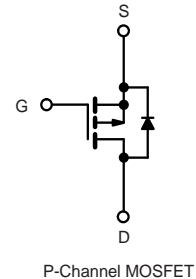
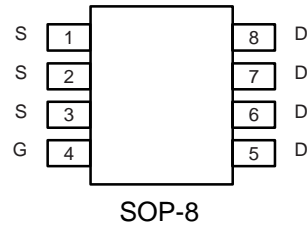


**PRODUCT SUMMARY**

- $V_{DS} (V) = -40V$
- $R_{DS(ON)} < 18m\Omega$  ( $V_{GS} = -10V$ )
- $R_{DS(ON)} < 29m\Omega$  ( $V_{GS} = -4.5V$ )

**APPLICATIONS**

- Load Switch
- POL


**ABSOLUTE MAXIMUM RATINGS**  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{DS}$	- 40	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current ( $T_J = 150\text{ }^\circ\text{C}$ )	$T_C = 25\text{ }^\circ\text{C}$	- 16.1	A	
	$T_C = 70\text{ }^\circ\text{C}$	- 12.9		
	$T_A = 25\text{ }^\circ\text{C}$	- 10.2 <sup>b, c</sup>		
	$T_A = 70\text{ }^\circ\text{C}$	- 8.2 <sup>b, c</sup>		
Pulsed Drain Current	$I_{DM}$	- 50		
Continuous Source-Drain Diode Current	$T_C = 25\text{ }^\circ\text{C}$	- 5.3		
	$T_A = 25\text{ }^\circ\text{C}$	- 2.1 <sup>b, c</sup>		
Single Pulse Avalanche Current	L = 0.1 mH	$I_{AS}$	- 28	
Single Pulse Avalanche Energy		$E_{AS}$	39	
Maximum Power Dissipation	$T_C = 25\text{ }^\circ\text{C}$	$P_D$	6.3	W
	$T_C = 70\text{ }^\circ\text{C}$		4	
	$T_A = 25\text{ }^\circ\text{C}$		2.5 <sup>b, c</sup>	
	$T_A = 70\text{ }^\circ\text{C}$		1.6 <sup>b, c</sup>	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 150	$^\circ\text{C}$	

**THERMAL RESISTANCE RATINGS**

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b, d</sup>	$R_{thJA}$	37	50	$^\circ\text{C/W}$
Maximum Junction-to-Foot (Drain)	$R_{thJF}$	16	20	

Notes:

- Based on  $T_C = 25\text{ }^\circ\text{C}$ .
- Surface mounted on 1" x 1" FR4 board.
- $t = 10\text{ s}$ .
- Maximum under steady state conditions is  $85\text{ }^\circ\text{C/W}$ .

**SPECIFICATIONS**  $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted

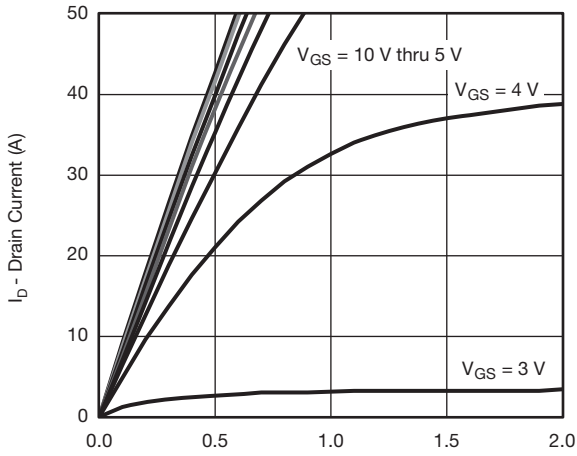
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-40			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$\mu\text{A}$		-36		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			5		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1.2		-2.5	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -40\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
		$V_{DS} = -40\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			-5	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}, V_{GS} = -10\text{ V}$	-25			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -10.2\text{ A}$			18	m $\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -8.4\text{ A}$			29	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -15\text{ V}, I_D = -10.2\text{ A}$		37		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		3007		pF
Output Capacitance	$C_{oss}$			335		
Reverse Transfer Capacitance	$C_{rss}$			291		
Total Gate Charge	$Q_g$	$V_{DS} = -20\text{ V}, V_{GS} = -10\text{ V}, I_D = -10.2\text{ A}$		64	95	nC
Gate-Source Charge	$Q_{gs}$	$V_{DS} = -20\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -10.2\text{ A}$		33	50	
Gate-Drain Charge	$Q_{gd}$			9.8		
Gate Resistance	$R_g$		$f = 1\text{ MHz}$	0.4	2	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -20\text{ V}, R_L = 2.4\text{ }\Omega$ $I_D \cong -8.2\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		57	86	ns
Rise Time	$t_r$			50	75	
Turn-Off Delay Time	$t_{d(off)}$			40	60	
Fall Time	$t_f$			17	26	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -20\text{ V}, R_L = 2.4\text{ }\Omega$ $I_D \cong -8.2\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		13	20	
Rise Time	$t_r$			11	20	
Turn-Off Delay Time	$t_{d(off)}$			45	68	
Fall Time	$t_f$			9	18	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			-5.3	A
Pulse Diode Forward Current	$I_{SM}$				-50	
Body Diode Voltage	$V_{SD}$	$I_S = -8.2\text{ A}, V_{GS} = 0\text{ V}$		-0.8	-1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = -8.2\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		36	54	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			41	62	nC
Reverse Recovery Fall Time	$t_a$			20		ns
Reverse Recovery Rise Time	$t_b$			16		

Notes:

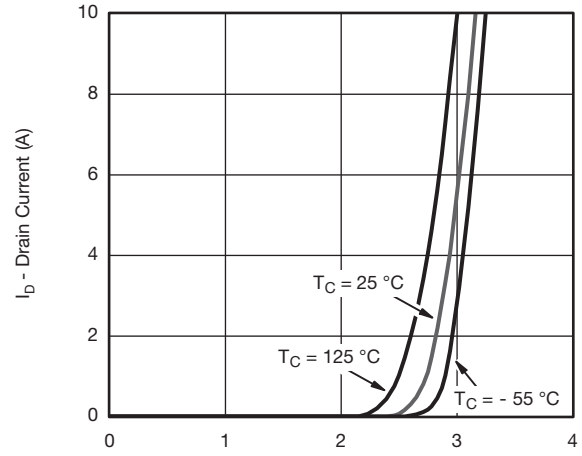
 a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

b. Guaranteed by design, not subject to production testing.

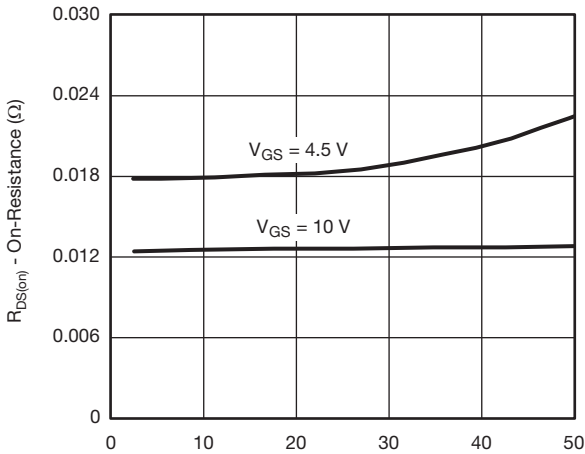
### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



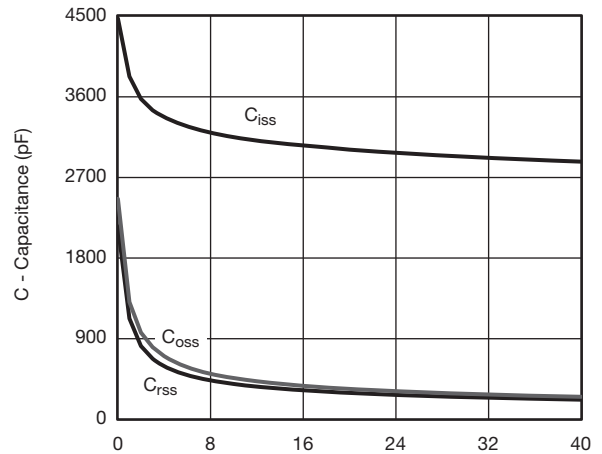
$V_{GS}$  - Drain-to-Source Voltage (V)  
**Output Characteristics**



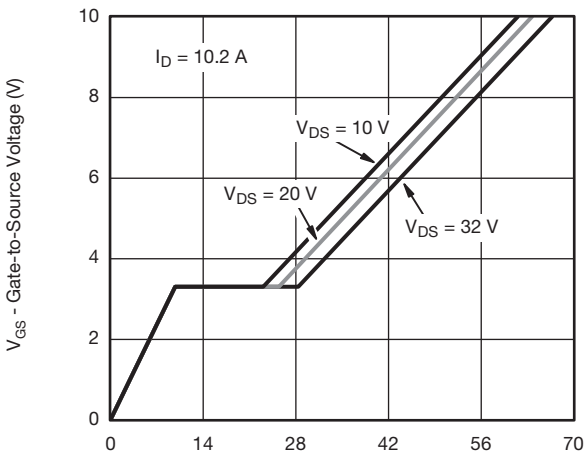
$V_{GS}$  - Gate-to-Source Voltage (V)  
**Transfer Characteristics**



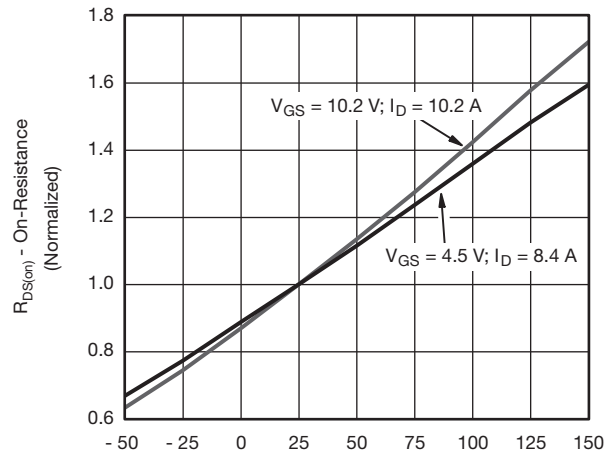
$I_D$  - Drain Current (A)  
**On-Resistance vs. Drain Current**



$V_{DS}$  - Drain-to-Source Voltage (V)  
**Capacitance**

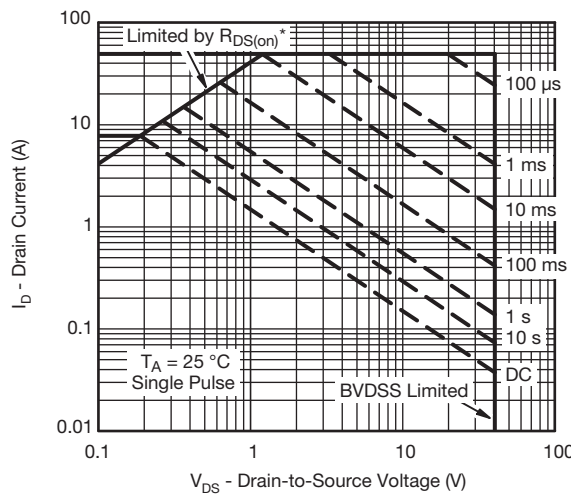
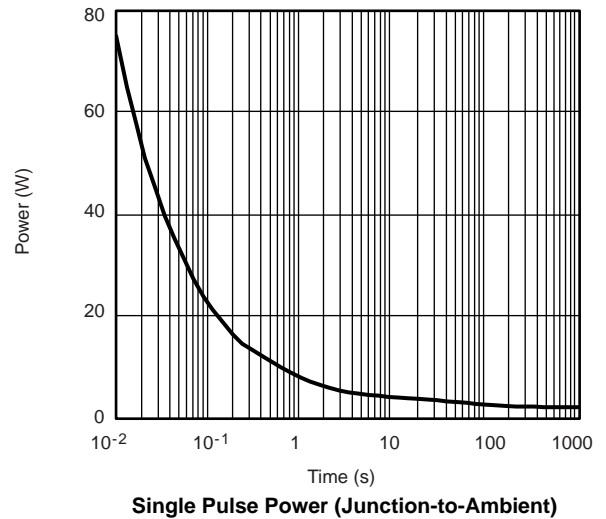
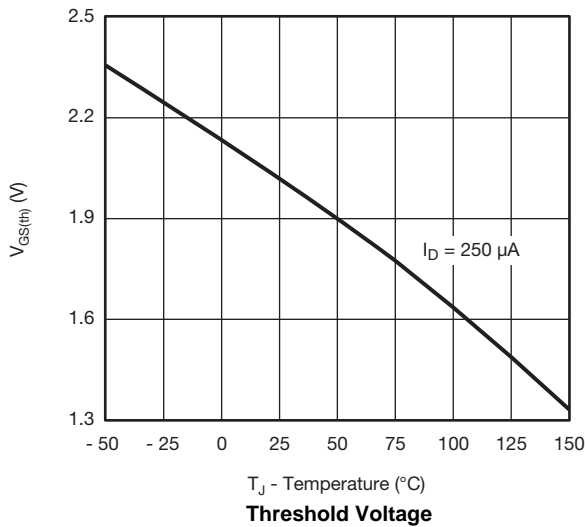
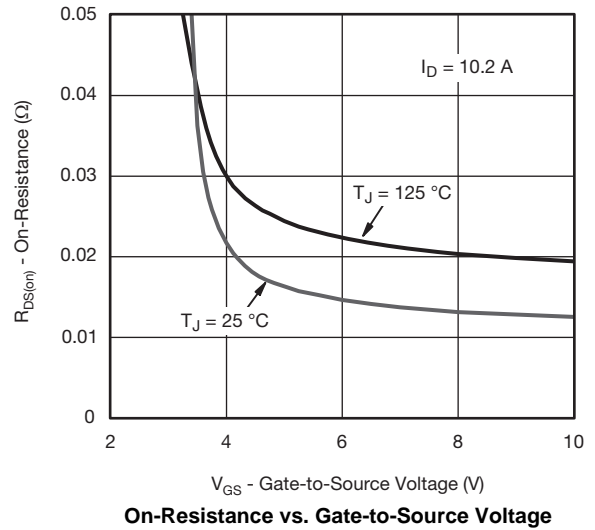
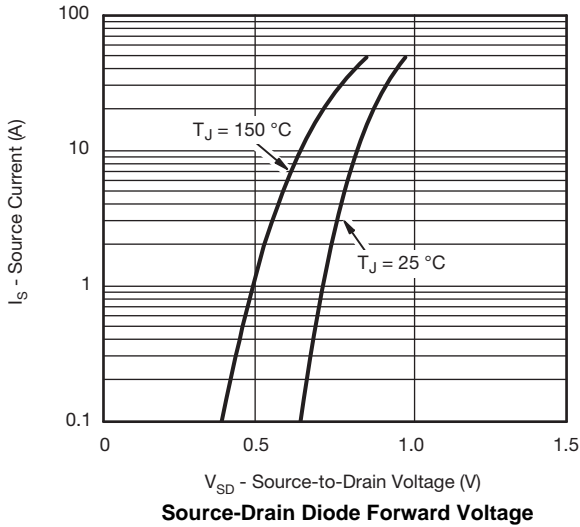


$Q_g$  - Total Gate Charge (nC)  
**Gate Charge**



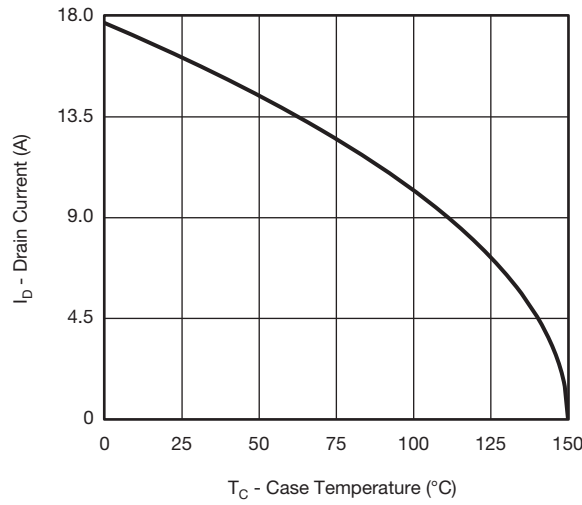
$T_J$  - Junction Temperature (°C)  
**On-Resistance vs. Junction Temperature**

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

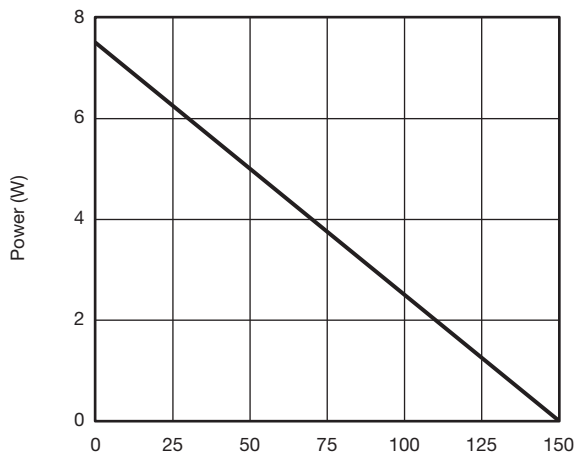


\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

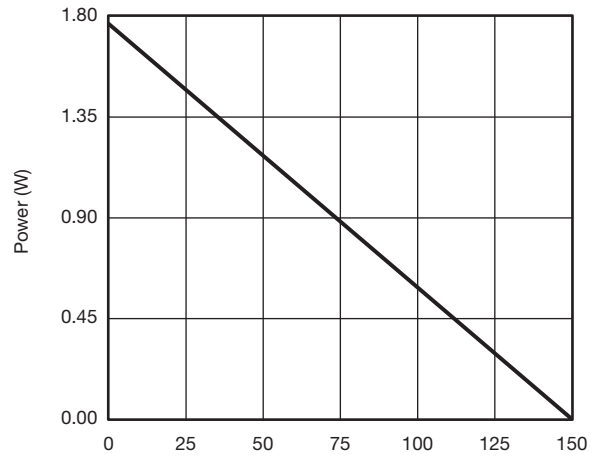
### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



**Current Derating\***



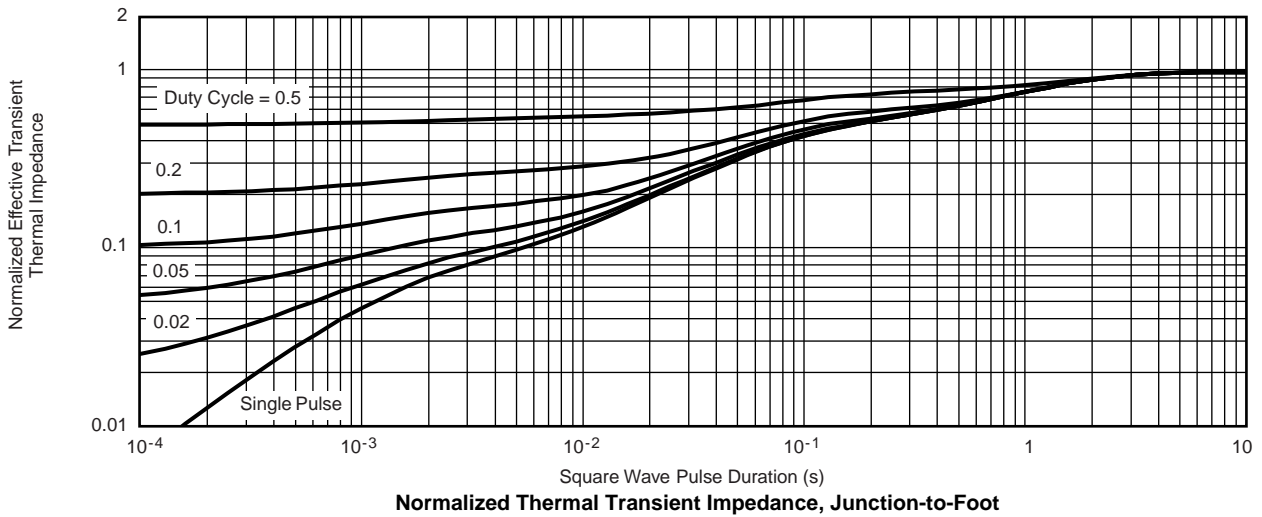
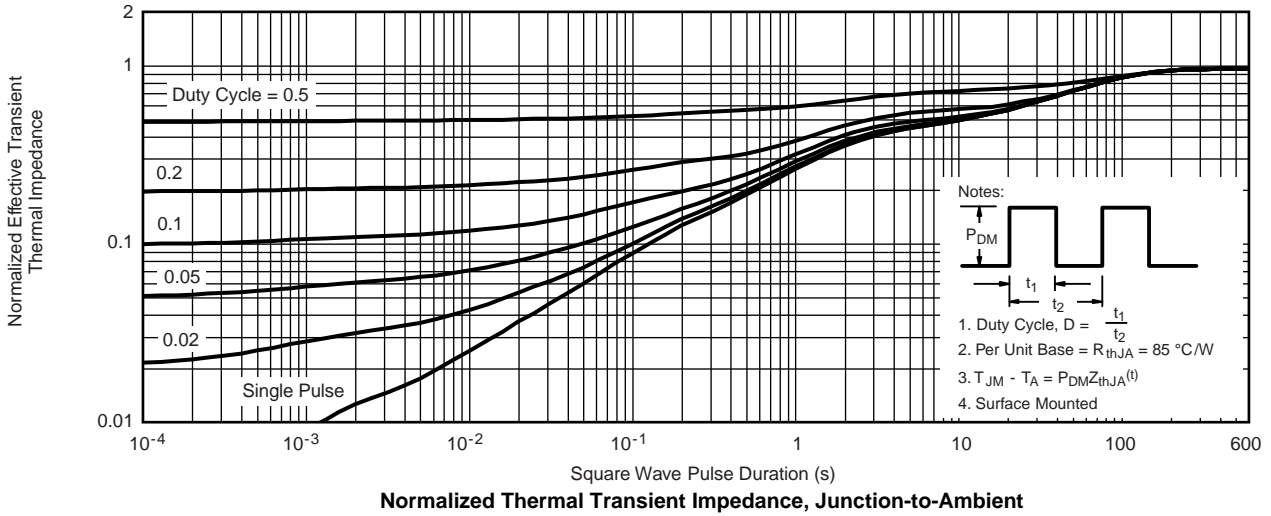
**Power, Junction-to-Foot**



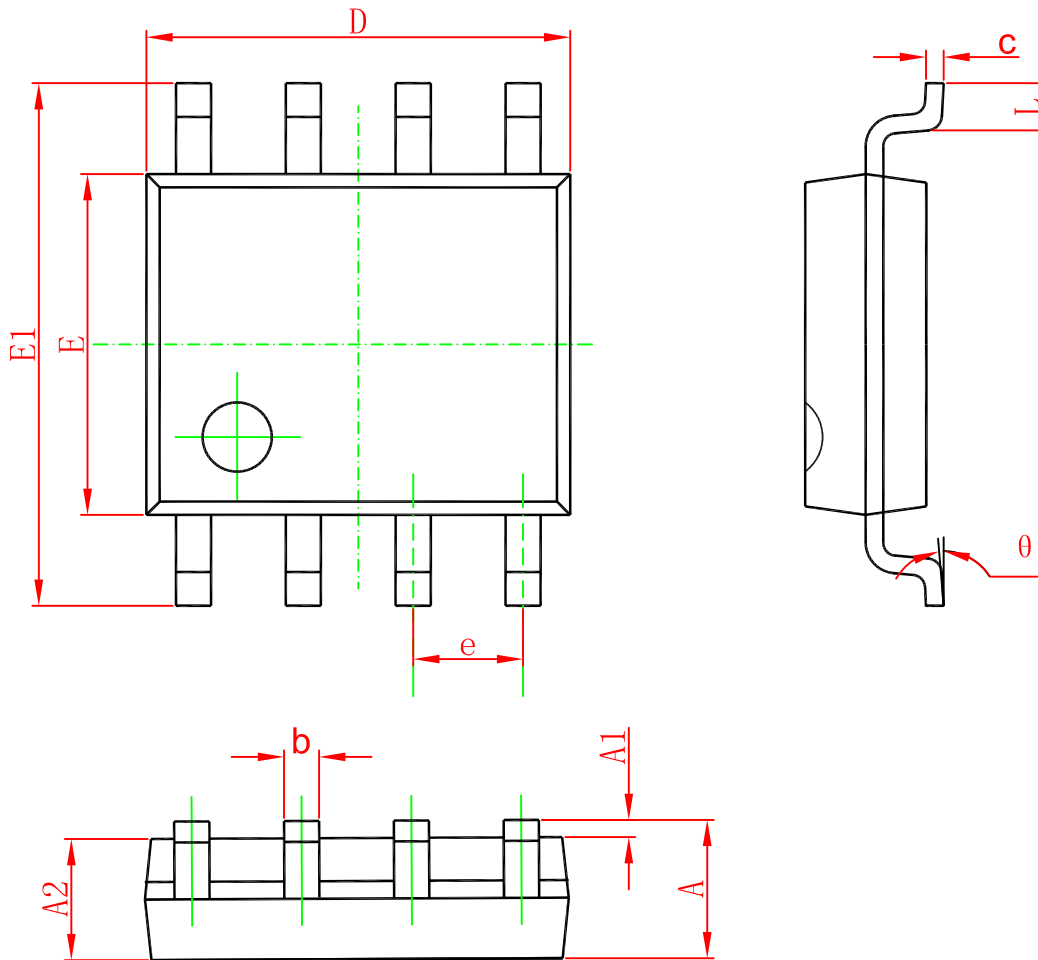
**Power, Junction-to-Ambient**

\* The power dissipation  $P_D$  is based on  $T_{J(max)} = 150$  °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

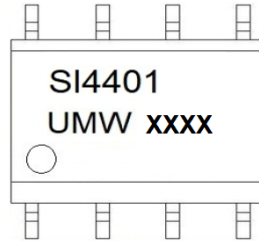


SOP-8



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
SI4401BDY	SOP-8	3000	Tape and reel