

Features

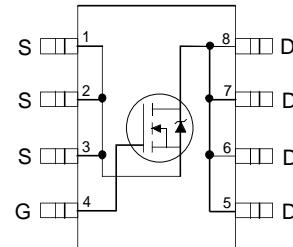
- $V_{DS(V)} = 40V$
- $R_{DS(ON)} < 15.5m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 17 m\Omega$ ($V_{GS} = 4.5V$)

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



Top View

Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-to-Source Voltage	± 12	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	9.4	
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	7.5	A
I_{DM}	Pulsed Drain Current①	75	
$P_D @ T_A = 25^\circ C$	Maximum Power Dissipation	2.5	W
$P_D @ T_A = 70^\circ C$	Maximum Power Dissipation	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	
$R_{\theta JA}$	Junction-to-Ambient ④		50	°C/W

Notes:

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

③ Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.

② Starting $T_J = 25^\circ C$, $L = 5.0mH$
 $R_G = 25\Omega$, $I_{AS} = 8.0A$.

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

Static @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(\text{BR})\text{DSS}}$	Drain-to-Source Breakdown Voltage	40			V	$V_{\text{GS}} = 0\text{V}, I_D = 250\mu\text{A}$
$\Delta V_{(\text{BR})\text{DSS}/\Delta T_J}$	Breakdown Voltage Temp. Coefficient		0.025		V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$
$R_{\text{DS}(\text{on})}$	Static Drain-to-Source On-Resistance	11.7	15.5		$\text{m}\Omega$	$V_{\text{GS}} = 10\text{V}, I_D = 9.4\text{A}$ ④
		13.0	17.0			$V_{\text{GS}} = 4.5\text{V}, I_D = 7.5\text{A}$ ④
		18.0	35.0			$V_{\text{GS}} = 4.5\text{V}, I_D = 4.7\text{A}$ ④
$V_{\text{GS}(\text{th})}$	Gate Threshold Voltage	0.8	2.0		V	$V_{\text{DS}} = V_{\text{GS}}, I_D = 250\mu\text{A}$
I_{DSS}	Drain-to-Source Leakage Current		20		μA	$V_{\text{DS}} = 32\text{V}, V_{\text{GS}} = 0\text{V}$
			100			$V_{\text{DS}} = 32\text{V}, V_{\text{GS}} = 0\text{V}, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage		200		nA	$V_{\text{GS}} = 12\text{V}$
	Gate-to-Source Reverse Leakage		-200			$V_{\text{GS}} = -12\text{V}$

Dynamic @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	27			S	$V_{\text{DS}} = 20\text{V}, I_D = 8.0\text{A}$
Q_g	Total Gate Charge		23	34	nC	$I_D = 8.0\text{A}$
Q_{gs}	Gate-to-Source Charge		6.4	9.6		$V_{\text{DS}} = 20\text{V}$
Q_{gd}	Gate-to-Drain ("Miller") Charge		6.7	10		$V_{\text{GS}} = 4.5\text{V}$, ③
Q_{oss}	Output Gate Charge		17	26		$V_{\text{GS}} = 0\text{V}, V_{\text{DS}} = 16\text{V}$
$t_{\text{d}(\text{on})}$	Turn-On Delay Time		7.6		ns	$V_{\text{DD}} = 20\text{V}$
t_r	Rise Time		2.3			$I_D = 8.0\text{A}$
$t_{\text{d}(\text{off})}$	Turn-Off Delay Time		20			$R_G = 1.8\Omega$
t_f	Fall Time		3.8			$V_{\text{GS}} = 4.5\text{V}$, ③
C_{iss}	Input Capacitance		2460		pF	$V_{\text{GS}} = 0\text{V}$
C_{oss}	Output Capacitance		490			$V_{\text{DS}} = 20\text{V}$
C_{rss}	Reverse Transfer Capacitance		38			$f = 1.0\text{MHz}$

Avalanche Characteristics

Symbol	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②		160	mJ
I_{AR}	Avalanche Current ①		8.0	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			74		
V_{SD}	Diode Forward Voltage	0.81	1.3		V	$T_J = 25^\circ\text{C}, I_S = 8.0\text{A}, V_{\text{GS}} = 0\text{V}$ ③
		0.65				$T_J = 125^\circ\text{C}, I_S = 8.0\text{A}, V_{\text{GS}} = 0\text{V}$ ③
t_{rr}	Reverse Recovery Time	45	68	ns	nC	$T_J = 25^\circ\text{C}, I_F = 8.0\text{A}, V_R = 20\text{V}$ $di/dt = 100\text{A}/\mu\text{s}$ ③
Q_{rr}	Reverse Recovery Charge	76	110			$T_J = 125^\circ\text{C}, I_F = 8.0\text{A}, V_R = 20\text{V}$ $di/dt = 100\text{A}/\mu\text{s}$ ③
t_{fr}	Reverse Recovery Time	58	87	ns	nC	$T_J = 125^\circ\text{C}, I_F = 8.0\text{A}, V_R = 20\text{V}$ $di/dt = 100\text{A}/\mu\text{s}$ ③
Q_{fr}	Reverse Recovery Charge	110	160			

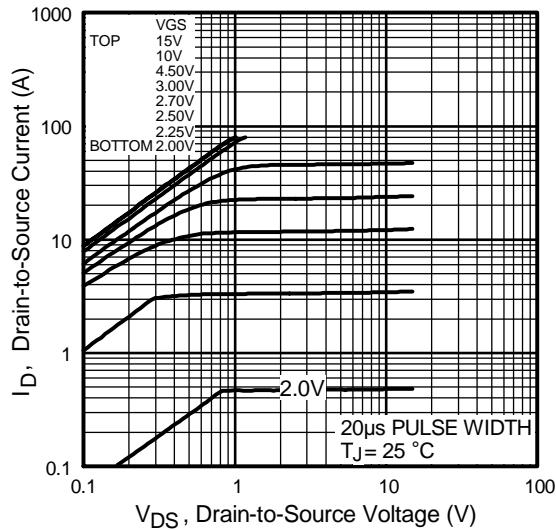


Fig 1. Typical Output Characteristics

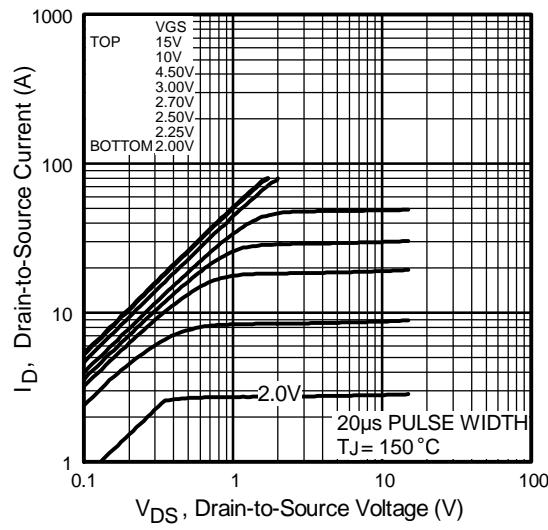


Fig 2. Typical Output Characteristics

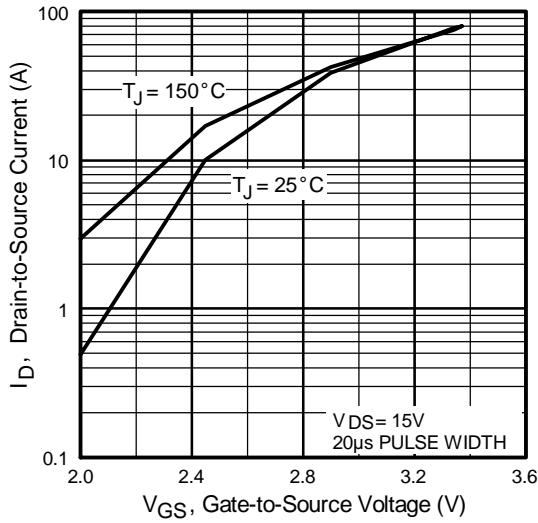


Fig 3. Typical Transfer Characteristics

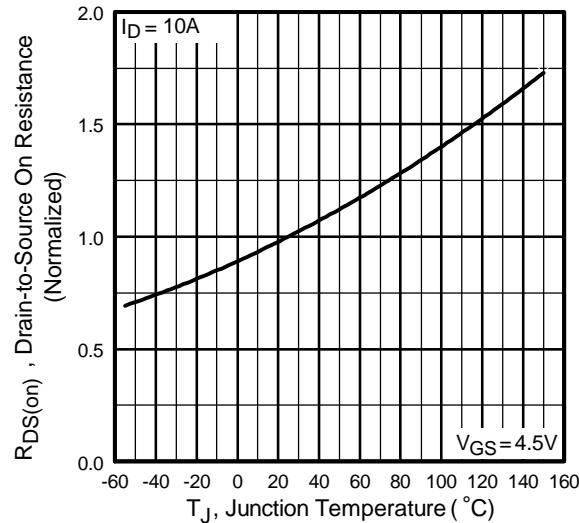


Fig 4. Normalized On-Resistance Vs. Temperature

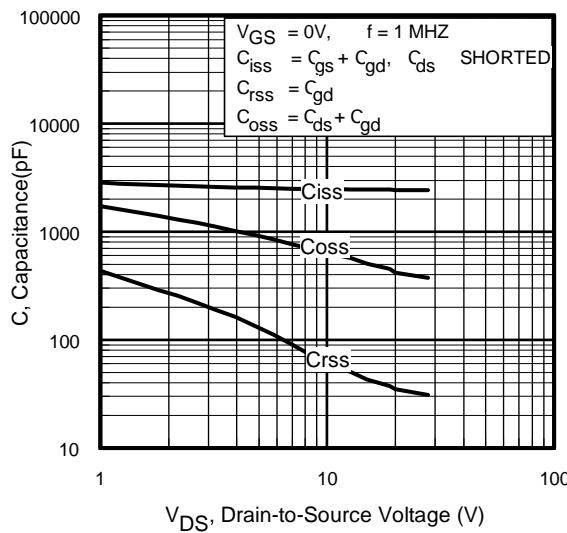


Fig 5. Typical Capacitance Vs.
Drain-to-Source Voltage

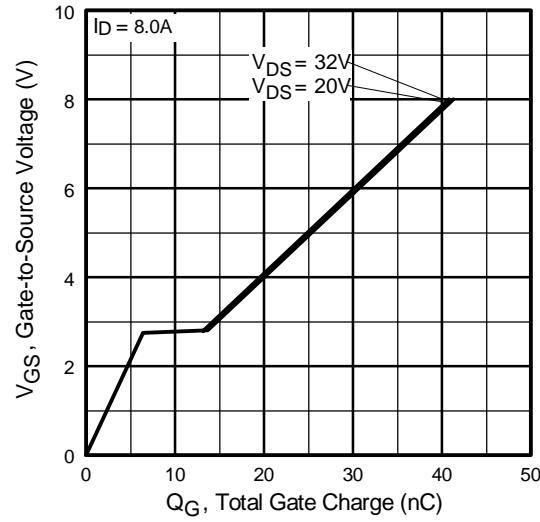


Fig 6. Typical Gate Charge Vs.
Gate-to-Source Voltage

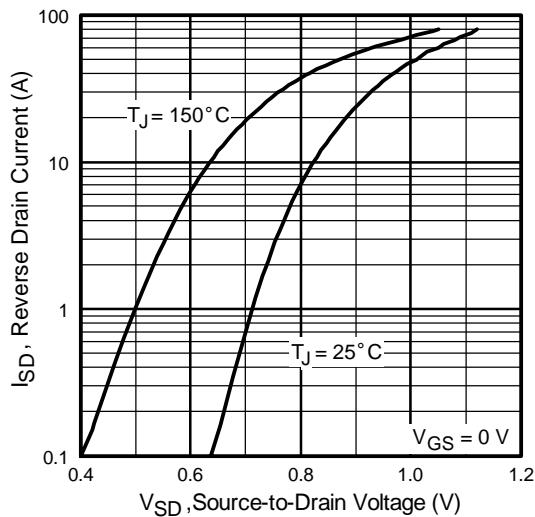


Fig 7. Typical Source-Drain Diode
Forward Voltage

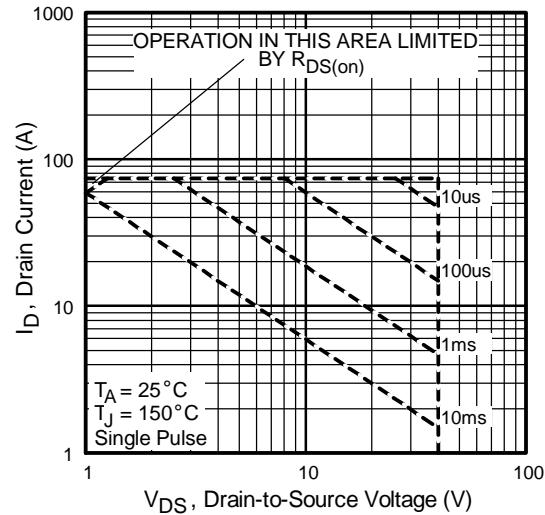


Fig 8. Maximum Safe Operating Area

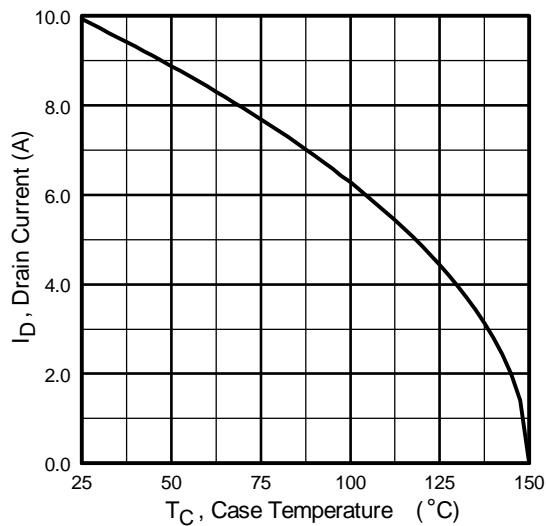


Fig 6. On-Resistance Vs. Drain Current

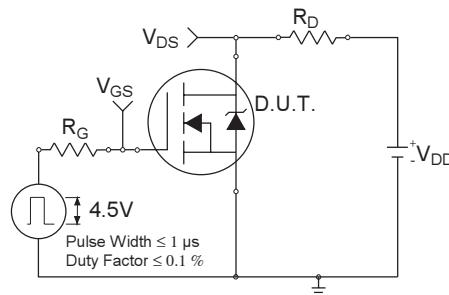


Fig 10a. Switching Time Test Circuit

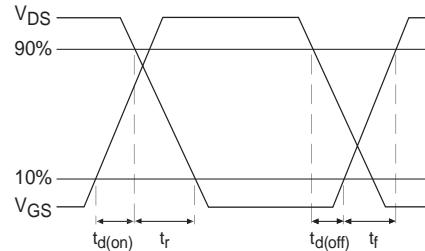


Fig 10b. Switching Time Waveforms

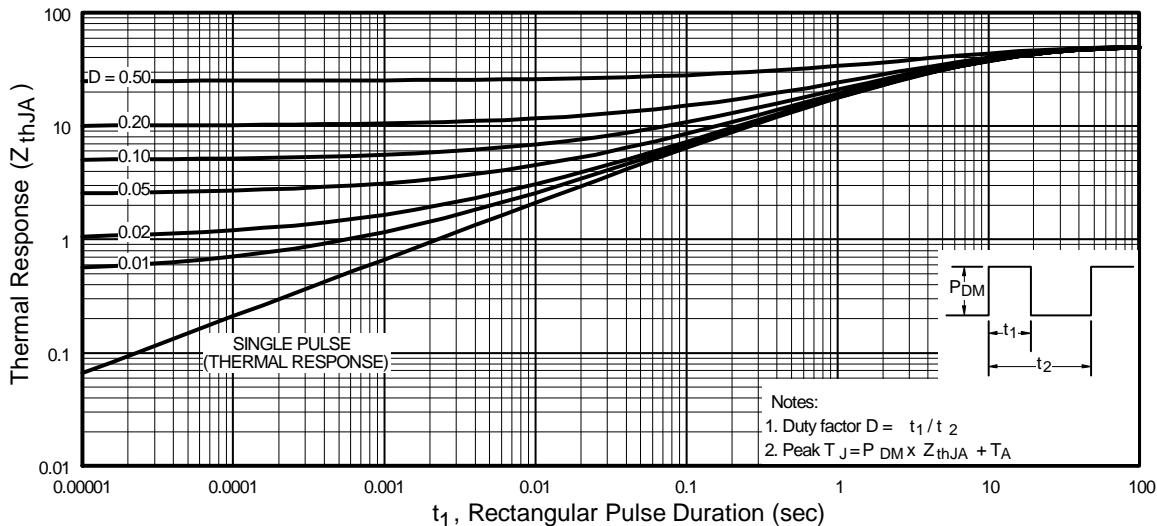


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Case

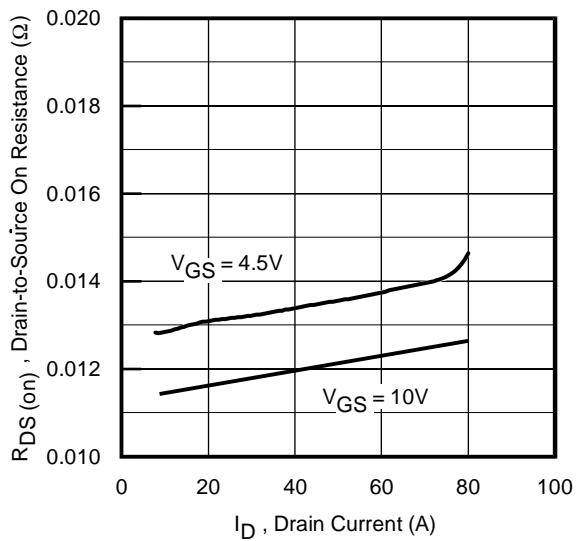


Fig 12. On-Resistance Vs. Drain Current

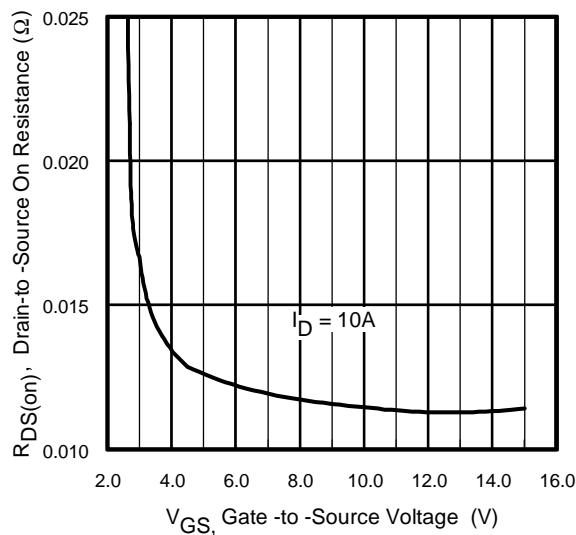


Fig 13. On-Resistance Vs. Gate Voltage

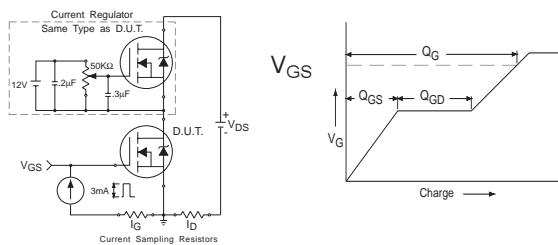


Fig 13a&b. Basic Gate Charge Test Circuit and Waveform

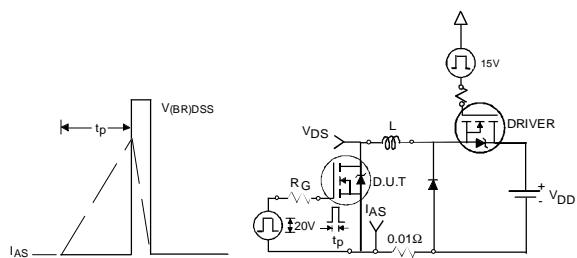


Fig 14a&b. Unclamped Inductive Test circuit and Waveforms

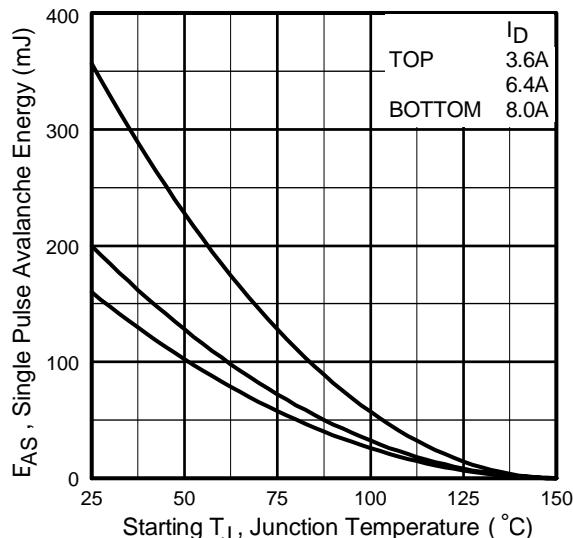
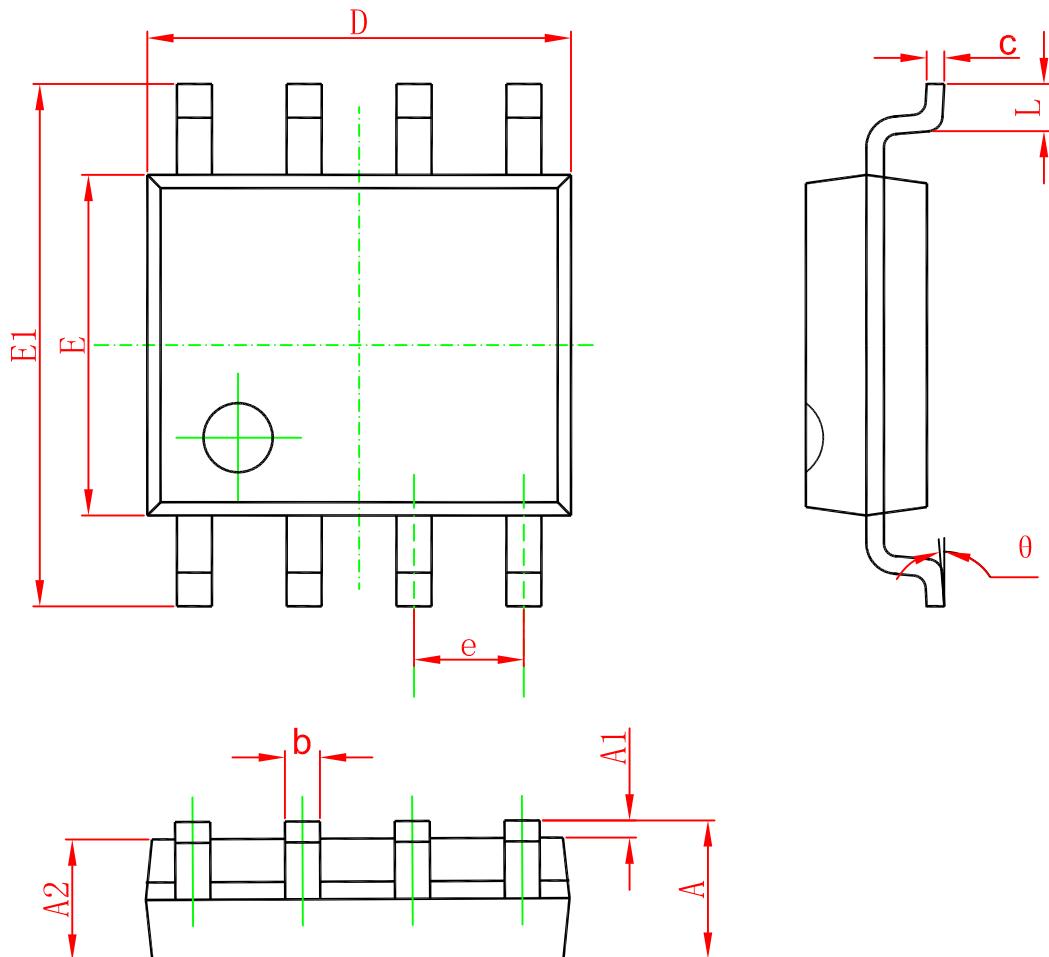


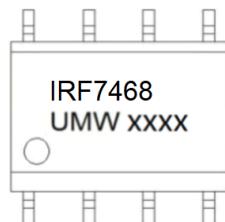
Fig 14c. Maximum Avalanche Energy Vs. Drain Current

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



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW IRF7468TR	SOP-8	3000	Tape and reel