

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON) \max}$	$I_D \max$ $T_A = +25^\circ\text{C}$
30V	11m Ω @ $V_{GS} = 10\text{V}$	10.3A
	15m Ω @ $V_{GS} = 4.5\text{V}$	9.3A

Description

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

Applications

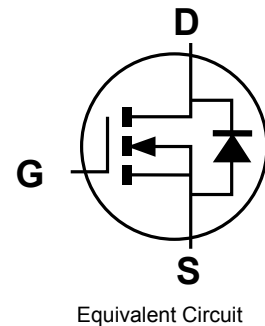
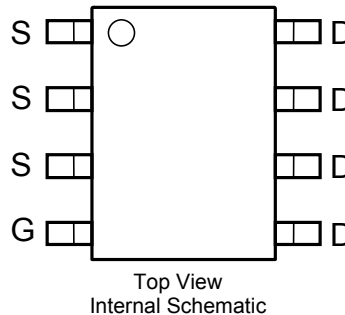
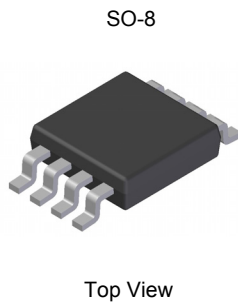
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

- 100% Unclamped Inductive Switch (UIS) test in production
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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
- Terminal Connections Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)

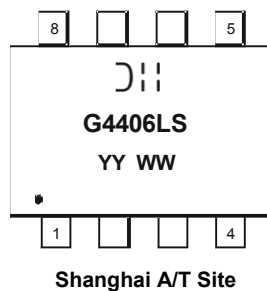
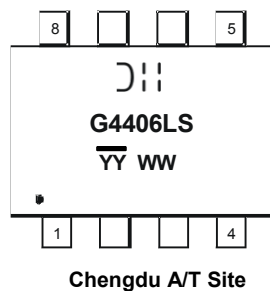


Ordering Information (Note 4)

Part Number	Case	Packaging
DMG4406LSS-13	SO-8	2,500/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



- ⌋|| = Manufacturer's Marking
- G4406LS = Product Type Marking Code
- YYWW = Date Code Marking
- YY or YY = Year (ex: 13 = 2013)
- WW = Week (01 - 53)
- YY = Date Code Marking for SAT (Shanghai Assembly/ Test site)
- YY = Date Code Marking for CAT (Chengdu Assembly/ Test site)

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	30	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = 10V	Steady State	T _A = +25°C T _A = +70°C	I _D	10.3 8.3	A
	t<10s	T _A = +25°C T _A = +70°C	I _D	13.4 10.6	A
Continuous Drain Current (Note 6) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	9.3 7.3	A
	t<10s	T _A = +25°C T _A = +70°C	I _D	12.0 9.5	A
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	2.5	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I _{DM}	90	A
Avalanche Current (Note 7) L = 0.1mH			I _{AR}	22	A
Repetitive Avalanche Energy (Note 7) L = 0.1mH			E _{AR}	24	mJ

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

Characteristic			Symbol	Value	Units
Total Power Dissipation (Note 5)			P _D	1.5	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State		R _{θJA}	80	°C/W
	t<10s			48	°C/W
Total Power Dissipation (Note 6)			P _D	2.0	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R _{θJA}	61	°C/W
	t<10s			37	°C/W
Thermal Resistance, Junction to Case			R _{θJC}	6.4	°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}	30	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	µA	V _{DS} = 30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(th)}	1.4	—	2.0	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(on)}	—	8	11	mΩ	V _{GS} = 10V, I _D = 12A
		—	12	15		V _{GS} = 4.5V, I _D = 10A
Forward Transfer Admittance	Y _{fs}	—	32	-	S	V _{DS} = 5V, I _D = 12A
Diode Forward Voltage	V _{SD}	—	0.70	1.0	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iSS}	—	1281	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	145	—		
Reverse Transfer Capacitance	C _{rss}	—	125	—		
Gate resistance	R _g	—	1.2	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	12.5	—	nC	V _{DS} = 15V, I _D = 12A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	26.7	—		
Gate-Source Charge	Q _{gs}	—	3.6	—		
Gate-Drain Charge	Q _{gd}	—	4.4	—		
Turn-On Delay Time	t _{D(on)}	—	5.2	—	ns	V _{DD} = 15V, V _{GS} = 10V, R _L = 1.25Ω, R _G = 3Ω,
Turn-On Rise Time	t _r	—	21.2	—		
Turn-Off Delay Time	t _{D(off)}	—	22.3	—		
Turn-Off Fall Time	t _f	—	5.1	—		
Reverse Recovery Time	t _{rr}	—	8.5	—	ns	IF=12A, di/dt=500A/µs
Reverse Recovery Charge	Q _{rr}	—	7.0	—	nC	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep T_J = +25°C
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

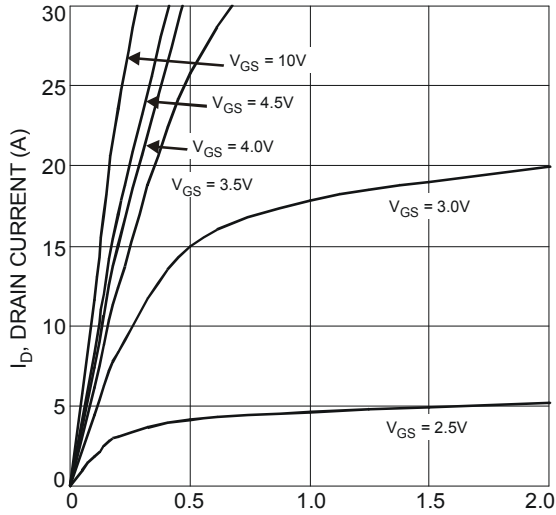


Fig. 1 Typical Output Characteristics

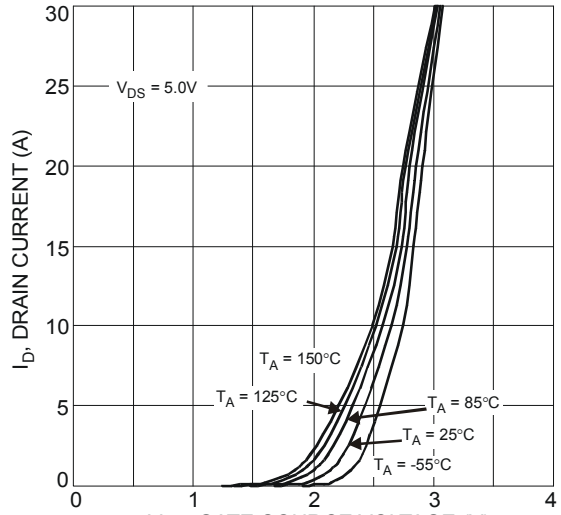


Fig. 2 Typical Transfer Characteristics

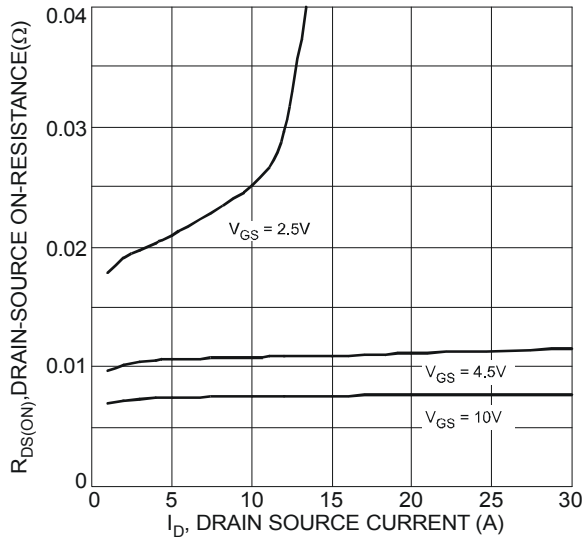


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

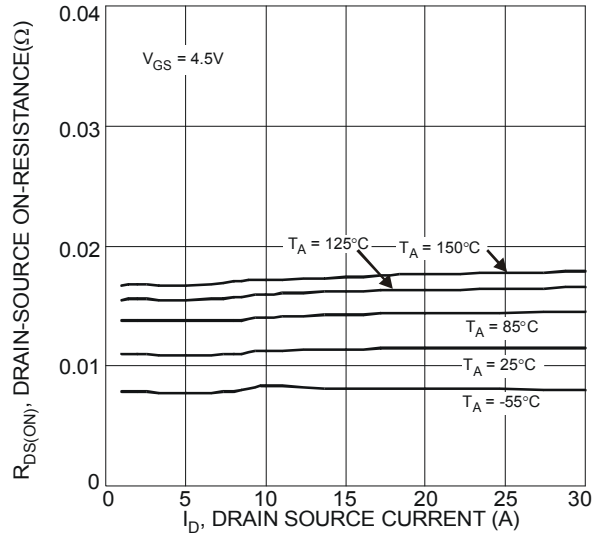


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

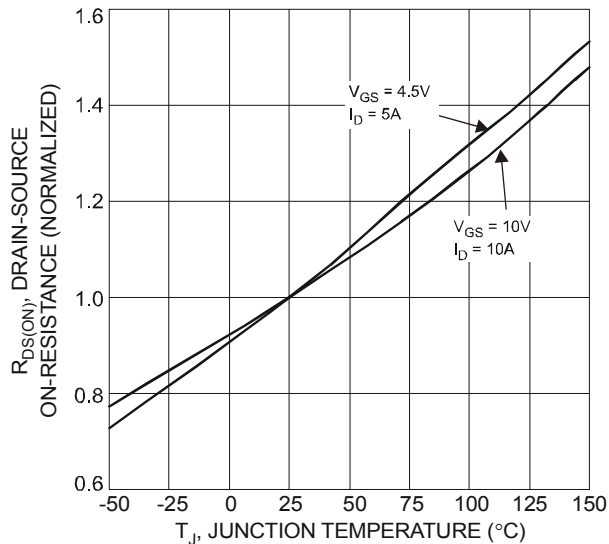


Fig. 5 On-Resistance Variation with Temperature

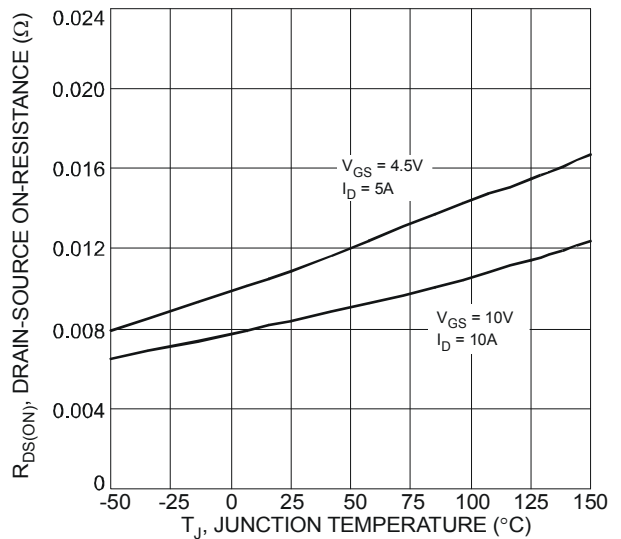


Fig. 6 On-Resistance Variation with Temperature

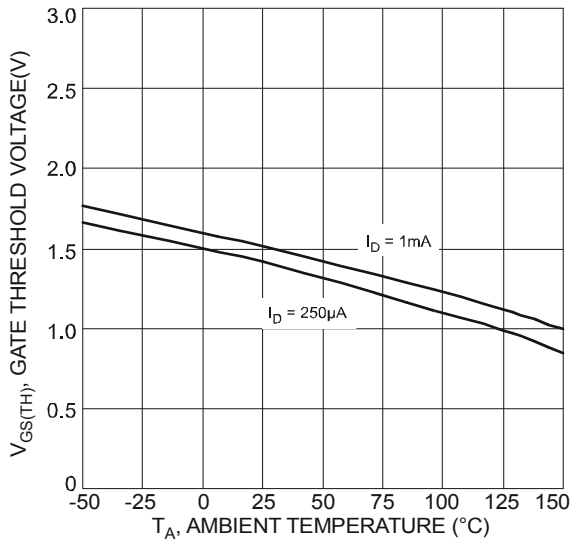


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

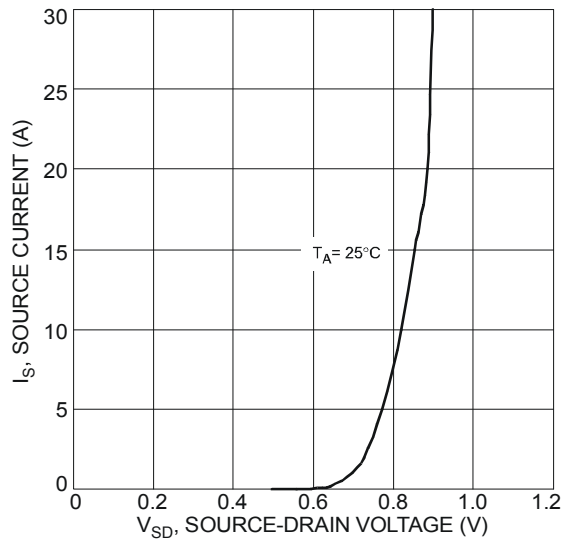


Fig. 8 Diode Forward Voltage vs. Current

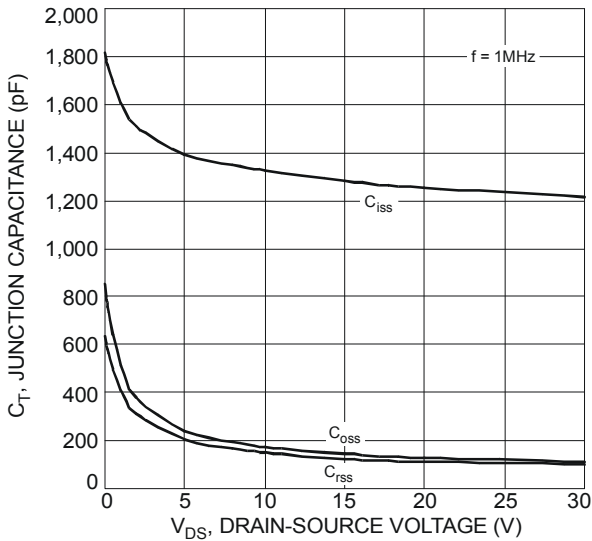


Fig. 9 Typical Junction Capacitance

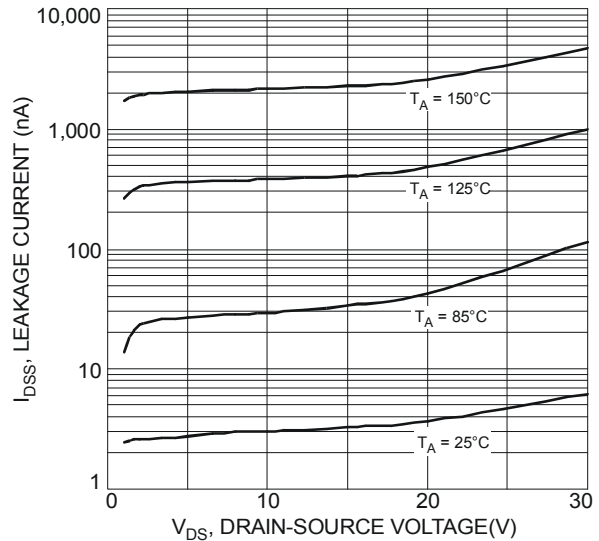


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

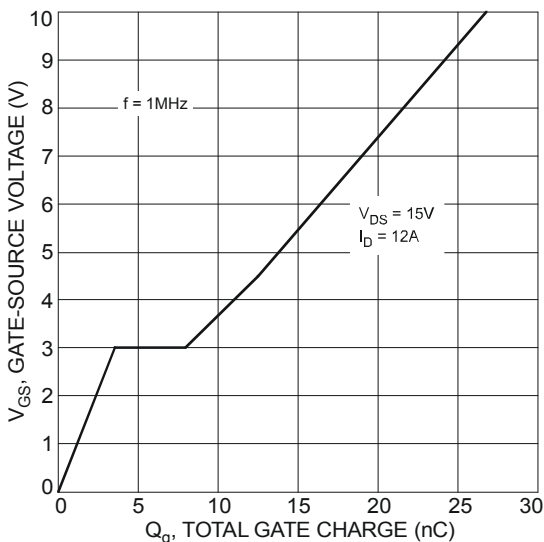


Fig. 11 Gate-Charge Characteristics

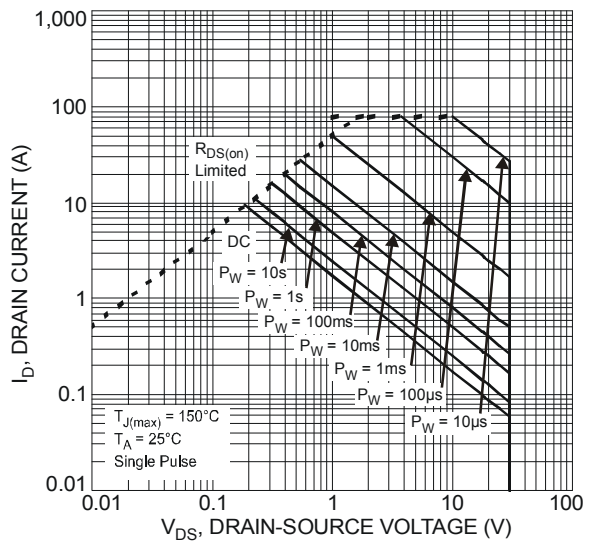


Fig. 12 SOA, Safe Operation Area

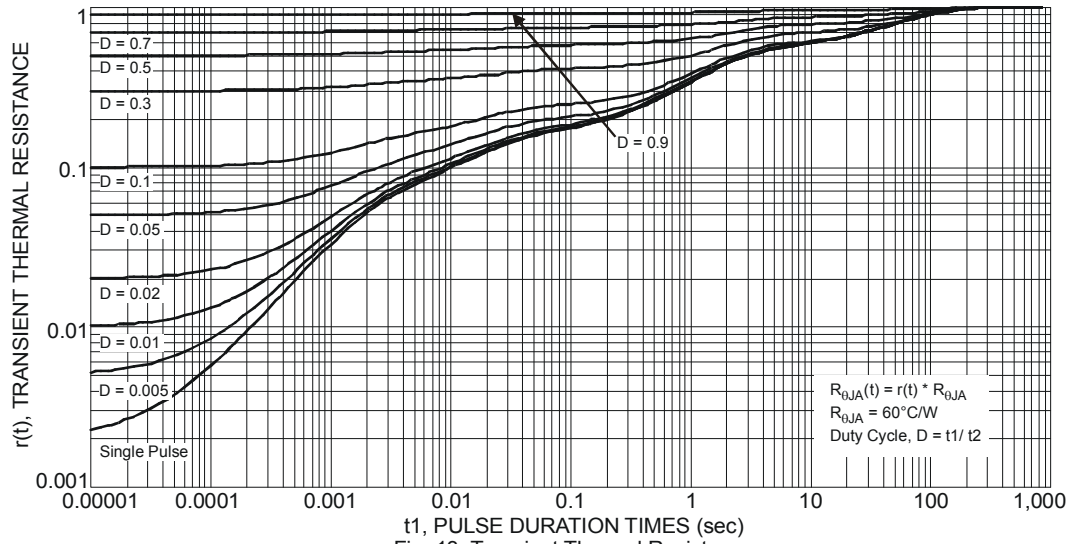
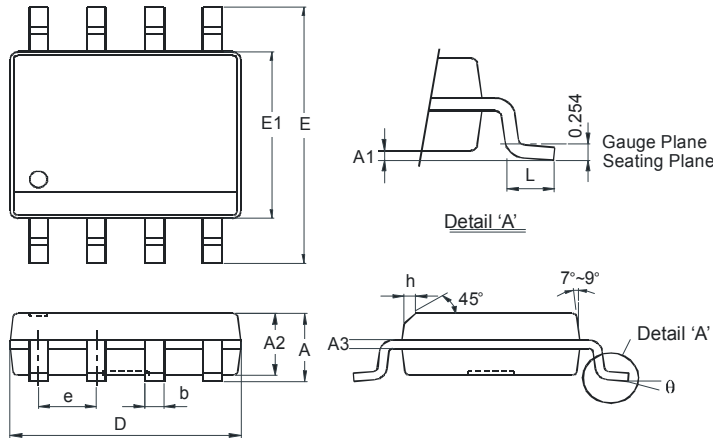


Fig. 13 Transient Thermal Resistance

Package Outline Dimensions

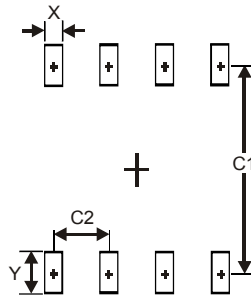
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SO-8		
Dim	Min	Max
A	-	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°
All Dimensions in mm		

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for latest version.



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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