



YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _A = +25°C
60V	19.5mΩ @ V _{GS} = 10V	7.6A
	28mΩ @ V _{GS} = 4.5V	6.2A

Description and Applications

This MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) and maintain superior switching performance, making it ideal for high efficiency power management applications.

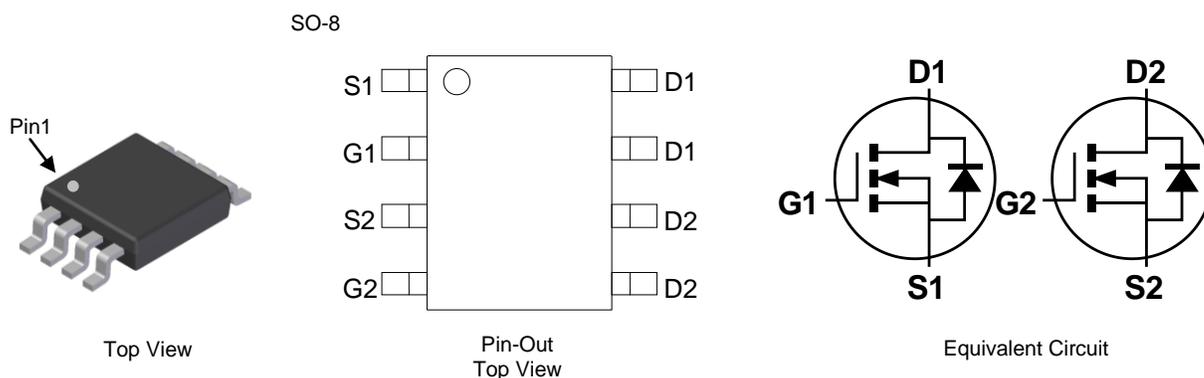
- Load Switch
- Adaptor Switch
- Notebook PC

Features and Benefits

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – ensures more reliable and robust end application
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed

Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ^{Ⓔ3}
- Weight: 0.076 grams (Approximate)



Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	I_D	$T_A = +25^\circ\text{C}$	7.6
		$T_A = +100^\circ\text{C}$	5.4
Continuous Drain Current (Note 6) $V_{GS} = 4.5\text{V}$	I_D	$T_A = +25^\circ\text{C}$	6.2
		$T_A = +100^\circ\text{C}$	4.4
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)	I_{DM}	40	A
Maximum Continuous Body Diode Forward Current	I_S	1.7	A
Pulsed Body Diode Forward Current (10 μs pulse, duty cycle = 1%)	I_{SM}	40	A
Avalanche Current, $L = 0.1\text{mH}$	I_{AS}	15.3	A
Avalanche Energy, $L = 0.1\text{mH}$	E_{AS}	11.7	mJ

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	1.4	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	103	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	P_D	1.9	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	77	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	14.5	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +175	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 48\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	2.5	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	15	19.5	m Ω	$V_{GS} = 10\text{V}, I_D = 10\text{A}$
		—	21	28		$V_{GS} = 4.5\text{V}, I_D = 6\text{A}$
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	864	—	pF	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	282	—		
Reverse Transfer Capacitance	C_{rss}	—	27	—		
Gate Resistance	R_g	—	1.3	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	8.4	—	nC	$V_{DS} = 30\text{V}, I_D = 10\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	—	17	—		
Gate-Source Charge	Q_{gs}	—	3.1	—		
Gate-Drain Charge	Q_{gd}	—	4.3	—		
Turn-On Delay Time	$t_{D(ON)}$	—	3.4	—	ns	$V_{GS} = 10\text{V}, V_{DS} = 30\text{V}, R_G = 6\Omega, I_D = 10\text{A}$
Turn-On Rise Time	t_R	—	5.2	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	13	—		
Turn-Off Fall Time	t_F	—	7	—		
Reverse Recovery Time	t_{RR}	—	22	—	ns	$I_F = 10\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{RR}	—	11	—	nC	

- Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1 inch square copper plate.
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to product testing.

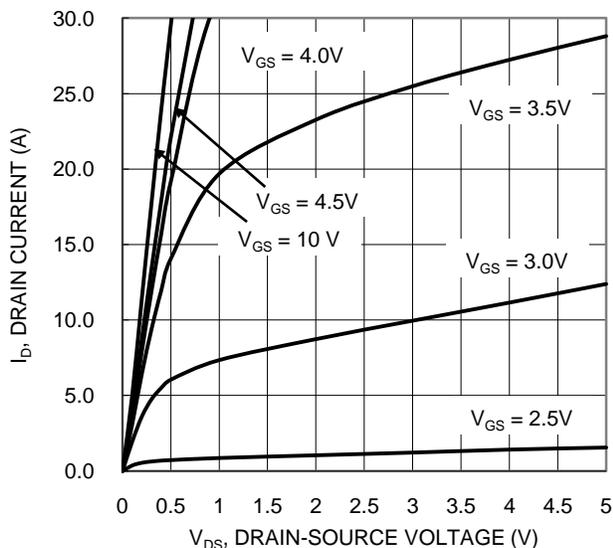


Figure 1. Typical Output Characteristic

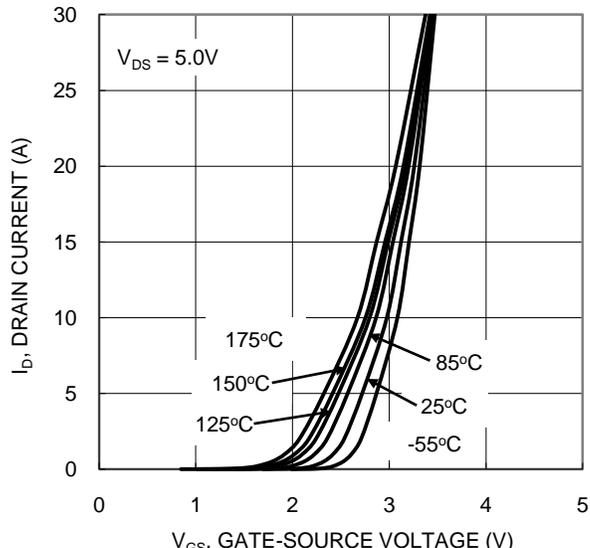


Figure 2. Typical Transfer Characteristic

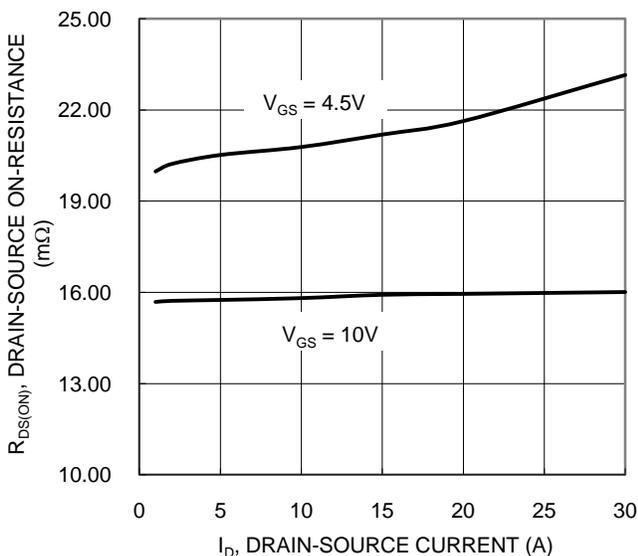


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

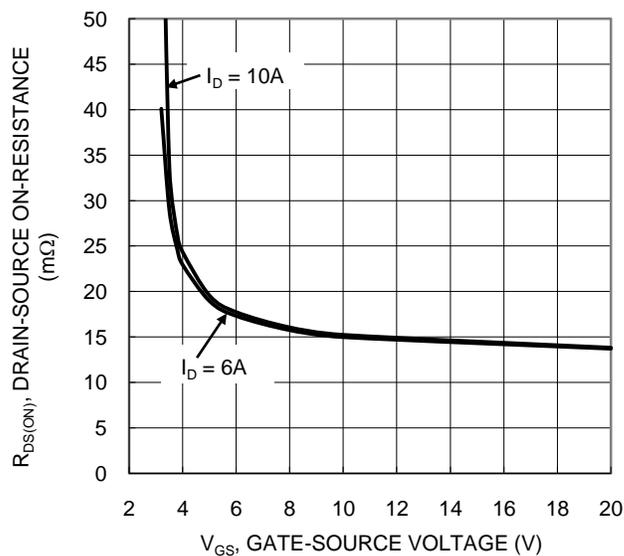


Figure 4. Typical Transfer Characteristic

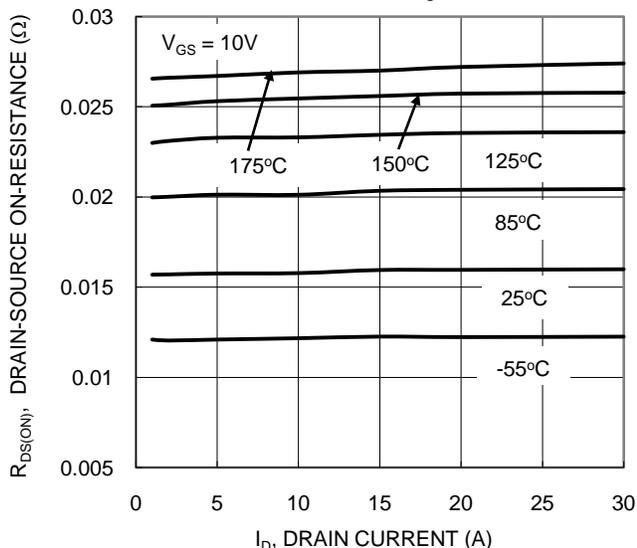


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

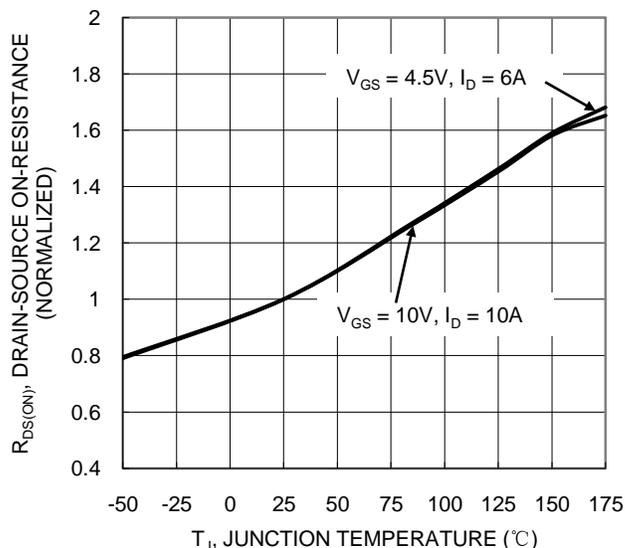


Figure 6. On-Resistance Variation with Temperature

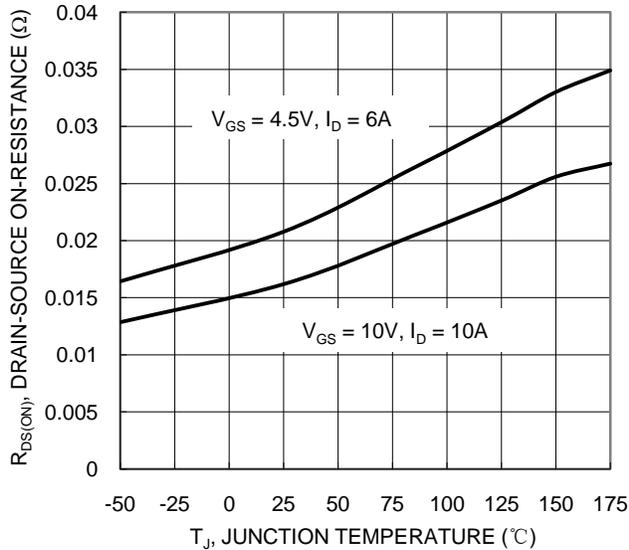


Figure 7. On-Resistance Variation with Temperature

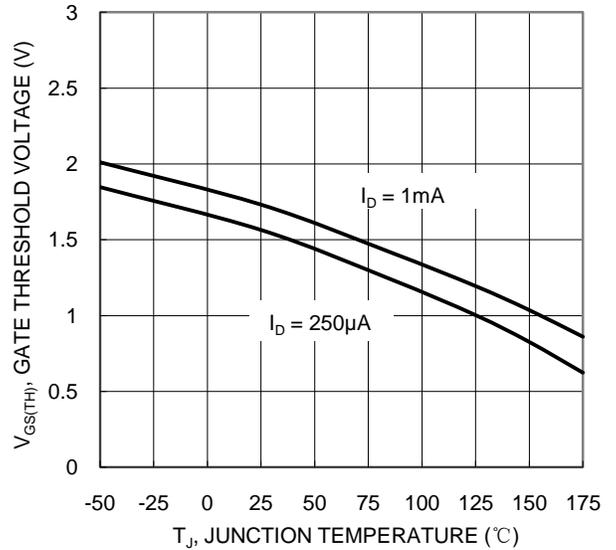


Figure 8. Gate Threshold Variation vs. Junction Temperature

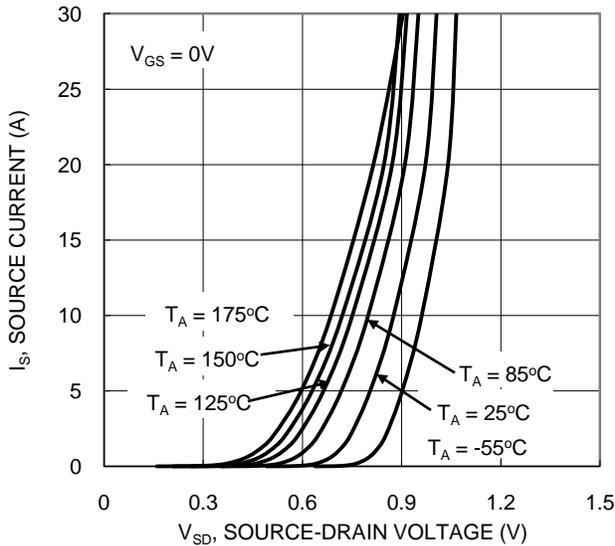


Figure 9. Diode Forward Voltage vs. Current

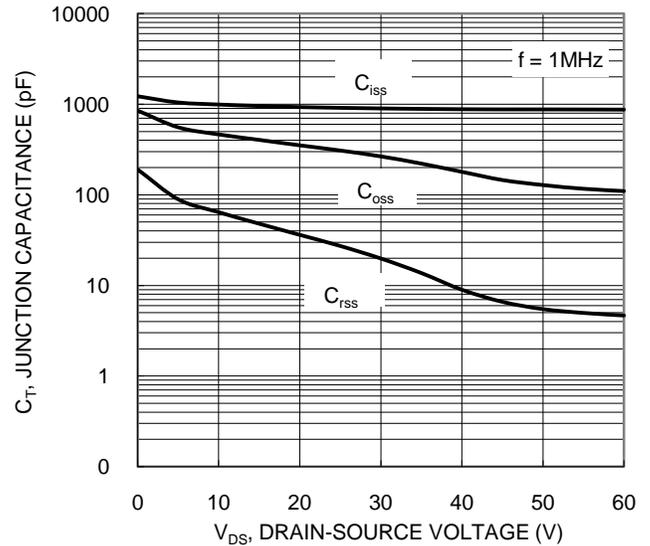


Figure 10. Typical Junction Capacitance

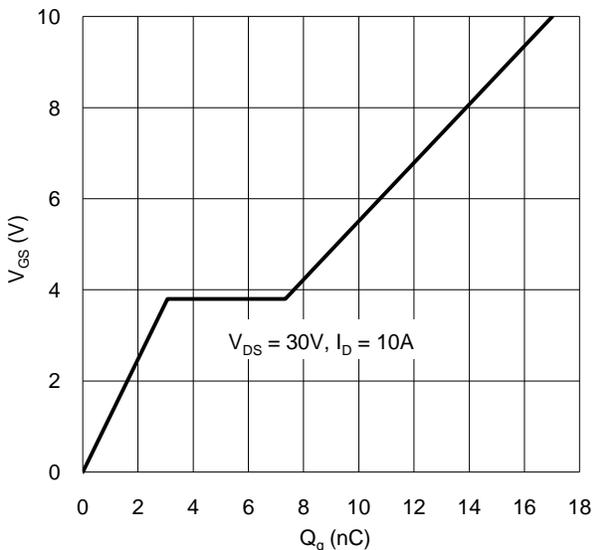


Figure 11. Gate Charge

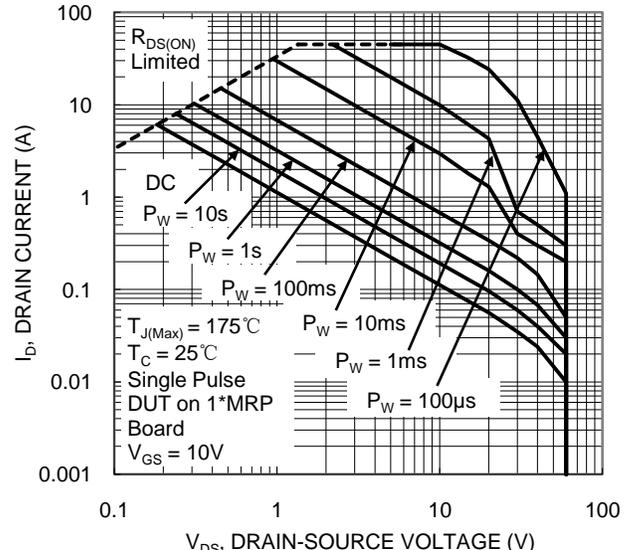


Figure 12. SOA, Safe Operation Area

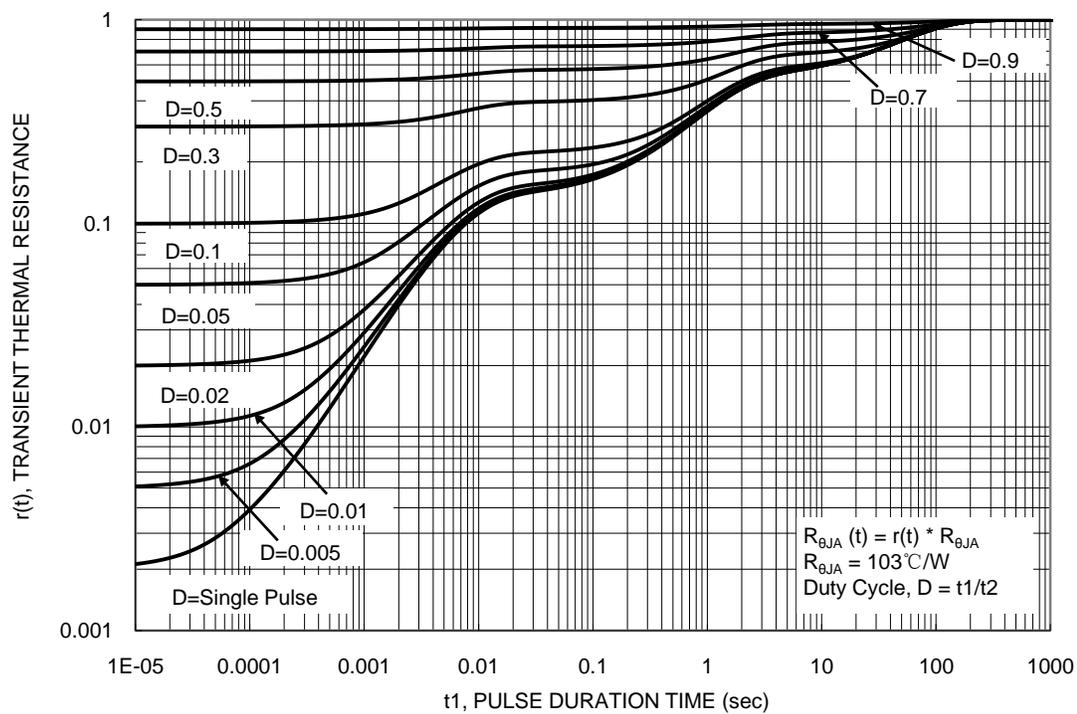
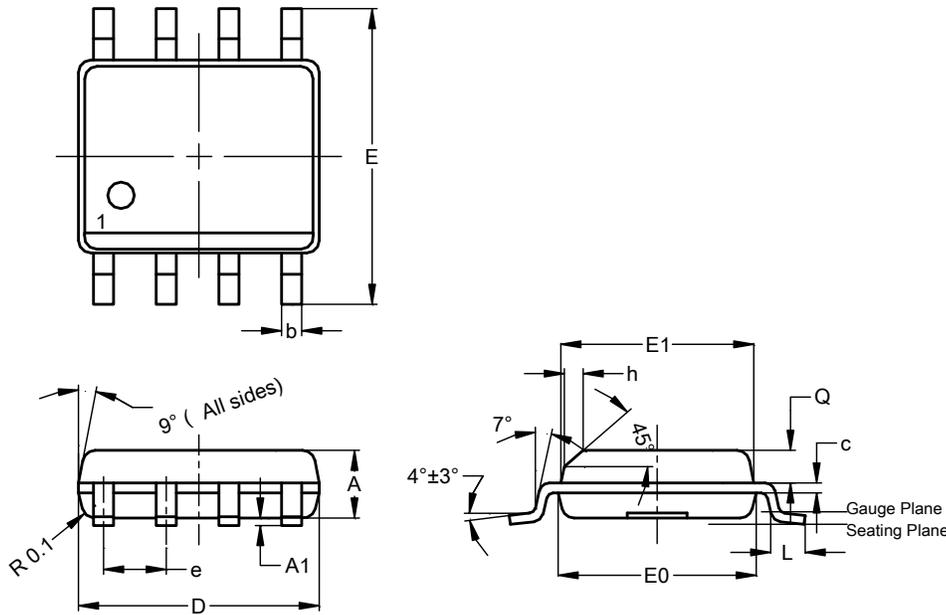


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

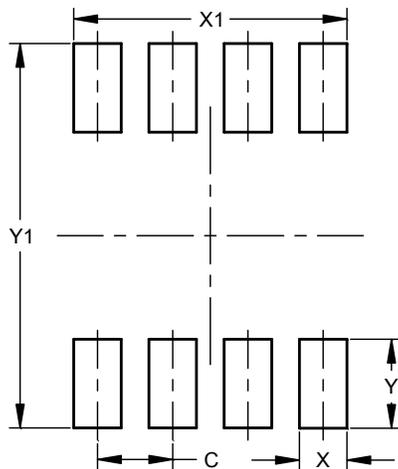
SO-8



SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

Suggested Pad Layout

SO-8



Dimensions	Value (in mm)
C	1.27
X	0.802
X1	4.612
Y	1.505
Y1	6.50