



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)} Max	I _D Max T _A = +25°C
-20V	38mΩ @ V _{GS} = -4.5V	-5.4A
	56mΩ @ V _{GS} = -2.5V	-4.4A

Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage

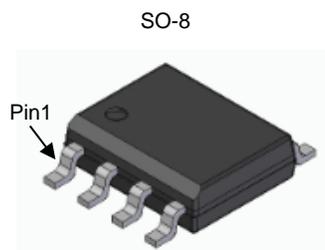
Description and Applications

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

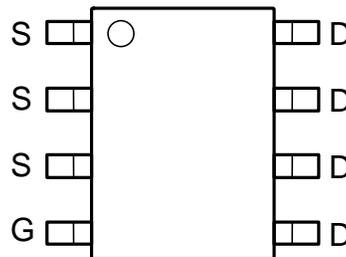
- Backlighting
- Power management functions
- DC-DC converters

Mechanical Data

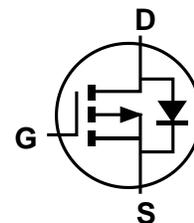
- Package: SO-8
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.072g (Approximate)



Top View



Pin-Out
Top View



Equivalent Circuit

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-20	V
Gate-Source Voltage			V _{GSS}	±8	V
Continuous Drain Current (Note 6) V _{GS} = -4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-5.4 -3.2	A
Continuous Drain Current (Note 7) V _{GS} = -4.5V	Steady State	T _C = +25°C T _C = +70°C	I _D	-12.9 -10.4	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	-30	A
Continuous Source-Drain Diode Current (Note 6)			I _S	-1.4	A
Avalanche Current, L = 0.1mH (Note 10)			I _{AS}	-18.7	A
Avalanche Energy, L = 0.1mH (Note 10)			E _{AS}	17.5	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	104	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	1.67	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	75	°C/W
Thermal Resistance, Junction to Case (Note 7)	Steady State	R _{θJC}	14	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	-20	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-100	nA	V _{DS} = -16V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	-0.5	—	-1.5	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DSON}	—	31	38	mΩ	V _{GS} = -4.5V, I _D = -5A
		—	37	56		V _{GS} = -2.5V, I _D = -4.3A
Diode Forward Voltage	V _{SD}	-0.5	-0.7	-1.2	V	V _{GS} = 0V, I _S = -2.1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	1575	—	pF	V _{DS} = -10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	124	—		
Reverse Transfer Capacitance	C _{riss}	—	89	—		
Gate Resistance	R _g	—	10	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	27.9	—	nC	V _{DS} = -10V, I _D = -4.5A
Total Gate Charge (V _{GS} = -8V)	Q _g	—	15.5	—		
Gate-Source Charge	Q _{gs}	—	1.6	—		
Gate-Drain Charge	Q _{gd}	—	3.4	—		
Turn-On Delay Time	t _{D(ON)}	—	5.2	—	ns	V _{DD} = -5V, R _L = 6Ω V _{GS} = -4.5V, R _g = 6Ω, I _D = -1A
Turn-On Rise Time	t _r	—	12.2	—		
Turn-Off Delay Time	t _{D(OFF)}	—	103	—		
Turn-Off Fall Time	t _f	—	30.7	—		
Body Diode Reverse Recovery Time	t _{RR}	—	13	—	ns	I _F = -8.9A, di/dt = -100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	6.3	—	nC	I _F = -8.9A, di/dt = -100A/μs

- Notes:
- Device mounted on FR-4 PCB, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PCB, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.

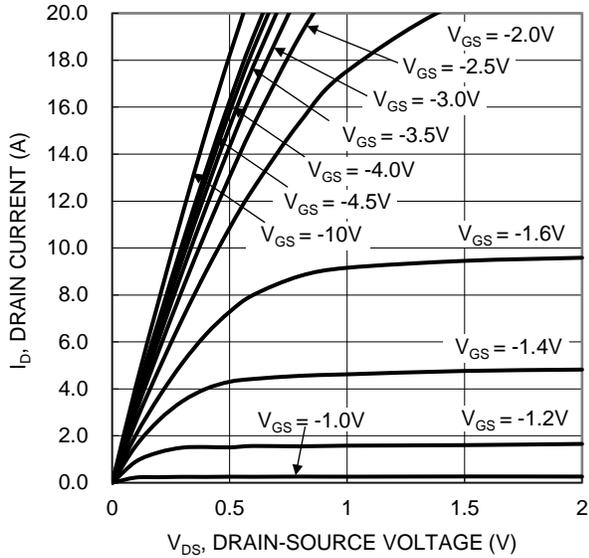


Figure 1. Typical Output Characteristic

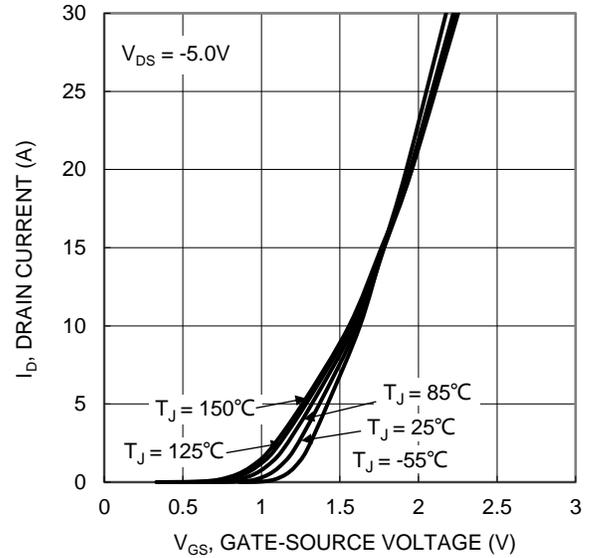


Figure 2. Typical Transfer Characteristic

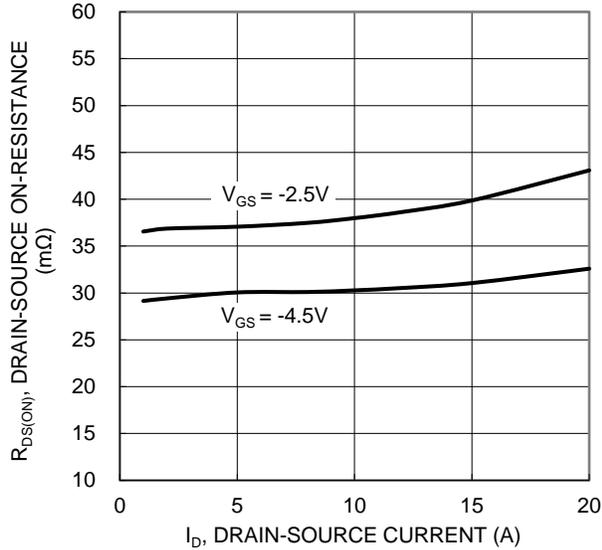


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

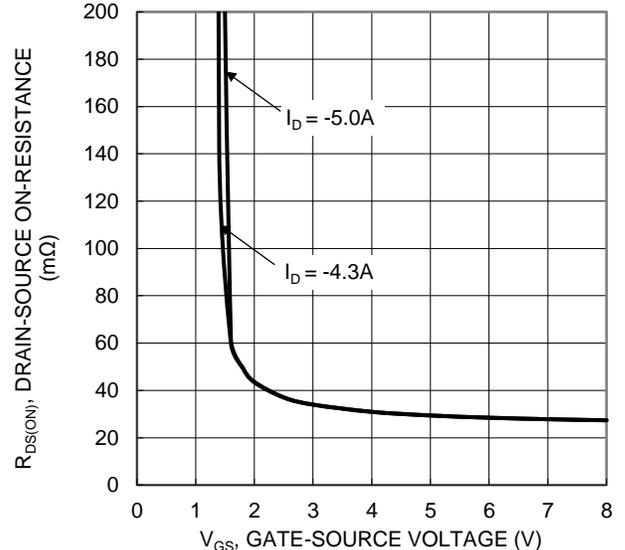


Figure 4. Typical Transfer Characteristic

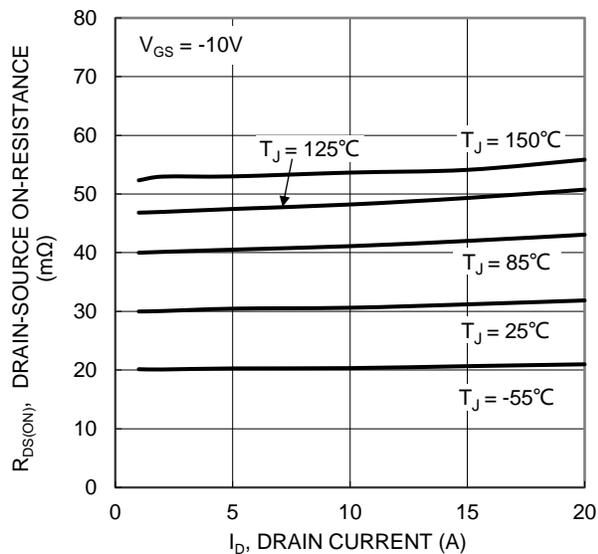


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

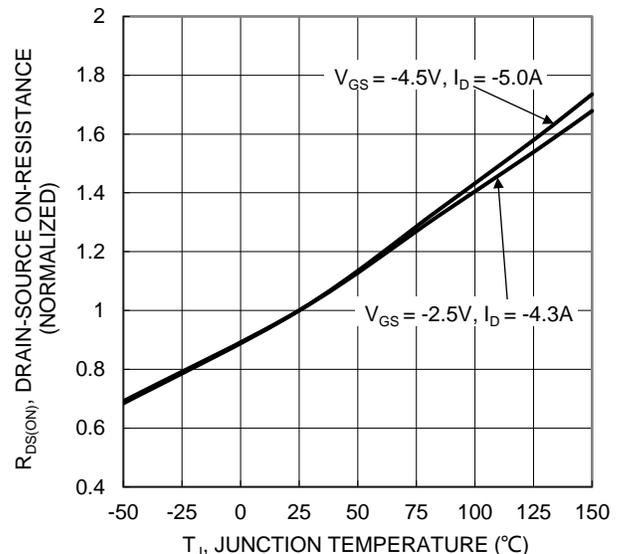


Figure 6. On-Resistance Variation with Temperature

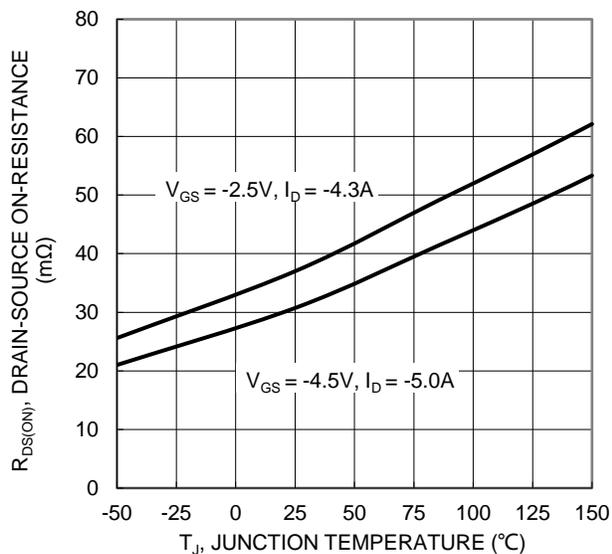


Figure 7. On-Resistance Variation with Temperature

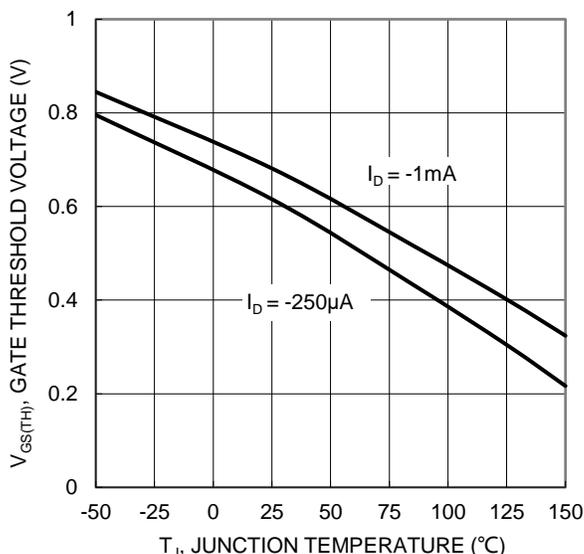


Figure 8. Gate Threshold Variation vs. Junction Temperature

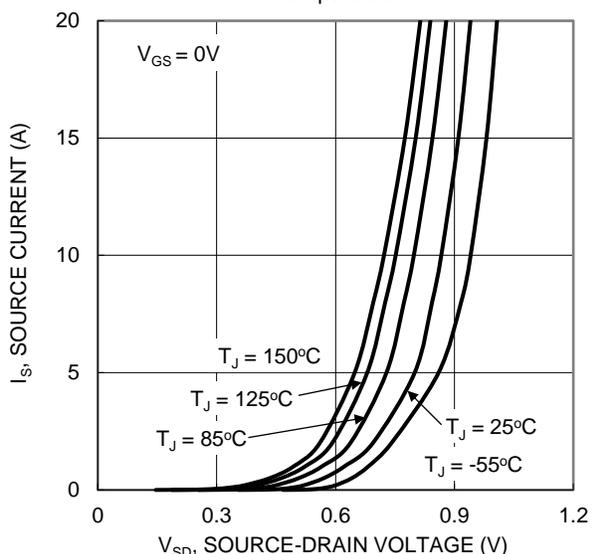


Figure 9. Diode Forward Voltage vs. Current

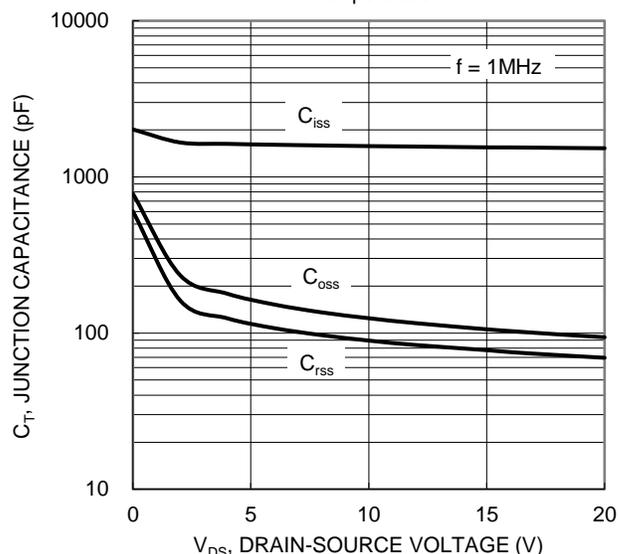


Figure 10. Typical Junction Capacitance

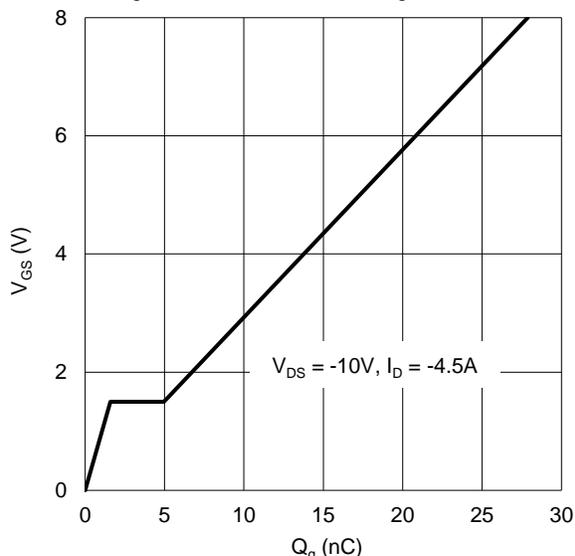


Figure 11. Gate Charge

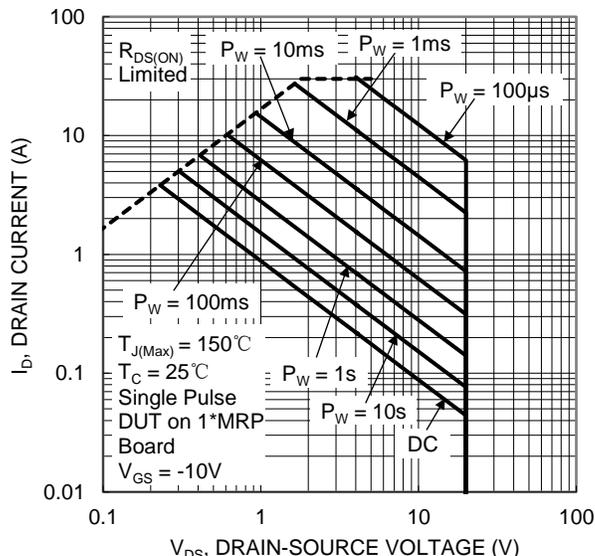


Figure 12. SOA, Safe Operation Area

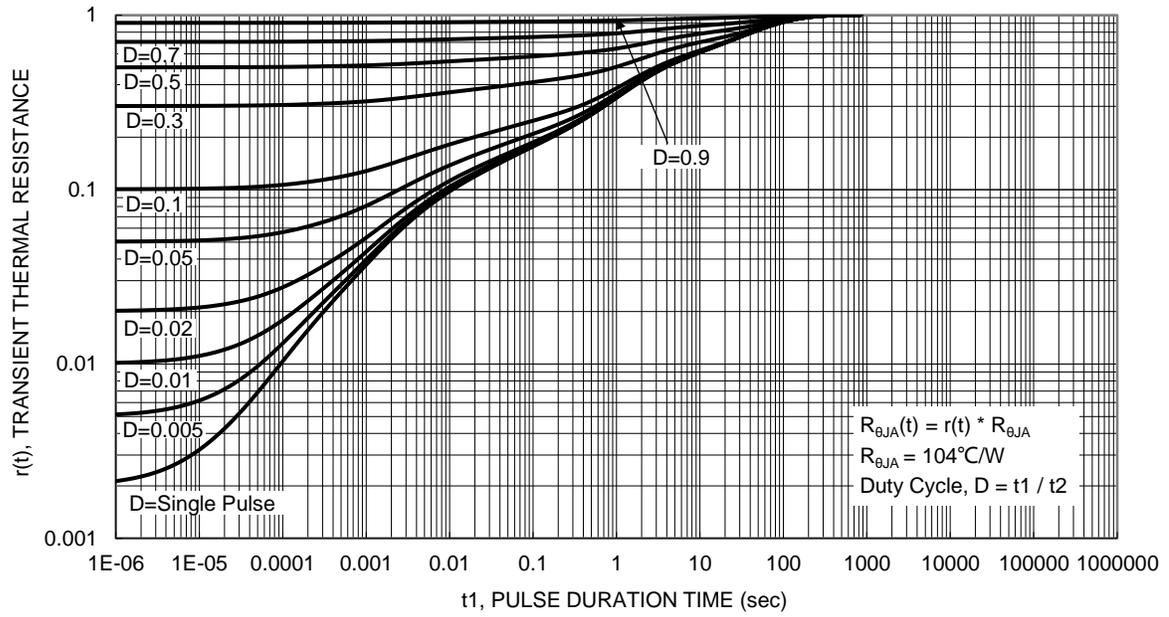
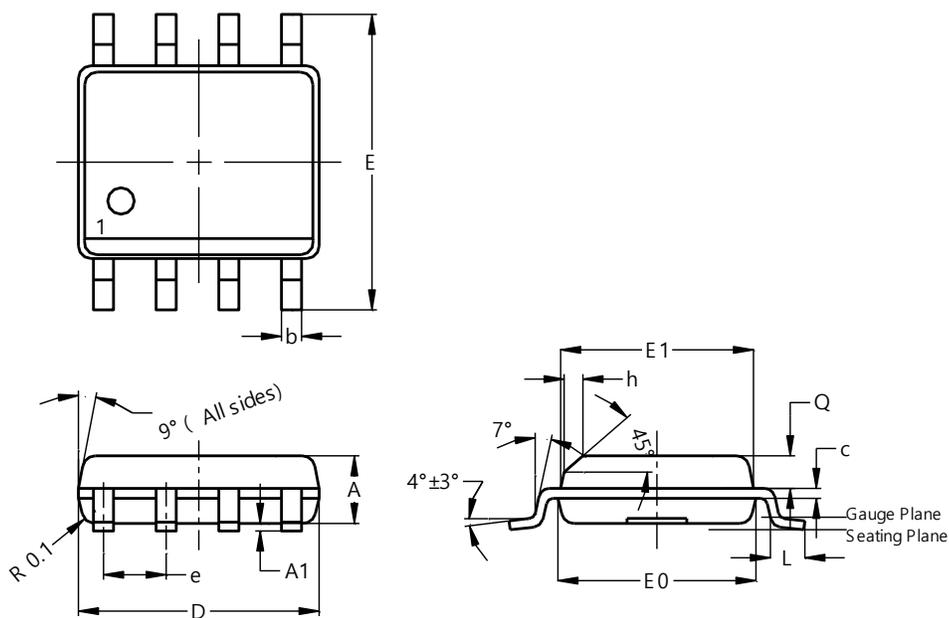


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

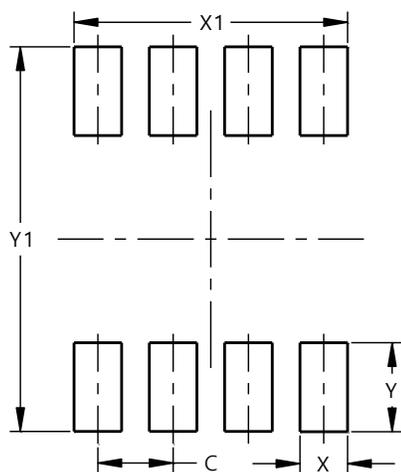
SO-8



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