



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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企业微信二维码



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Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D $T_A = +25^\circ C$
60V	66m Ω @ $V_{GS} = 10V$	4.4A
	97m Ω @ $V_{GS} = 4.5V$	3.6A

Features and Benefits

- Low On-Resistance
- Fast Switching Speed
- 100% Unclamped Inductive Switch (UIS) Test in Production

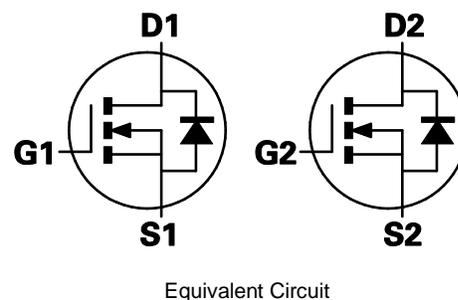
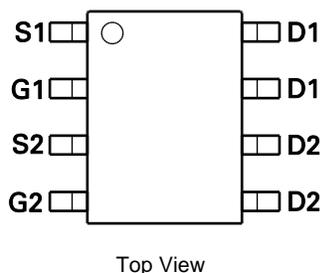
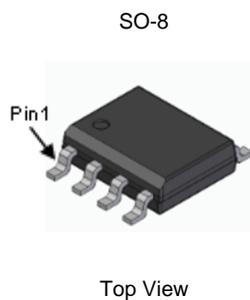
Description and Applications

This MOSFET is designed to minimize the on-state resistance yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

- Motor controls
- Backlighting
- DC-DC converters
- Power-management functions

Mechanical Data

- Package: SO-8
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.074 grams (Approximate)



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

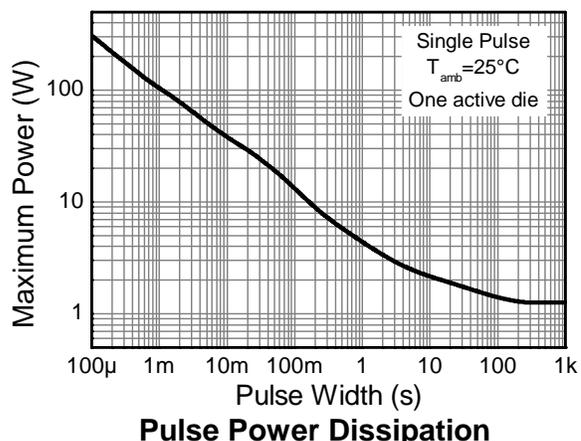
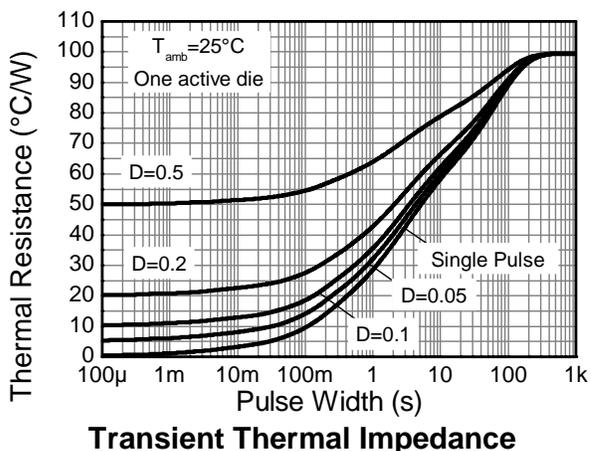
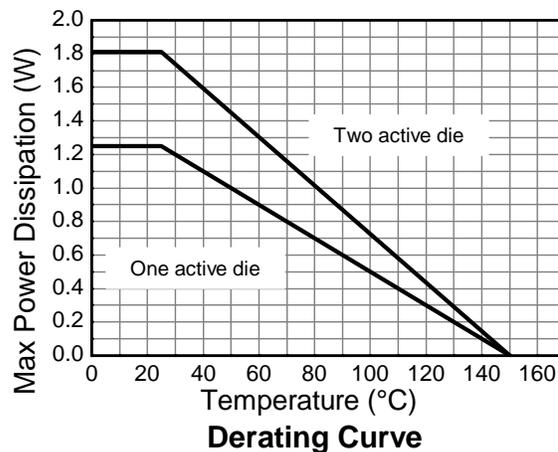
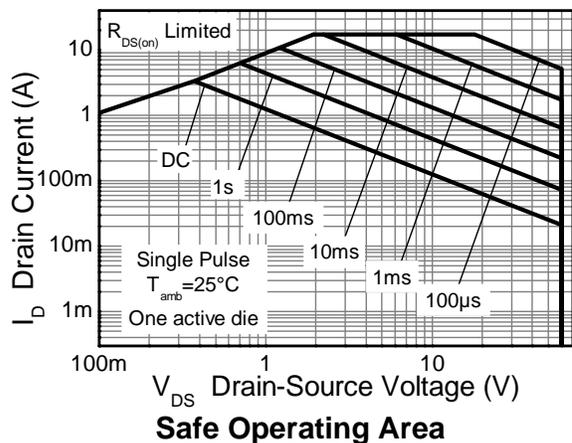
Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage	(Note 5)	V_{GS}	± 20	V
Single Pulsed Avalanche Energy		E_{AS}	37.5	mJ
Single Pulsed Avalanche Current		I_{AS}	5.0	A
Continuous Drain Current	$V_{GS} = 10\text{V}$	(Note 8)	4.4	A
		$T_A = +70^\circ\text{C}$ (Note 8)	3.5	
		(Note 6)	3.3	
Pulsed Drain Current	$V_{GS} = 10\text{V}$	I_{DM}	17.0	A
Continuous Source Current (Body Diode)		I_S	3.2	A
Pulsed Source Current (Body Diode)		I_{SM}	17.0	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 6 & 9)	P_D	1.25	W mW/ $^\circ\text{C}$
			10	
	(Notes 6 & 10)		1.8	
			14.3	
Thermal Resistance, Junction to Ambient	(Notes 7 & 9)	$R_{\theta JA}$	2.14	$^\circ\text{C/W}$
			17.2	
	(Notes 6 & 9)		100	
	(Notes 6 & 10)		70	
Thermal Resistance, Junction to Lead	(Notes 7 & 9)	$R_{\theta JL}$	58	$^\circ\text{C/W}$
	(Notes 9 & 11)		55	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

- Notes:
5. AEC-Q101 V_{GS} maximum is $\pm 16\text{V}$.
 6. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 7. Same as Note 6, except the device is measured at $t \leq 10$ sec.
 8. Same as Note 6, except the device is pulsed with $D = 0.02$ and pulse width 300 μs . The pulse current is limited by the maximum junction temperature.
 9. For a dual device with one active die.
 10. For a device with two active dies running at equal power.
 11. Thermal resistance from junction to solder-point (at the end of the drain lead).
 12. UIS in production with $L = 3.0\text{mH}$, $I_{AS} = 5.0\text{A}$, $R_G = 25\Omega$, $V_{DD} = 50\text{V}$, starting $T_J = +25^\circ\text{C}$.

Thermal Characteristics

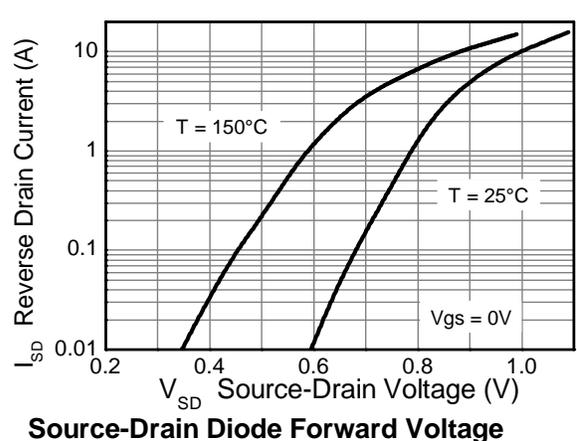
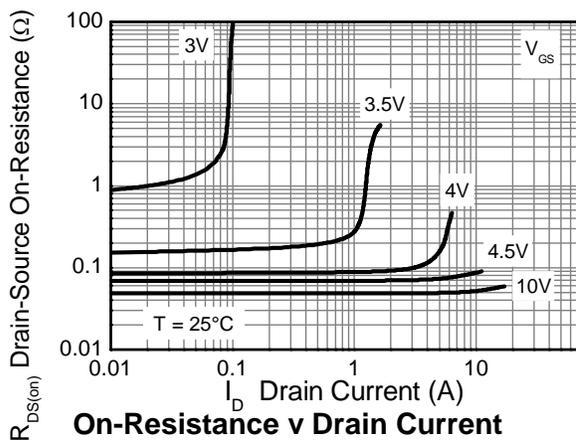
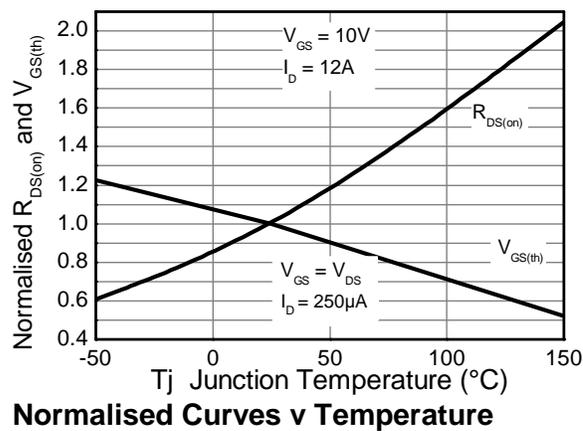
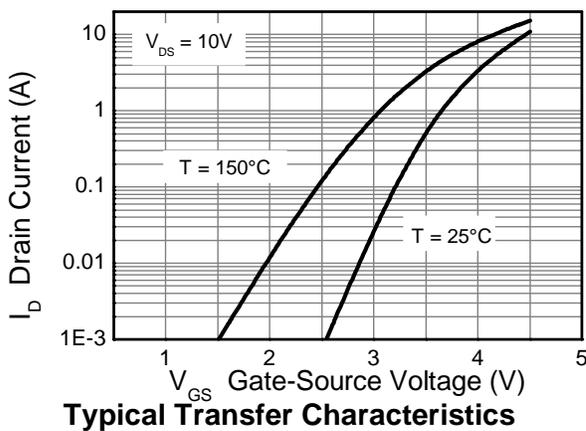
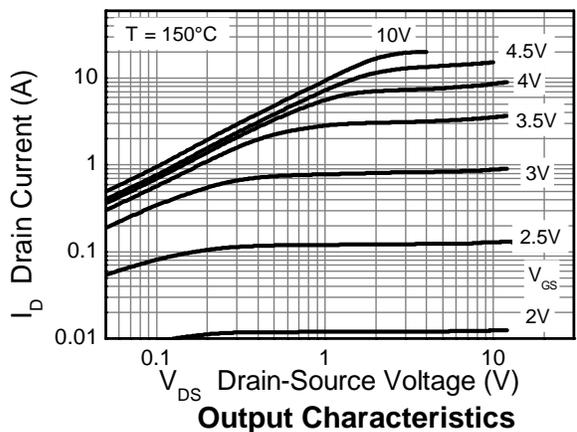
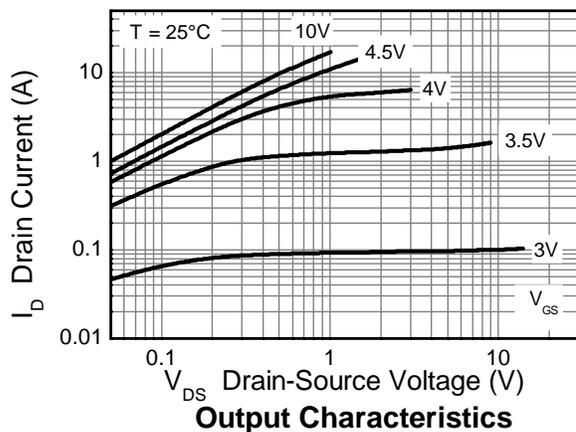


Electrical Characteristics (@T_A = 25°C, unless otherwise specified.)

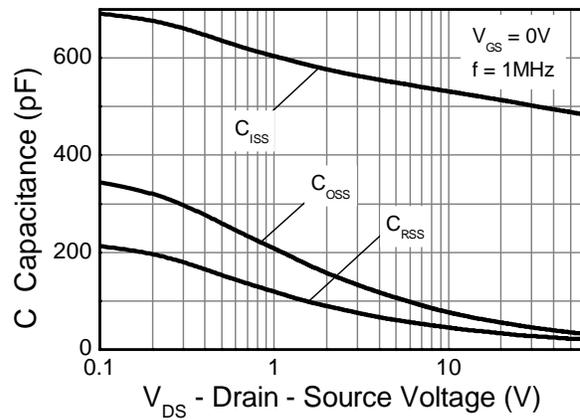
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	I _D = 250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	0.5	μA	V _{DS} = 60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	1.0	—	3.0	V	I _D = 250μA, V _{DS} = V _{GS}
Static Drain-Source On-Resistance (Note 13)	R _{DS(on)}	—	48	66	mΩ	V _{GS} = 10V, I _D = 4.5A
			68	97		V _{GS} = 4.5V, I _D = 3.5A
Forward Transconductance (Notes 13 & 14)	g _{fs}	—	19.2	—	S	V _{DS} = 15V, I _D = 6A
Diode Forward Voltage (Note 13)	V _{SD}	—	0.89	1.15	V	I _S = 4.5A, V _{GS} = 0V
Reverse-Recovery Time (Note 14)	t _{rr}	—	22.2	—	ns	I _S = 1.9A, di/dt = 100A/μs
Reverse-Recovery Charge (Note 14)	Q _{rr}	—	16.9	—	nC	
DYNAMIC CHARACTERISTICS (Note 14)						
Input Capacitance	C _{iss}	—	502	—	pF	V _{DS} = 30V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	45.7	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	27.1	—	pF	
Total Gate Charge (Note 15)	Q _g	—	5.4	—	nC	V _{GS} = 4.5V
Total Gate Charge (Note 15)	Q _g	—	10.3	—	nC	V _{GS} = 10V
Gate-Source Charge (Note 15)	Q _{gs}	—	1.7	—	nC	
Gate-Drain Charge (Note 15)	Q _{gd}	—	3.2	—	nC	
Turn-On Delay Time (Note 15)	t _{D(on)}	—	2.7	—	ns	V _{DD} = 30V, V _{GS} = 10V I _D = 1A, R _G ≅ 6.0Ω
Turn-On Rise Time (Note 15)	t _r	—	2.4	—	ns	
Turn-Off Delay Time (Note 15)	t _{D(off)}	—	14.7	—	ns	
Turn-Off Fall Time (Note 15)	t _f	—	5.4	—	ns	

- Notes:
13. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
 14. For design aid only, not subject to production testing.
 15. Switching characteristics are independent of operating junction temperatures.

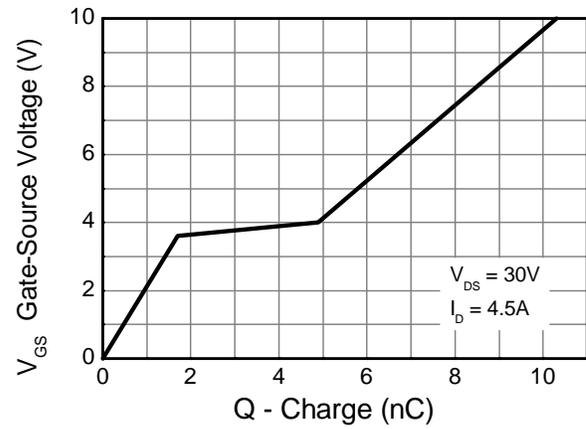
Typical Characteristics



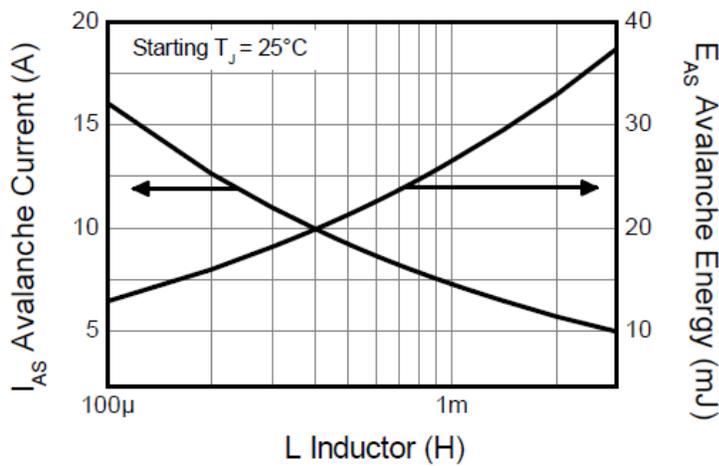
Typical Characteristics (continued)



Capacitance v Drain-Source Voltage

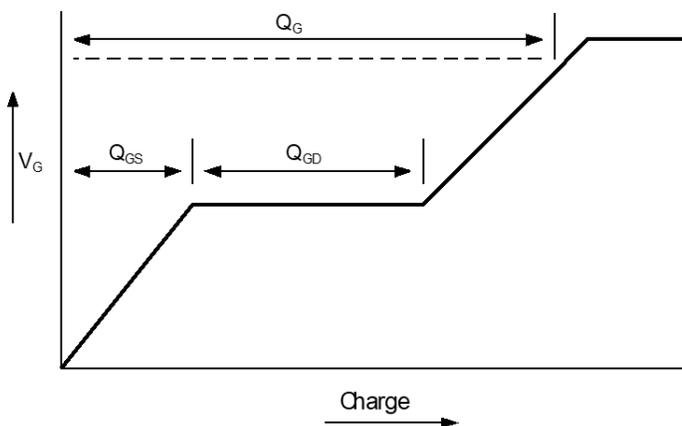


Gate-Source Voltage v Gate Charge

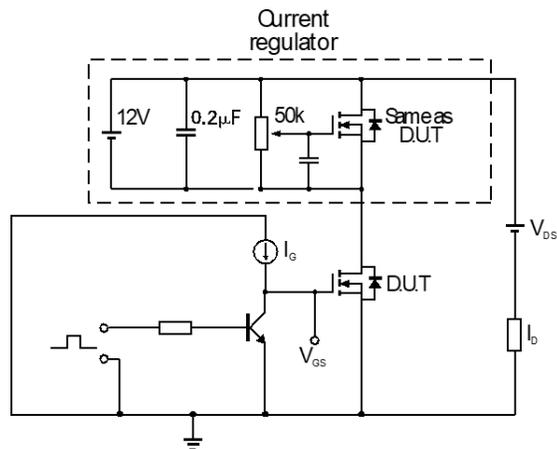


Single-Pulsed Avalanche Rating

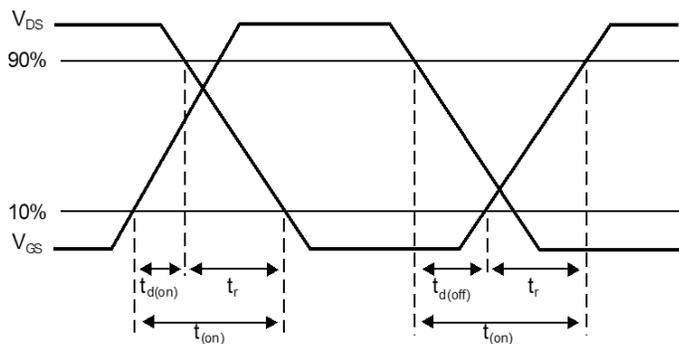
Test Circuits



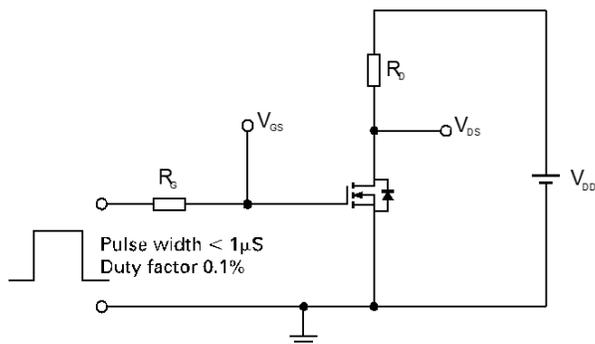
Basic gate charge waveform



Gate charge test circuit



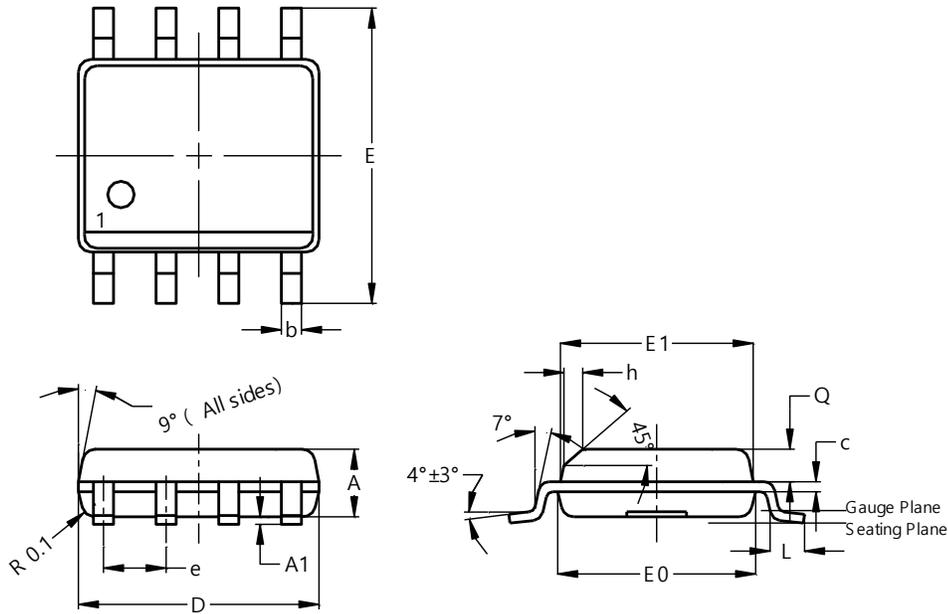
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

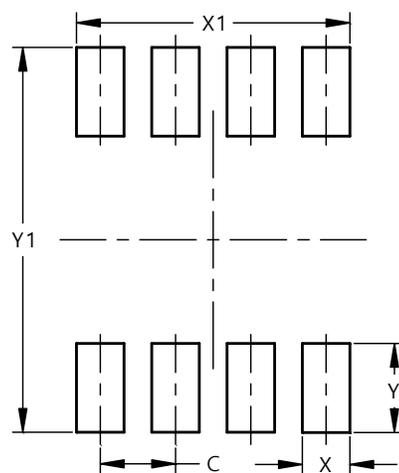
SO-8



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