t_{d(on)}$	Turn-On Delay Time		17		ns	V_{DD} = 15V
t_r	Rise Time		18			I_D = 1.0A
$t_{d(off)}$	Turn-Off Delay Time		51			R_G = 6Ω
t_f	Fall Time		44			V_{GS} = 4.5V ③
C_{iss}	Input Capacitance		3480		pF	V_{GS} = 0V
C_{oss}	Output Capacitance		870			V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance		100			f = 1.0MHz

Avalanche Characteristics

Symbol	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②		300	mJ
I_{AR}	Avalanche Current①		15	A

Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)			2.5	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①			120		
V_{SD}	Diode Forward Voltage			1.2	V	T_J = 25°C, I_S = 2.5A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time		64	96	ns	T_J = 25°C, I_F = 2.5A, V_R= 20V
Q_{rr}	Reverse Recovery Charge		99	150	nC	di/dt = 100A/μs ③

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

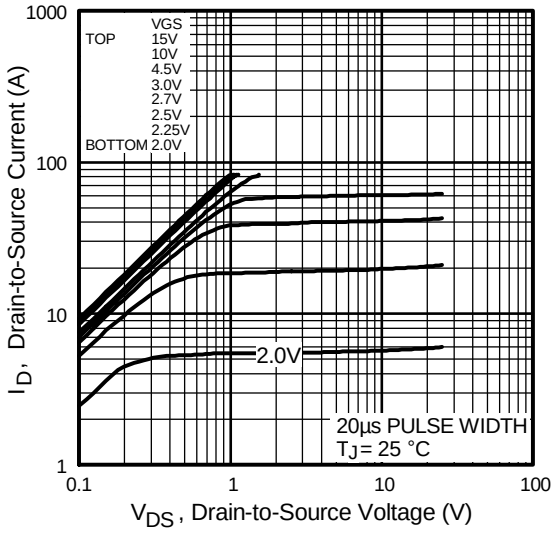


Fig 1. Typical Output Characteristics

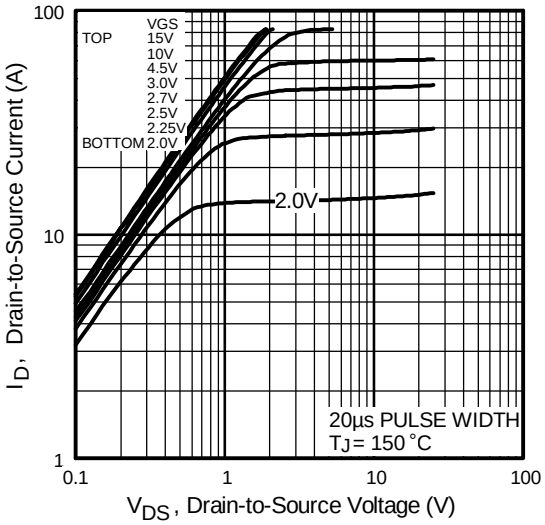


Fig 2. Typical Output Characteristics

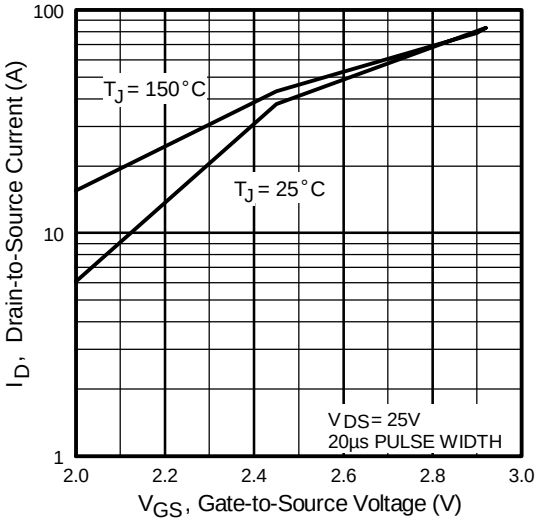


Fig 3. Typical Transfer Characteristics

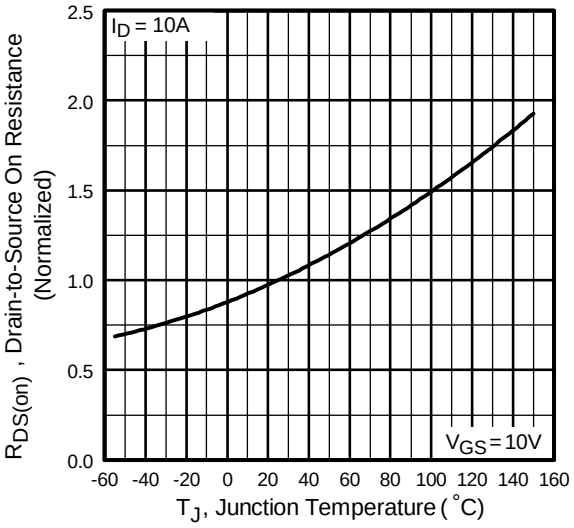


Fig 4. Normalized On-Resistance Vs. Temperature

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

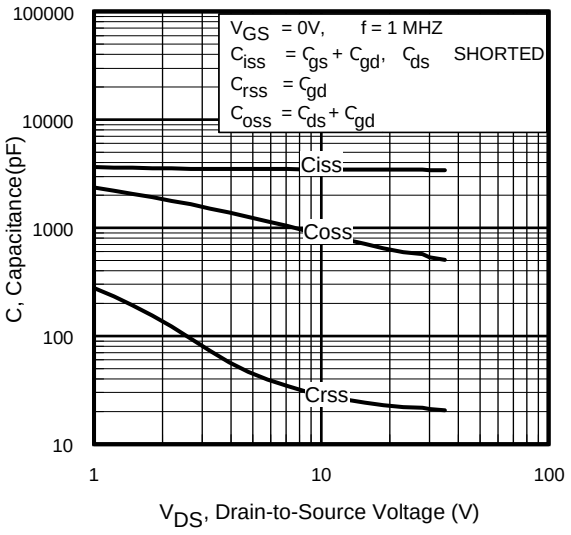


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

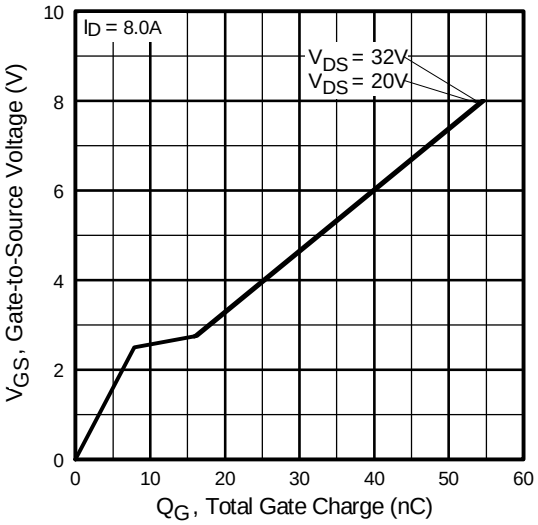


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

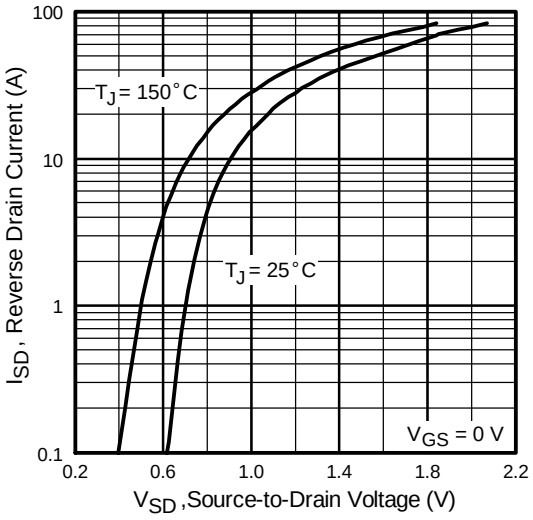


Fig 7. Typical Source-Drain Diode Forward Voltage

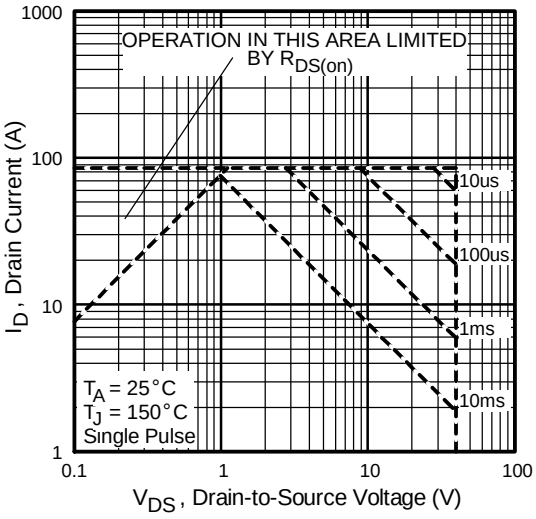


Fig 8. Maximum Safe Operating Area

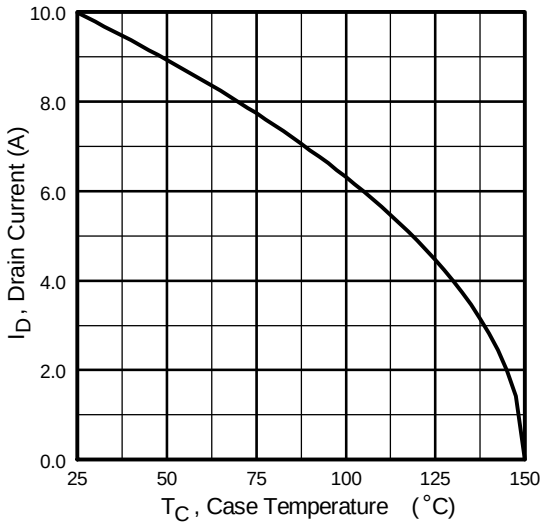


Fig 6. On-Resistance Vs. Drain Current

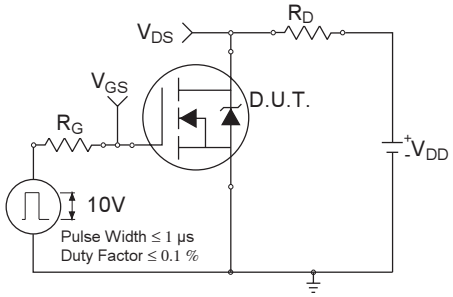


Fig 10a. Switching Time Test Circuit

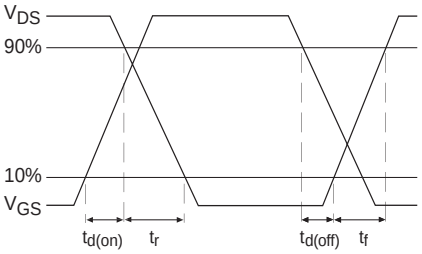


Fig 10b. Switching Time Waveforms

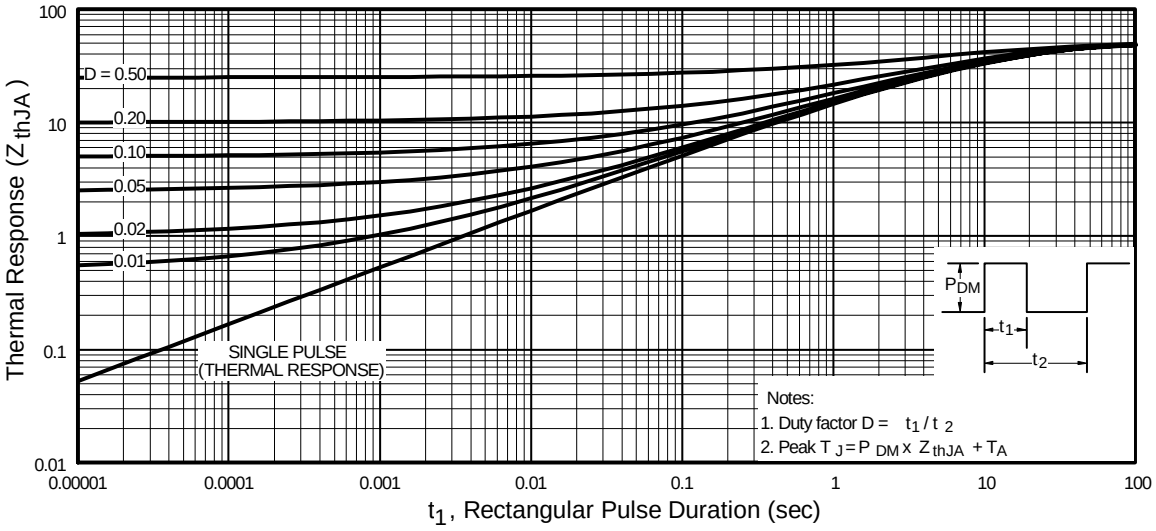


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

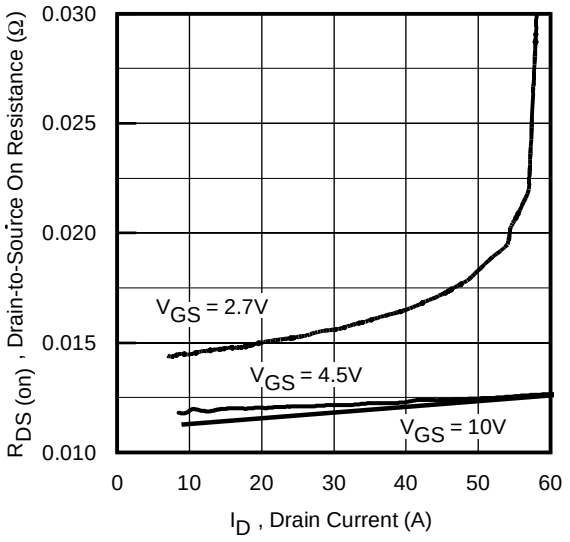


Fig 12. On-Resistance Vs. Drain Current

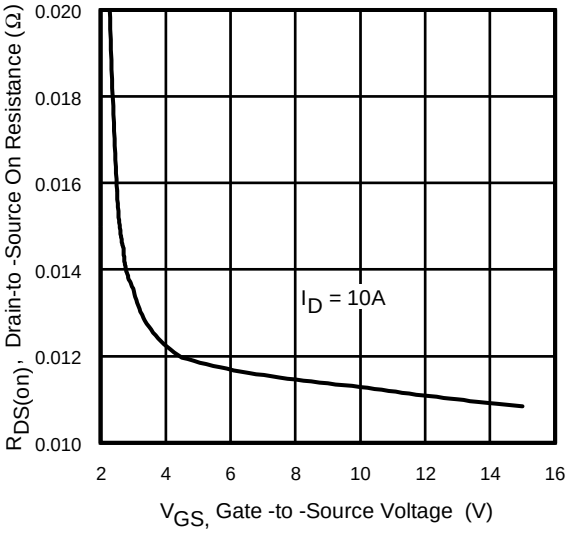


Fig 13. On-Resistance Vs. Gate Voltage

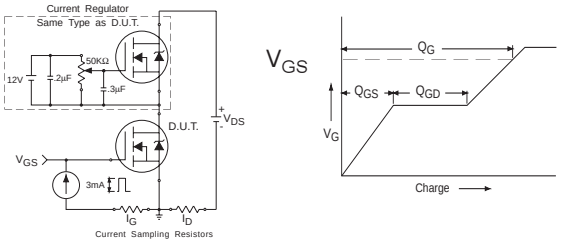


Fig 13a&b. Basic Gate Charge Test Circuit and Waveform

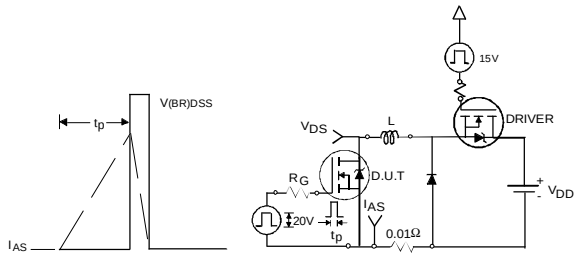


Fig 14a&b. Unclamped Inductive Test circuit and Waveforms

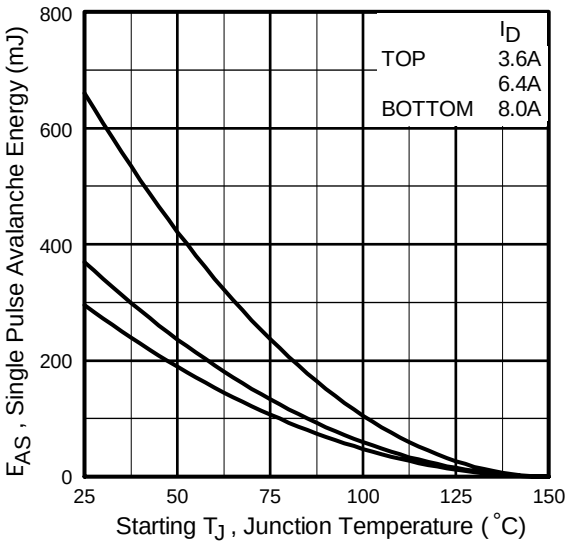
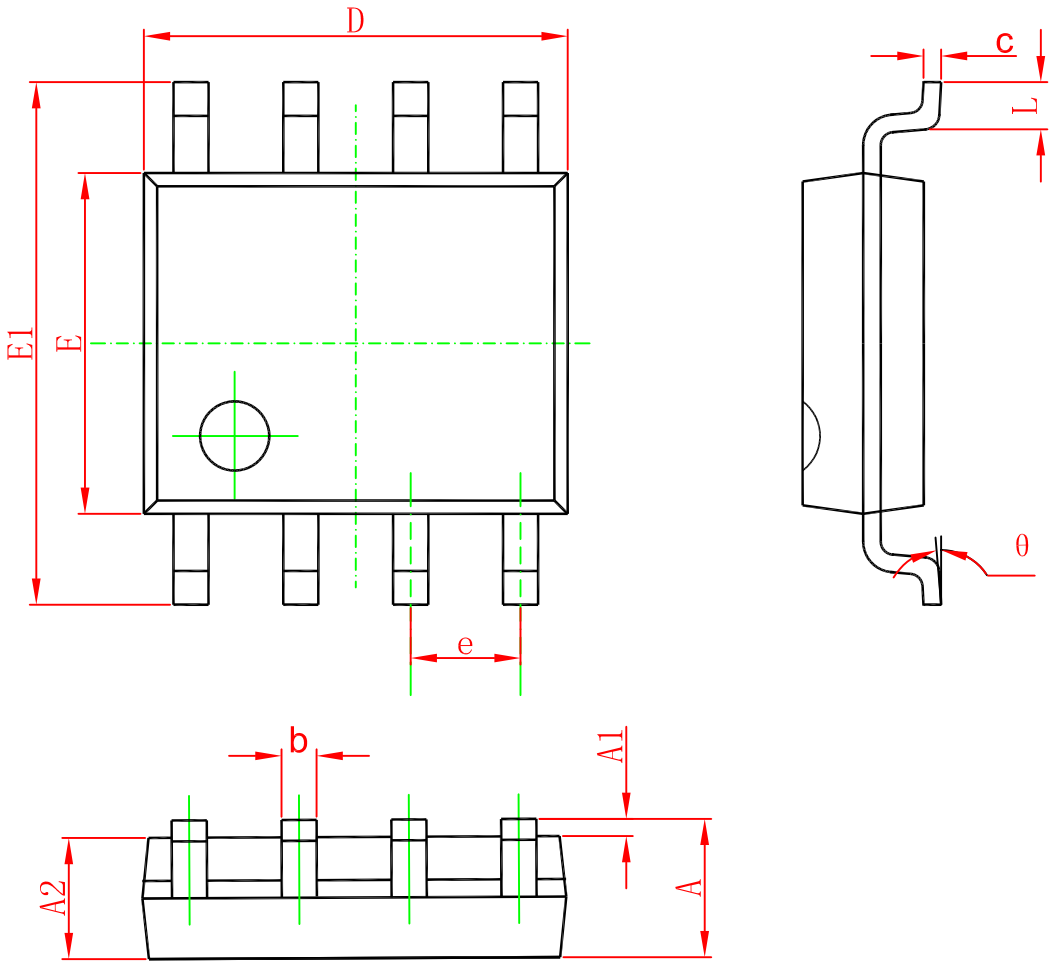


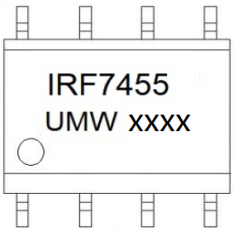
Fig 14c. Maximum Avalanche Energy Vs. Drain Current

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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