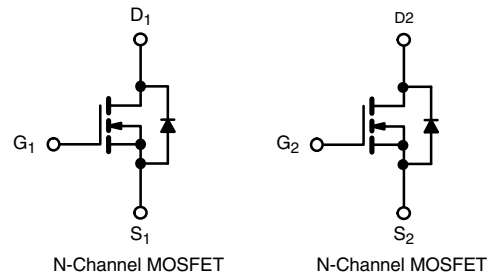


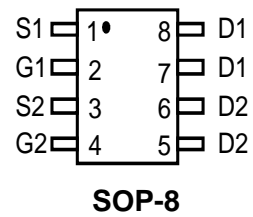
**FEATURES**

- $V_{DS} (V) = 60V$
- $I_D = 5.3A$  ( $V_{GS} = 10V$ )
- $R_{DS(ON)} < 36m\Omega$  ( $V_{GS} = 10V$ )
- $R_{DS(ON)} < 47m\Omega$  ( $V_{GS} = 4.5V$ )



**APPLICATIONS**

- LCD TV CCFL inverter
- Load switch



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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	$V_{DS}$	60	V
Gate-source voltage	$V_{GS}$	$\pm 20$	
Continuous drain current ( $T_J = 150\text{ }^\circ\text{C}$ )	$I_D$	$T_C = 25\text{ }^\circ\text{C}$	A
		$T_C = 70\text{ }^\circ\text{C}$	
		$T_A = 25\text{ }^\circ\text{C}$	
		$T_A = 70\text{ }^\circ\text{C}$	
Pulsed drain current (10 $\mu\text{s}$ width)	$I_{DM}$	20	
Continuous source-drain diode current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$	2.6
		$T_A = 25\text{ }^\circ\text{C}$	1.7 <sup>b, c</sup>
Avalanche current	$I_{AS}$	11	
Single-pulse avalanche energy	$E_{AS}$	6.1	mJ
Maximum power dissipation	$P_D$	$T_C = 25\text{ }^\circ\text{C}$	W
		$T_C = 70\text{ }^\circ\text{C}$	
		$T_A = 25\text{ }^\circ\text{C}$	
		$T_A = 70\text{ }^\circ\text{C}$	
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>a, d</sup>	$R_{thJA}$	55	62.5	$^\circ\text{C/W}$
Maximum junction-to-foot (drain)	$R_{thJF}$	33	40	

**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 110  $^\circ\text{C/W}$

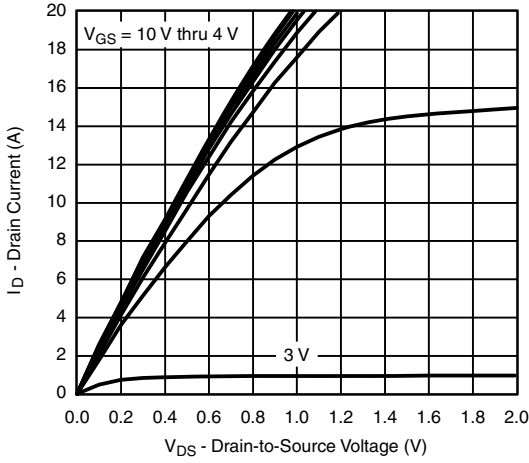
**SPECIFICATIONS** ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Static</b>						
Drain-source breakdown voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60			V
$V_{DS}$ temperature coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		55		mV/°C
$V_{GS(th)}$ temperature coefficient	$\Delta V_{GS(th)}/T_J$			-6		
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1		3	V
		$V_{DS} = V_{GS}, I_D = 5\text{ mA}$		2.5		
Gate-source leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = 20\text{ V}$			100	nA
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}, T_J = 85\text{ }^\circ\text{C}$			10	
On-state drain current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	20			A
Drain-source on-state resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 4.3\text{ A}$		25	36	m $\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 3.9\text{ A}$		32	47	
Forward transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 4.3\text{ A}$		15		S
<b>Dynamic <sup>b</sup></b>						
Input capacitance	$C_{iss}$	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		665		pF
Output capacitance	$C_{oss}$			75		
Reverse transfer capacitance	$C_{rss}$			40		
Total gate charge	$Q_g$	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 4.3\text{ A}$		13	20	nC
		$V_{DS} = 30\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 4.3\text{ A}$		6	9	
Gate-source charge	$Q_{gs}$	$V_{DS} = 30\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 4.3\text{ A}$		2.3		
Gate-drain charge	$Q_{gd}$			2.6		
Gate resistance	$R_g$	$f = 1\text{ MHz}$		2		$\Omega$
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 8.8\text{ }\Omega,$ $I_D \cong 3.4\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 1\text{ }\Omega$		15	25	ns
Rise time	$t_r$			65	100	
Turn-off delay time	$t_{d(off)}$			15	25	
Fall time	$t_f$			10	15	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 8.8\text{ }\Omega,$ $I_D \cong 3.4\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		10	15	
Rise time	$t_r$			15	25	
Turn-off delay time	$t_{d(off)}$			20	30	
Fall time	$t_f$			10	15	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous source-drain diode current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			2.6	A
Pulse diode forward current	$I_{SM}$				20	
Body diode voltage	$V_{SD}$	$I_S = 1.7\text{ A}, V_{GS} = 0\text{ V}$		0.8	1.2	V
Body diode reverse recovery time	$t_{rr}$	$I_F = 1.7\text{ A}, di/dt = 100\text{ A}/\mu\text{s},$ $T_J = 25\text{ }^\circ\text{C}$		30	60	ns
Body diode reverse recovery charge	$Q_{rr}$			32	50	nC
Reverse recovery fall time	$t_a$			25		ns
Reverse recovery rise time	$t_b$			5		

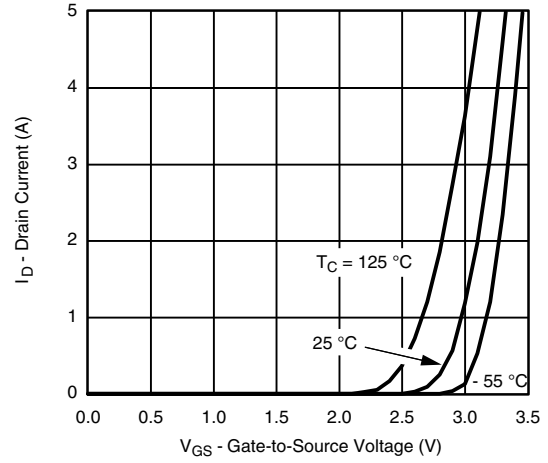
**Notes**

- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$
- b. Guaranteed by design, not subject to production testing

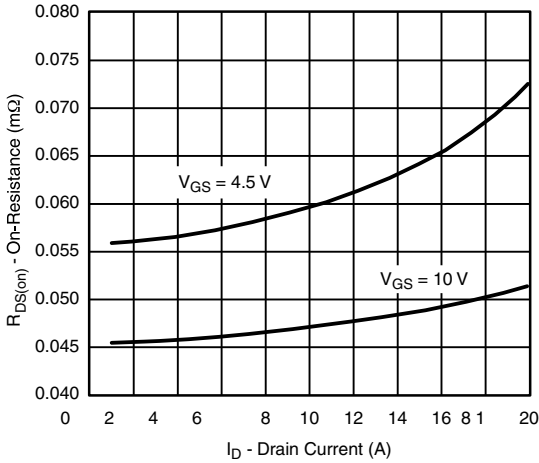
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



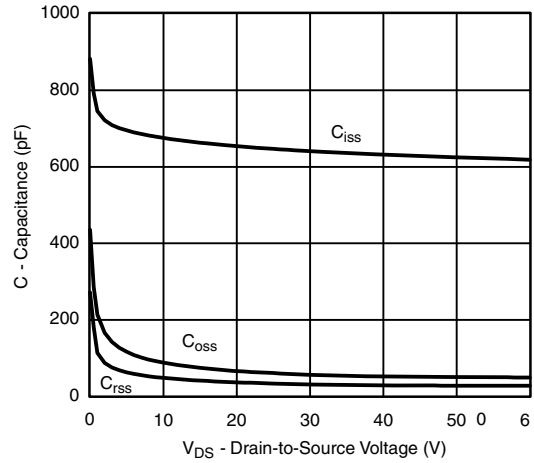
**Output Characteristics**



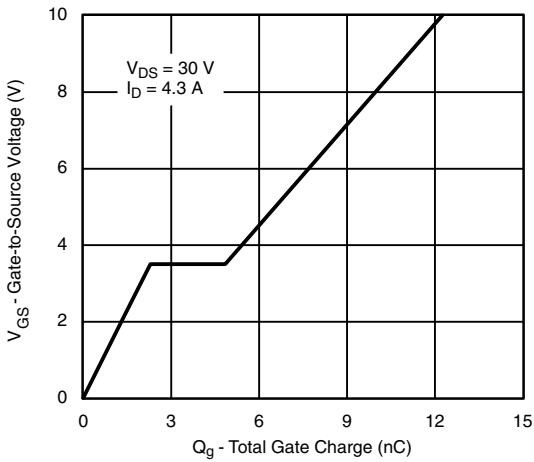
**Transfer Characteristics**



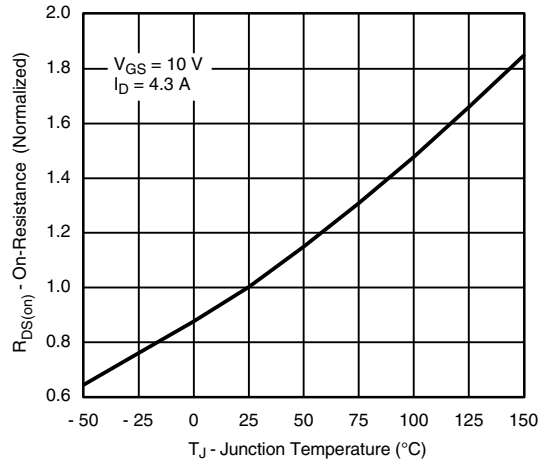
**On-Resistance vs. Drain Current and Gate Voltage**



**Capacitance**

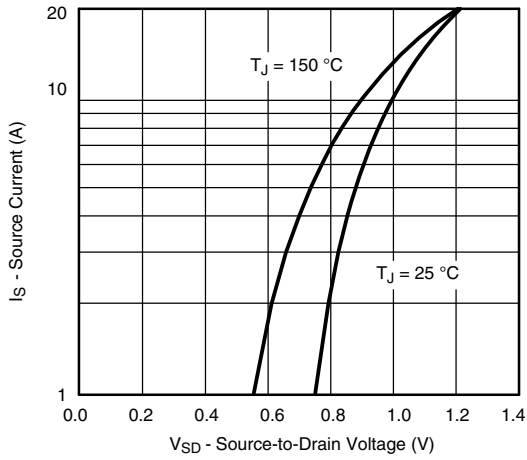


**Gate Charge**

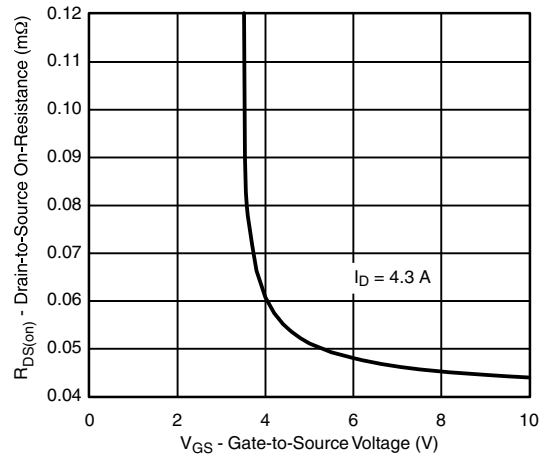


**On-Resistance vs. Junction Temperature**

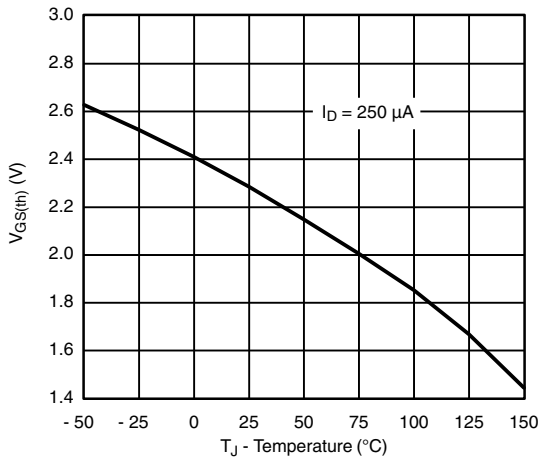
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



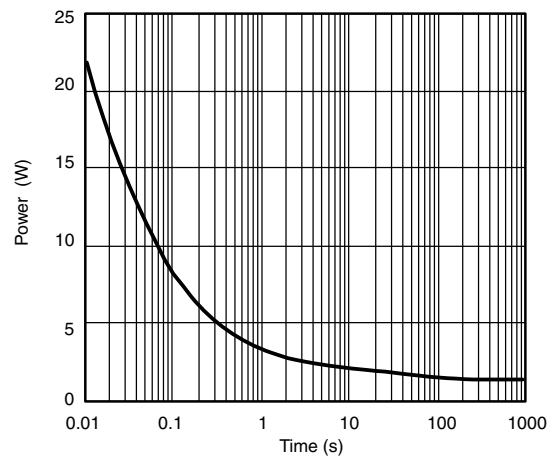
**Source-Drain Diode Forward Voltage**



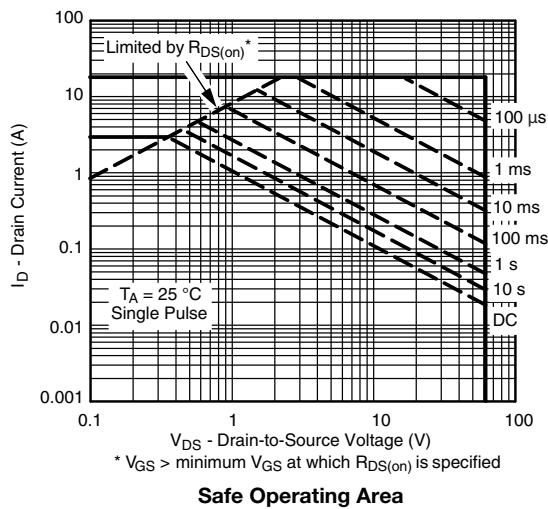
**On-Resistance vs. Gate-to-Source Voltage**



**Threshold Voltage**

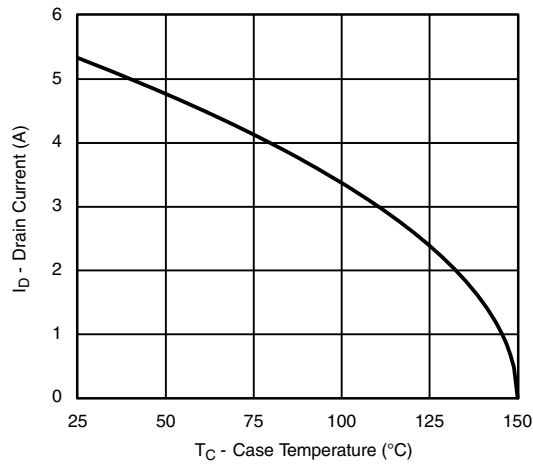


**Single Pulse Power, Junction-to-Ambient**

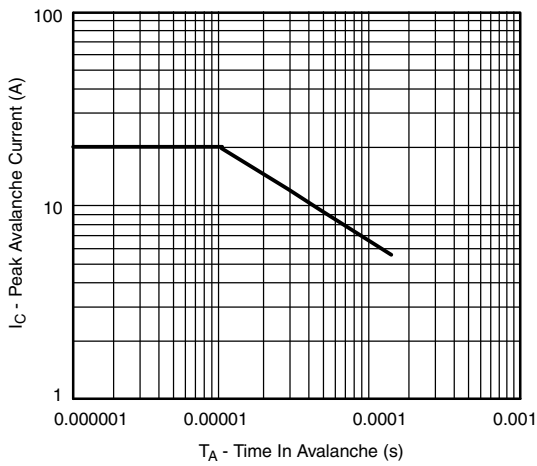


**Safe Operating Area**

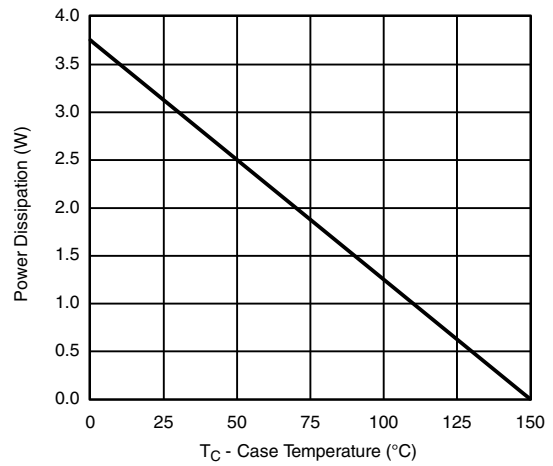
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



**Current Derating<sup>a</sup>**



**Single Pulse Avalanche Capability**

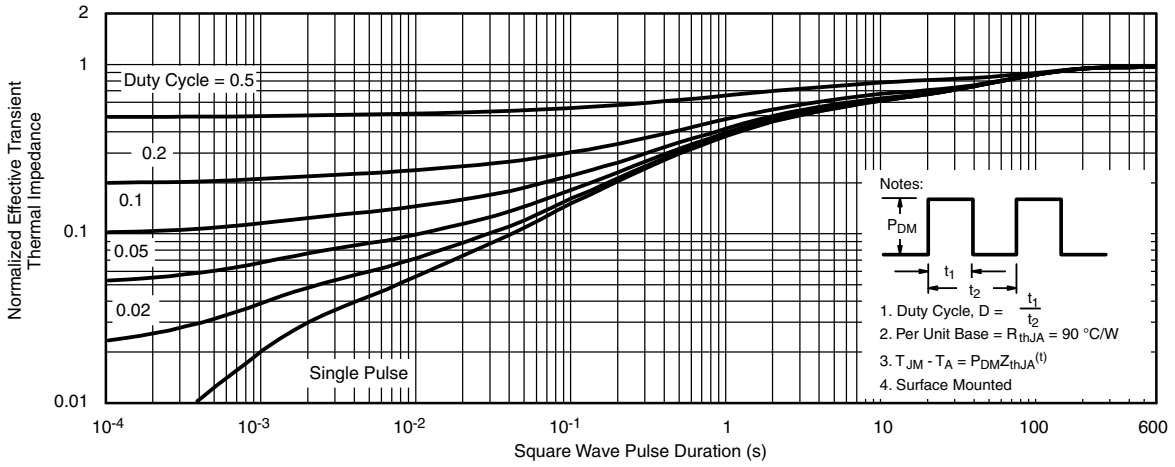


**Power Derating**

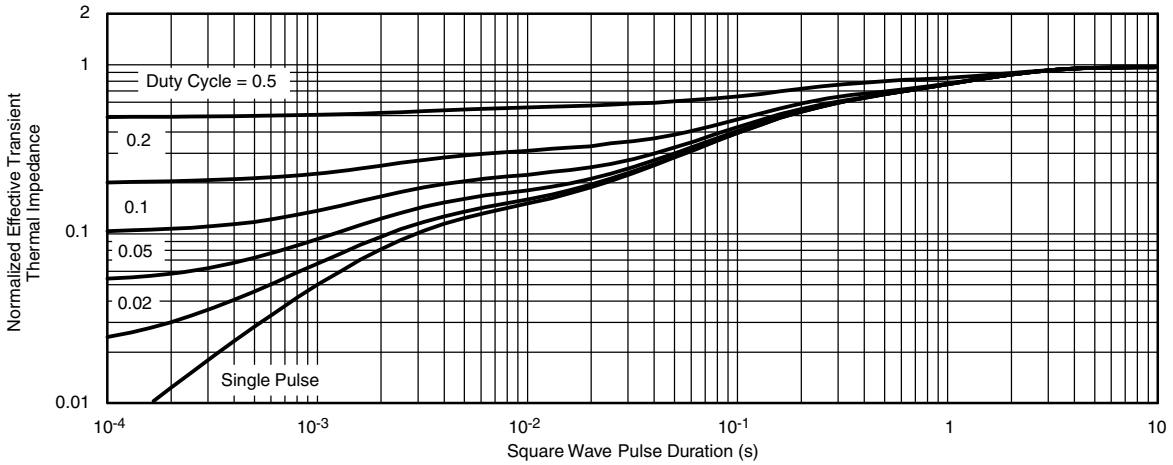
**Note**

- a. The power dissipation  $P_D$  is based on  $T_J \text{ max.} = 150 \text{ °C}$ , 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)

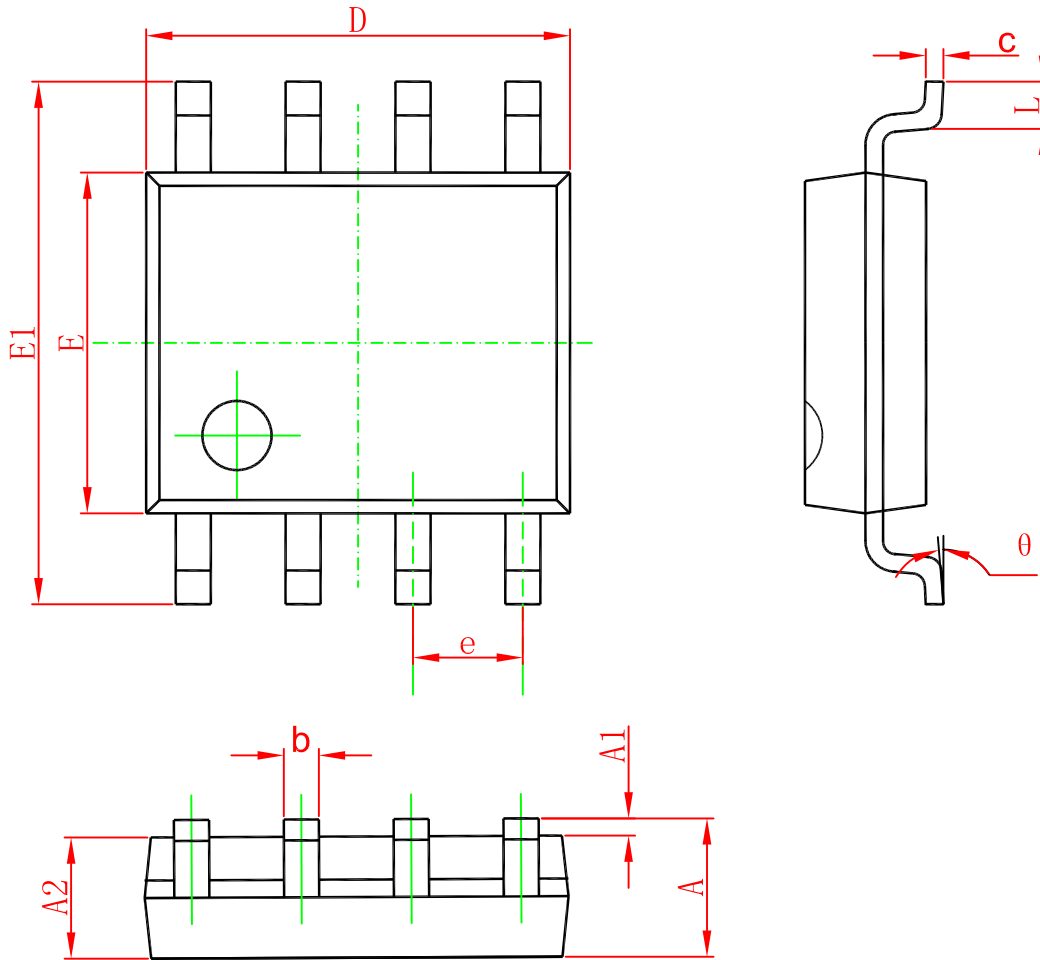


**Normalized Thermal Transient Impedance, Junction-to-Ambient**



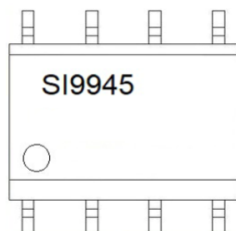
**Normalized Thermal Transient Impedance, Junction-to-Case**

**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



Order code	Package	Baseqty	Deliverymode
SI9945BDY	SOP-8	3000	Tape and reel