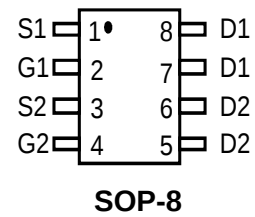
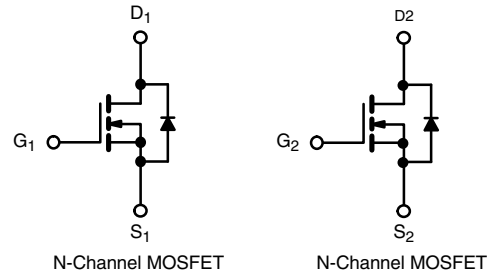


FEATURES

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

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}	± 20	
Continuous drain current ($T_J = 150\text{ }^{\circ}\text{C}$)	$T_C = 25\text{ }^{\circ}\text{C}$	I_D	5.3	A
	$T_C = 70\text{ }^{\circ}\text{C}$		4.3	
	$T_A = 25\text{ }^{\circ}\text{C}$		4.3 ^{b, c}	
	$T_A = 70\text{ }^{\circ}\text{C}$		3.4 ^{b, c}	
Pulsed drain current (10 μs width)		I_{DM}	20	
Continuous source-drain diode current	$T_C = 25\text{ }^{\circ}\text{C}$	I_S	2.6	
	$T_A = 25\text{ }^{\circ}\text{C}$		1.7 ^{b, c}	
Avalanche current	$L = 0.1\text{ mH}$	I_{AS}	11	mJ
Single-pulse avalanche energy		E_{AS}	6.1	
Maximum power dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	P_D	3.1	W
	$T_C = 70\text{ }^{\circ}\text{C}$		2	
	$T_A = 25\text{ }^{\circ}\text{C}$		2 ^{b, c}	
	$T_A = 70\text{ }^{\circ}\text{C}$		1.3 ^{b, 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 ^{a, d}		R_{thJA}	55	62.5	$^{\circ}\text{C/W}$
Maximum junction-to-foot (drain)	Steady state	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 $^{\circ}\text{C/W}$

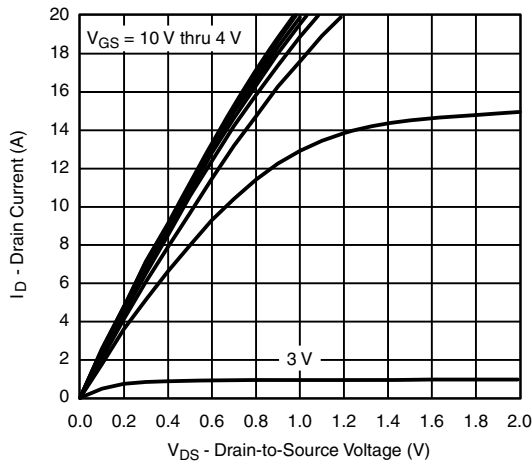
SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
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	μA
		$V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 85\text{ }^{\circ}\text{C}$			10	
On-state drain current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}$, $V_{GS} = 10\text{ V}$	20			A
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 4.3\text{ A}$		25	36	m Ω
		$V_{GS} = 4.5\text{ V}$, $I_D = 3.9\text{ A}$		32	47	
Forward transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 4.3\text{ A}$		15		S
Dynamic ^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}			2.3		
Gate-drain charge	Q_{gd}			2.6		
Gate resistance	R_g	$f = 1\text{ MHz}$		2		Ω
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	
Drain-Source Body Diode Characteristics						
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		

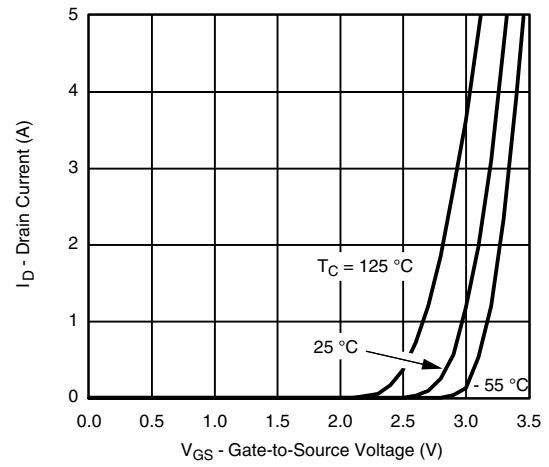
Notes

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

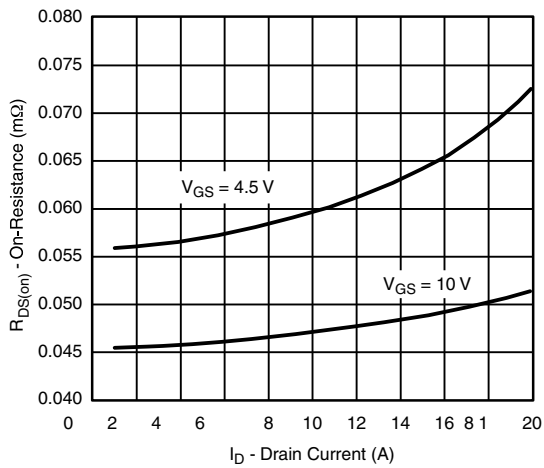
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



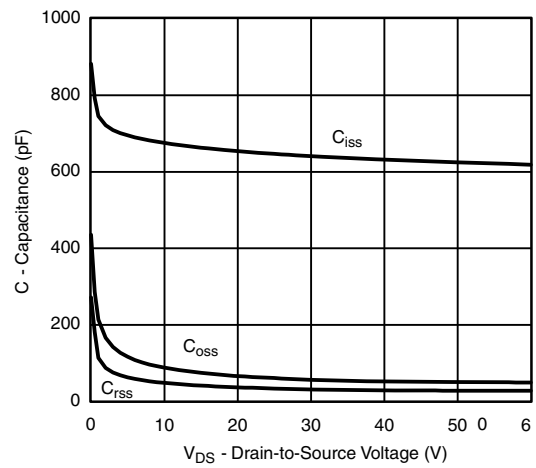
Output Characteristics



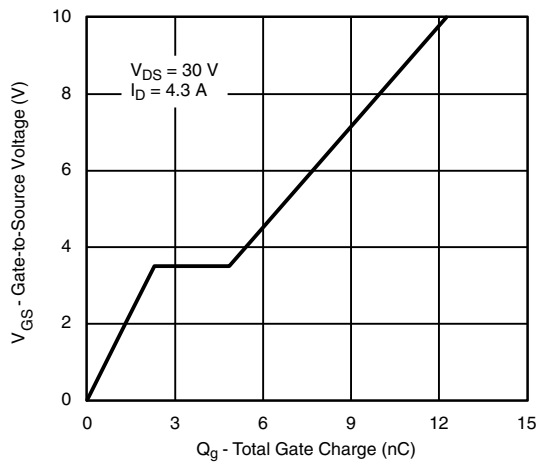
Transfer Characteristics



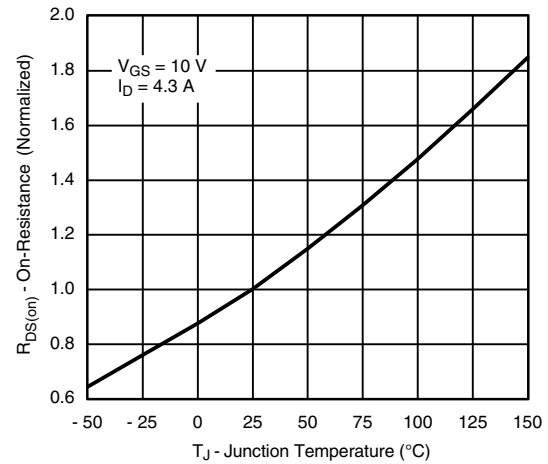
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

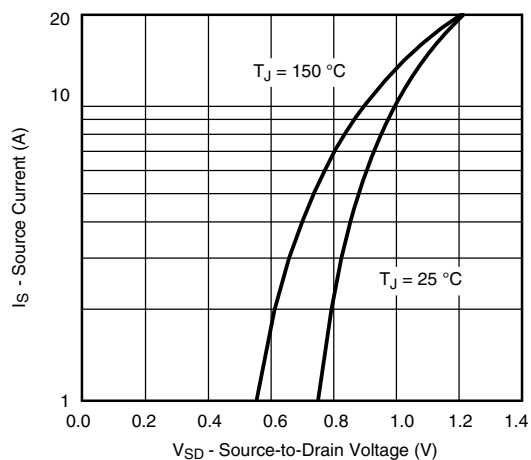


Gate Charge

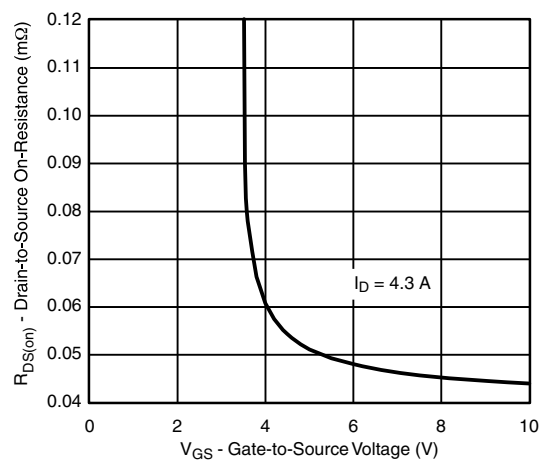


On-Resistance vs. Junction Temperature

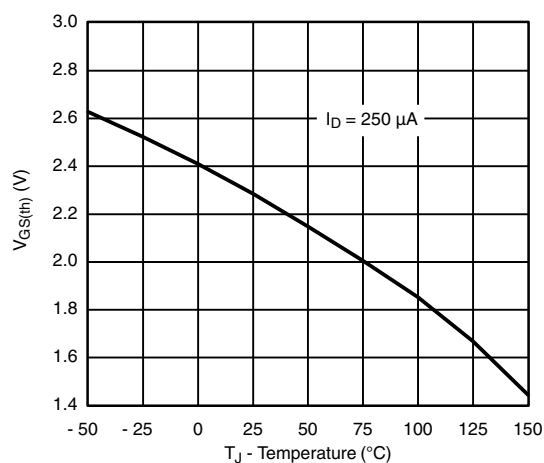
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



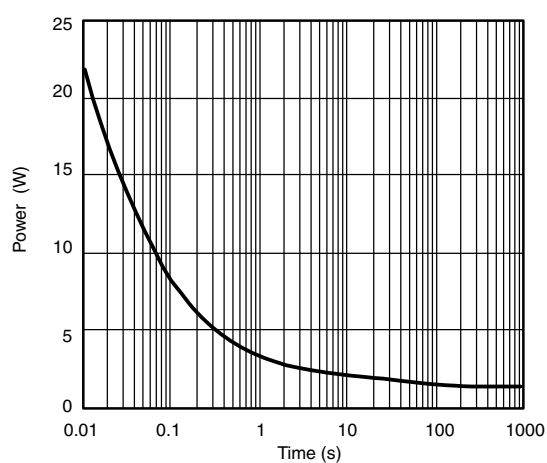
Source-Drain Diode Forward Voltage



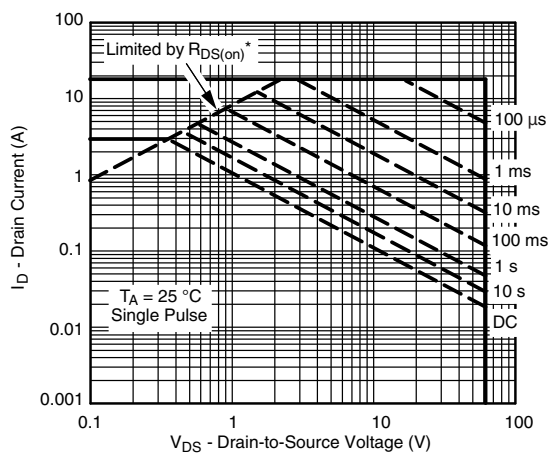
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



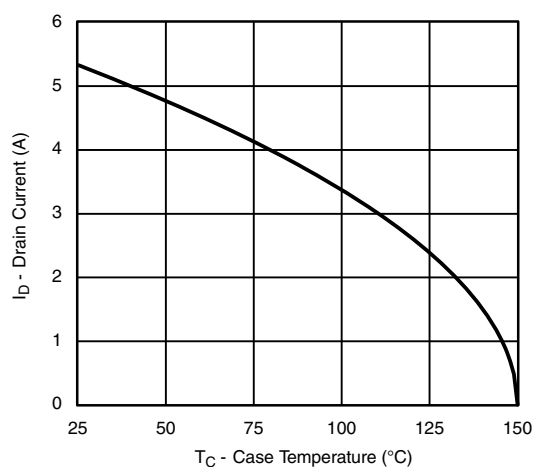
Single Pulse Power, Junction-to-Ambient



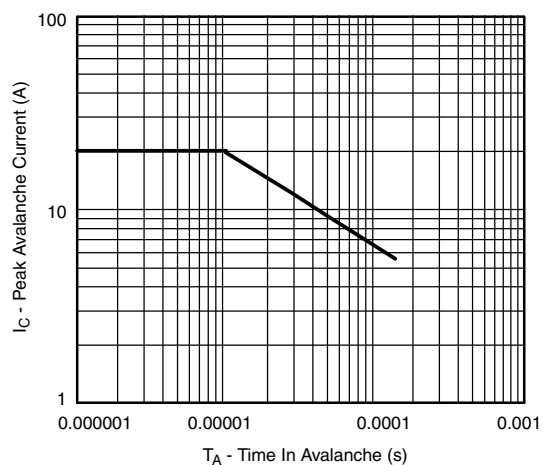
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area

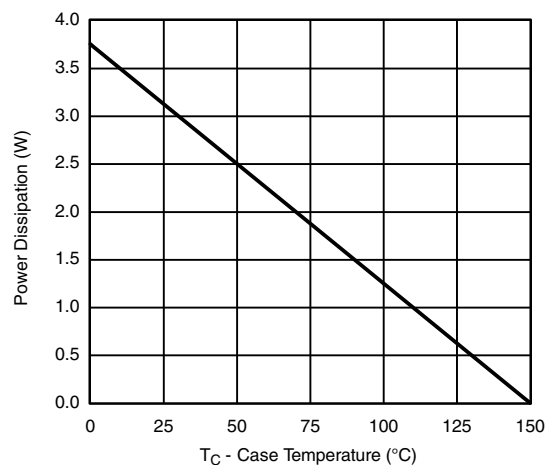
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating ^a



Single Pulse Avalanche Capability

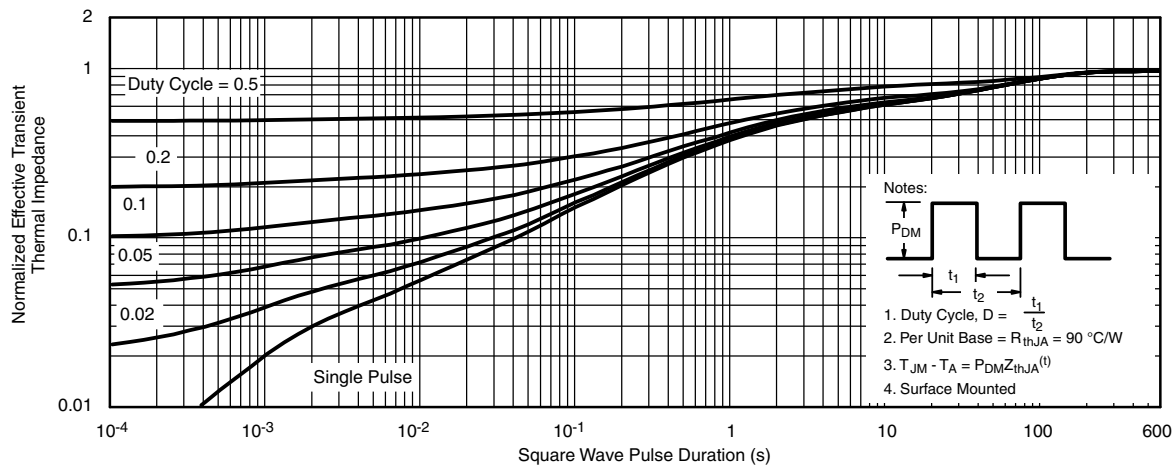


Power Derating

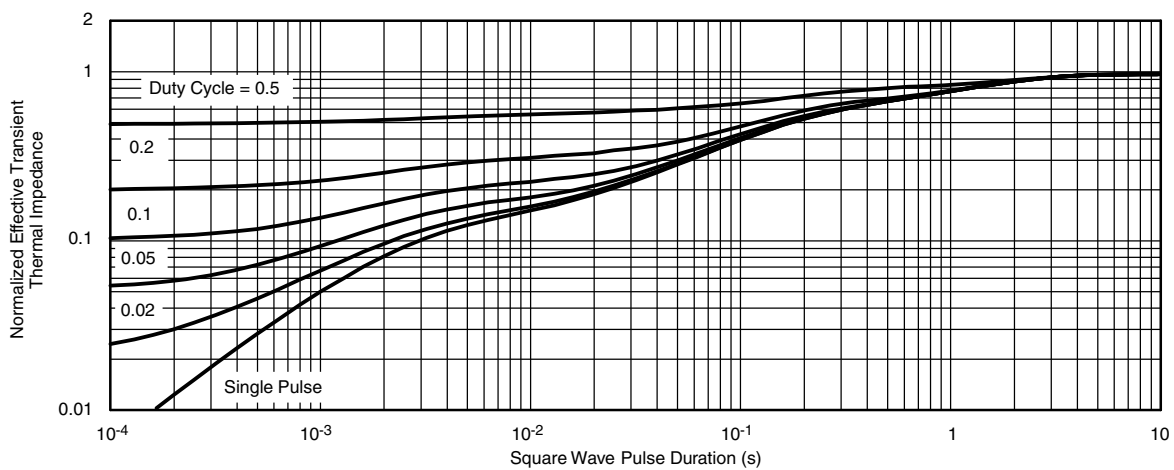
Note

- 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)

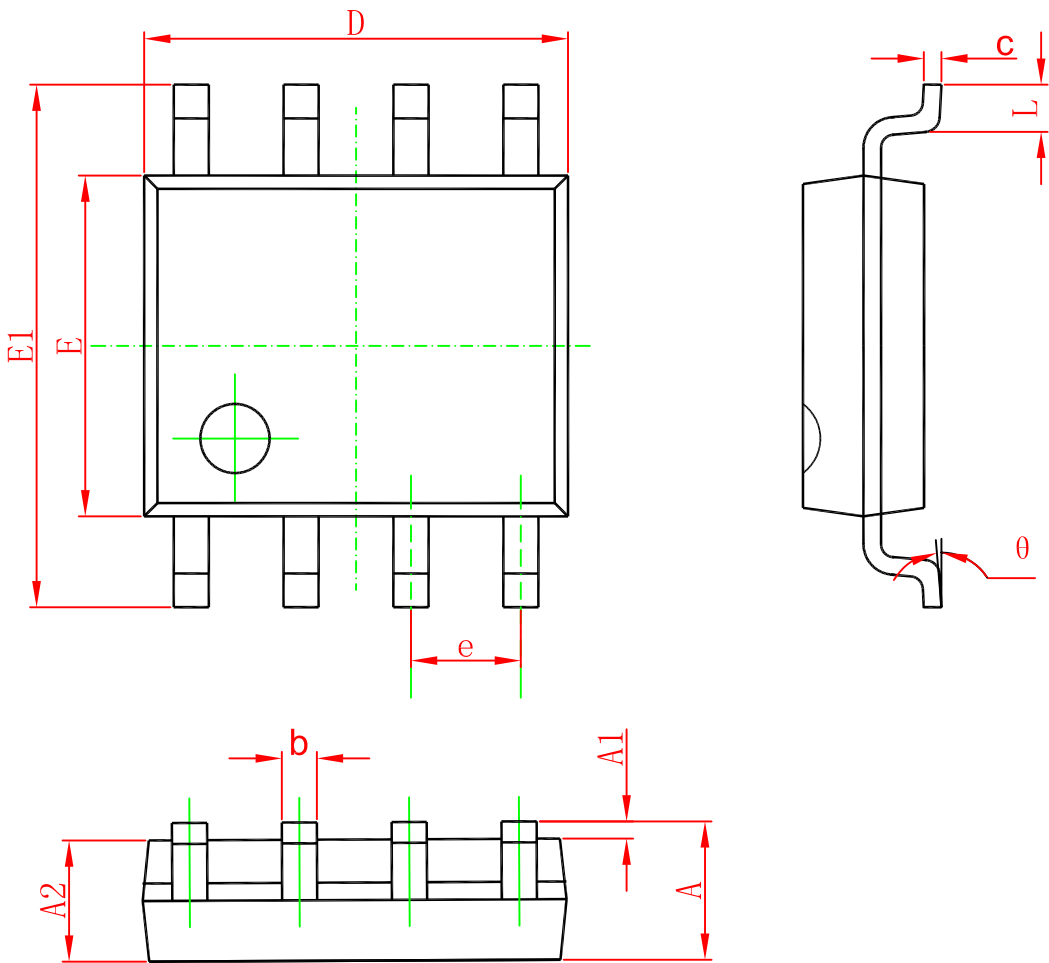


Normalized Thermal Transient Impedance, Junction-to-Ambient



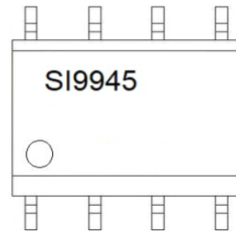
Normalized Thermal Transient Impedance, Junction-to-Case

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