

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D \text{ max}$ $T_A = +25^\circ\text{C}$
30V	15m Ω @ $V_{GS} = 10\text{V}$	10.7A
	18.5m Ω @ $V_{GS} = 4.5\text{V}$	9.6A

Description

This new generation 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.

Applications

- DC-DC Converters
- Power Management Functions

Features

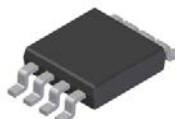
- DIOFET Utilizes a Unique Patented Process to Monolithically Integrate a MOSFET and a Schottky in a Single Die to Deliver:
 - Low $R_{DS(ON)}$ —Minimizes Conduction Losses
 - Low V_{SD} —Reduces Losses due to Body Diode Conduction
 - Low Q_{rr} —Lower Q_{rr} of the Integrated Schottky Reduces Body Diode Switching Losses
 - Low Gate Capacitance (Q_g/Q_{gs}) Ratio—Reduces Risk of SHOOT-THROUGH or Cross Conduction Currents at High Frequencies
 - Avalanche Rugged— I_{AR} and E_{AR} Rated
- **ESD Protected**
- **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

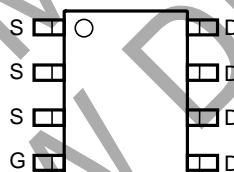
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Weight: 0.072 grams (approximate)



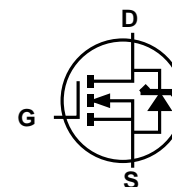
DIOFET



Top View



Top View
Internal Schematic



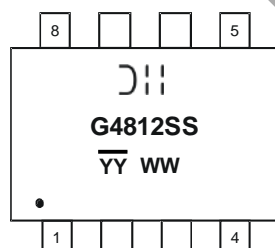
Equivalent Circuit

Ordering Information (Note 4)

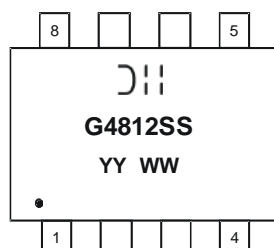
Part Number	Case	Packaging
DMG4812SSS-13	SO-8	2500/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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



Chengdu A/T Site



Shanghai A/T Site

- $\text{D}|||$ = Manufacturer's Marking
 G4812SS = Product Type Marking Code
 YYWW = Date Code Marking
 YY or \overline{YY} = Year (ex: 13 = 2013)
 WW = Week (01 - 53)
 \overline{YY} = Date Code Marking for SAT (Shanghai Assembly/ Test site)
 \overline{YY} = Date Code Marking for CAT (Chengdu Assembly/ Test site)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	30	V
Gate-Source Voltage			V _{GSS}	±12	V
Continuous Drain Current (Note 5) V _{GS} = 10V	Steady State	T _A = +25°C	I _D	8	A
		T _A = +85°C		6.4	
Continuous Drain Current (Note 6) V _{GS} = 10V	t ≤ 10 sec	T _A = +25°C	I _D	10.7	A
		T _A = +85°C		8.6	
Continuous Drain Current (Note 6) V _{GS} = 4.5V	t ≤ 10 sec	T _A = +25°C	I _D	9.6	A
		T _A = +85°C		7.7	
Pulsed Drain Current (Note 7)			I _{DM}	45	A
Avalanche Current (Notes 7 & 8)			I _{AR}	13	A
Repetitive Avalanche Energy (Notes 7 & 8) L = 0.3mH			E _{AR}	25.4	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	1.54	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	R _{θJA}	81	°C/W
Power Dissipation (Note 6)	P _D	2.8	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 6)	R _{θJA}	45	°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 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	30	—	—	V	V _{GS} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	150	μA	V _{DS} = 30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±12V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(th)}	1.0	—	2.3	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(on)}	—	11	15	mΩ	V _{GS} = 10V, I _D = 10.7A
		—	16.5	18.5		V _{GS} = 4.5V, I _D = 9.6A
Forward Transfer Admittance	Y _{fs}	—	20	—	S	V _{DS} = 5V, I _D = 10.7A
Diode Forward Voltage	V _{SD}	—	0.36	0.5	V	V _{GS} = 0V, I _S = 1A
Maximum Body-Diode + Schottky Continuous Current	I _S	—	—	5	A	—
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	1849	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	158	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	123	—	pF	
Gate Resistance	R _g	0.54	2.0	4.0	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge V _{GS} = 4.5V	Q _g	—	18.5	—	nC	V _{DS} = 15V, V _{GS} = 10V, I _D = 9.6A
Total Gate Charge V _{GS} = 10V	Q _g	—	43	—	nC	
Gate-Source Charge	Q _{gs}	—	4.7	—	nC	
Gate-Drain Charge	Q _{gd}	—	4.0	—	nC	
Turn-On Delay Time	t _{D(on)}	—	6.62	—	ns	V _{GS} = 10V, V _{DS} = 15V, R _G = 3Ω, R _L = 15Ω, I _D = 1A
Turn-On Rise Time	t _r	—	8.73	—	ns	
Turn-Off Delay Time	t _{D(off)}	—	36.41	—	ns	
Turn-Off Fall Time	t _f	—	4.69	—	ns	

- Notes:
- Device mounted on FR-4 PCB with minimum recommended pad layout. The value in any given application depends on the user's specific board design.
 - Device mounted on 1" x 1" FR-4 PCB with high coverage 1 oz. Copper, single sided, device is measured at t ≤ 10 sec.
 - Repetitive rating, pulse width limited by junction temperature.
 - 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 production testing.

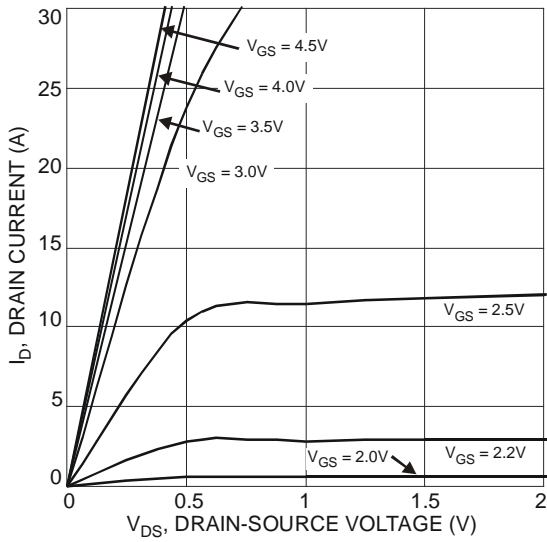


Fig. 1 Typical Output Characteristic

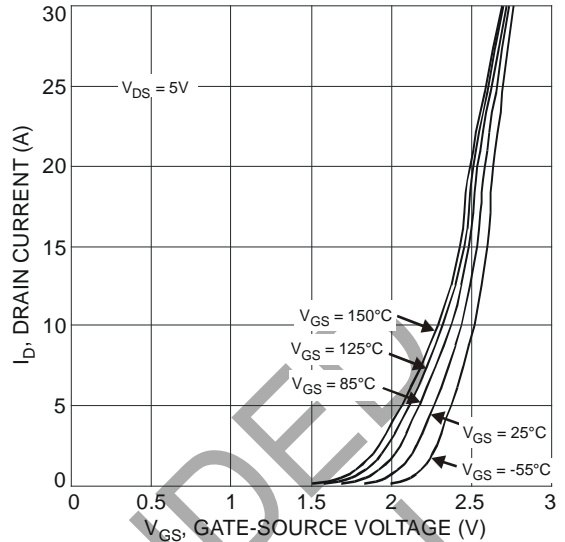


Fig. 2 Typical Transfer Characteristic

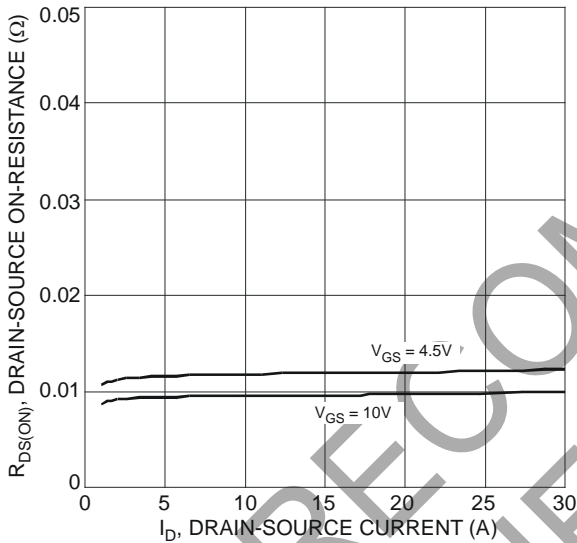


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

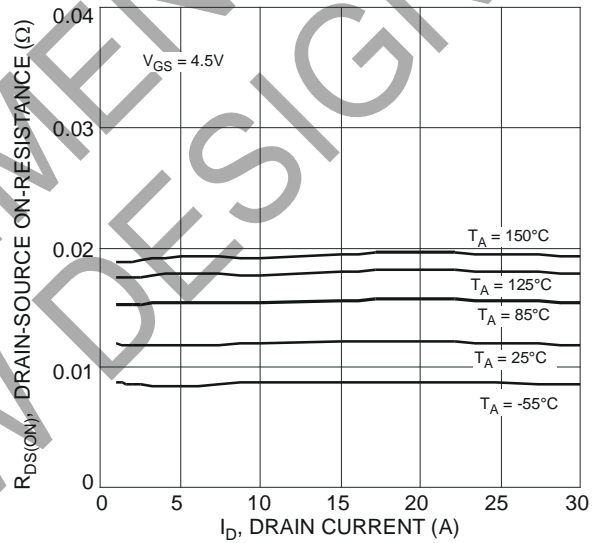


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

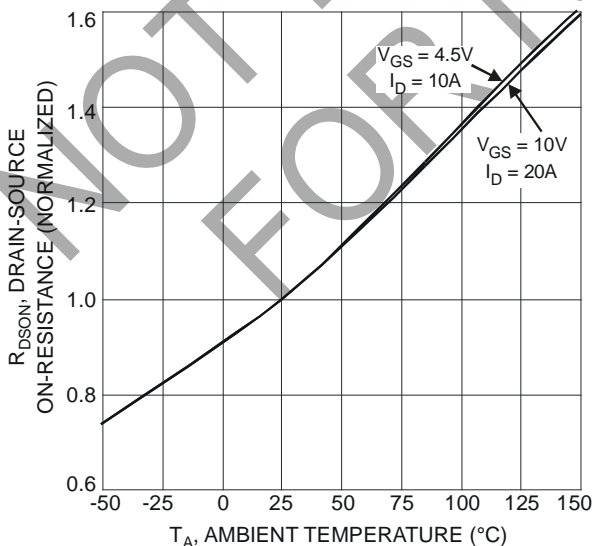


Fig. 5 On-Resistance Variation with Temperature

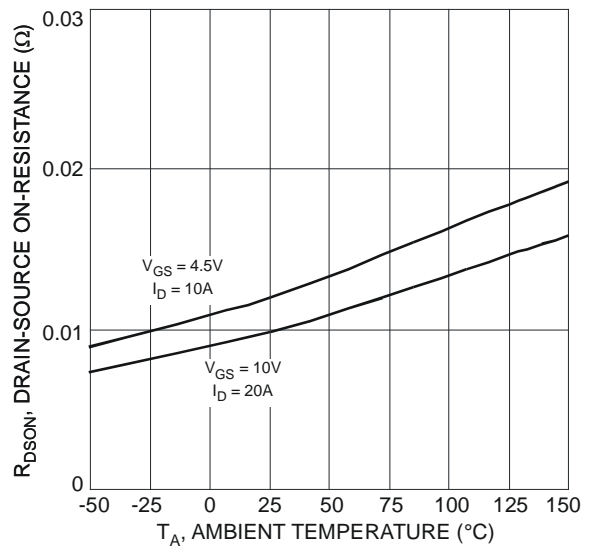


Fig. 6 On-Resistance Variation with Temperature

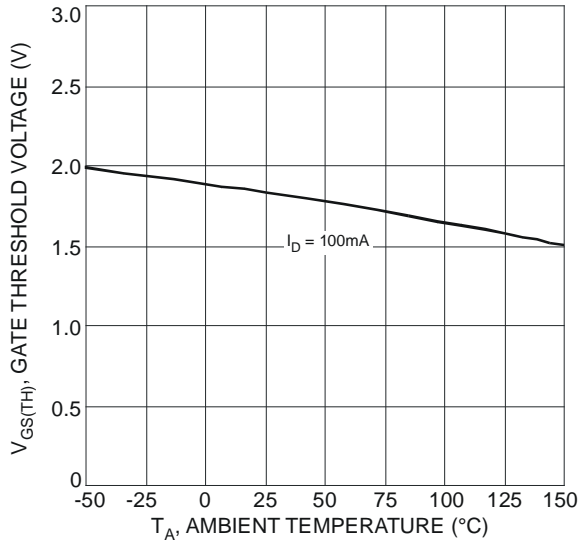


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

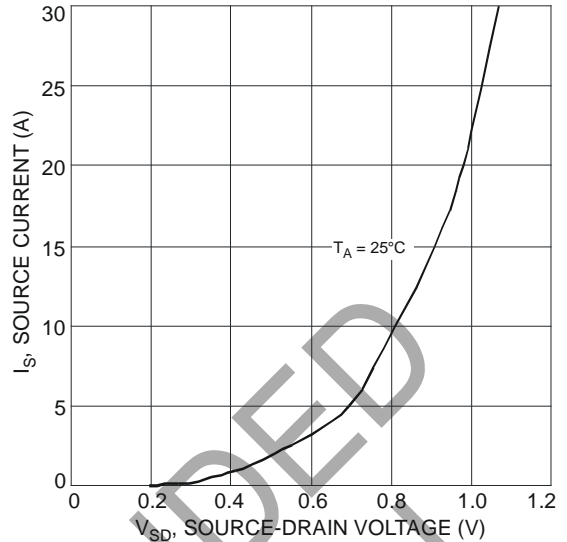


Fig. 8 Diode Forward Voltage vs. Current

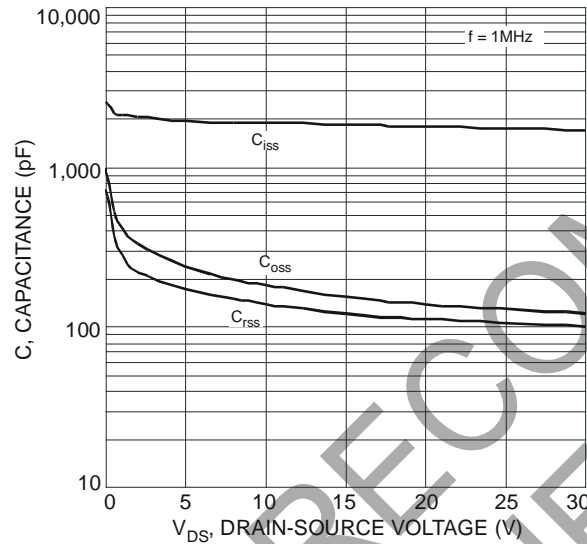


Fig. 9 Typical Total Capacitance

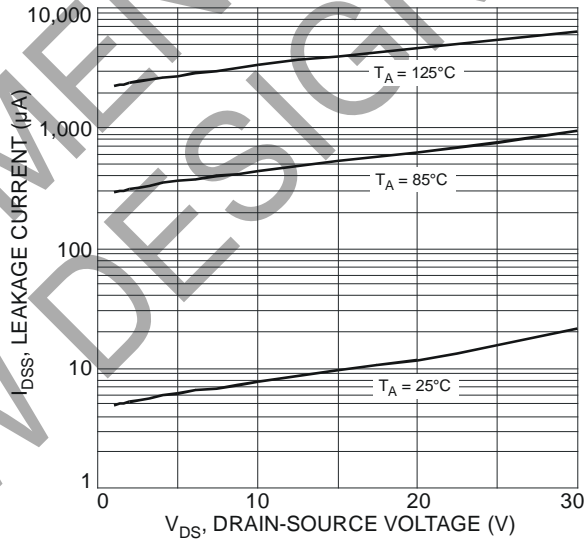


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

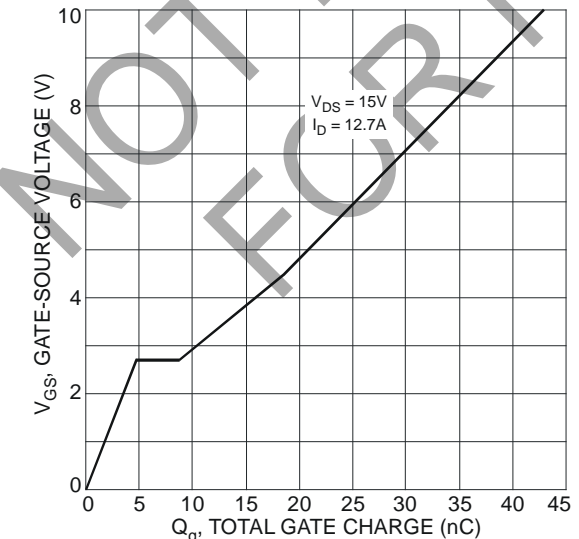


Fig. 11 Gate-Charge Characteristics

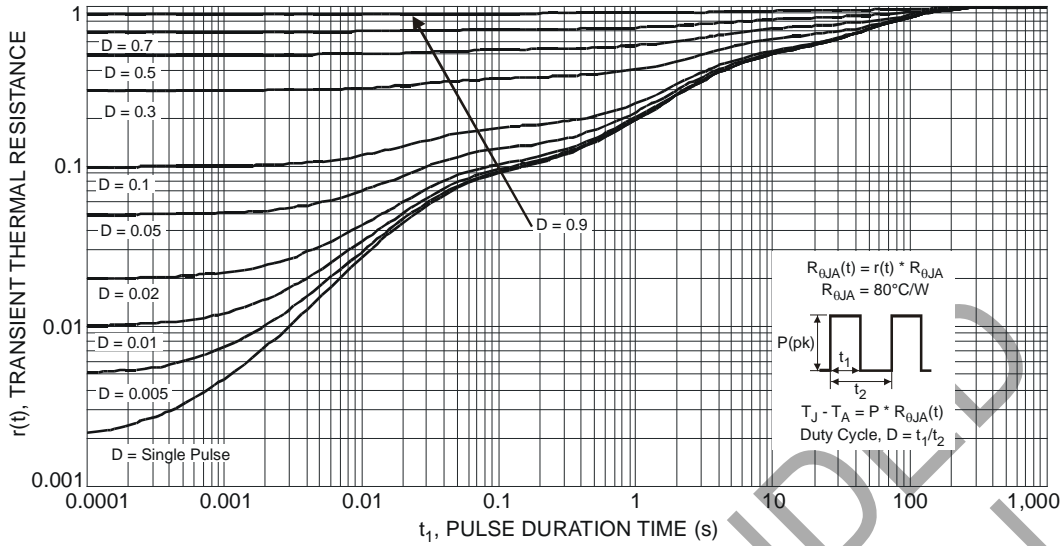


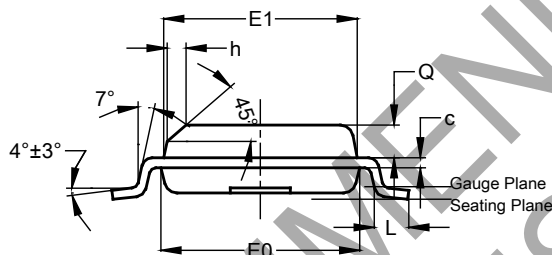
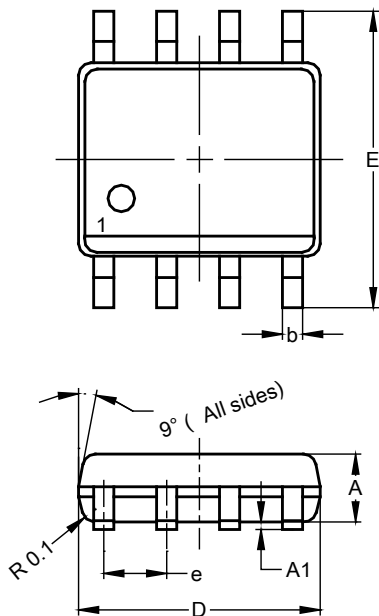
Fig. 12 Transient Thermal Response

NOT RECOMMENDED FOR NEW DESIGN

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version

SO-8

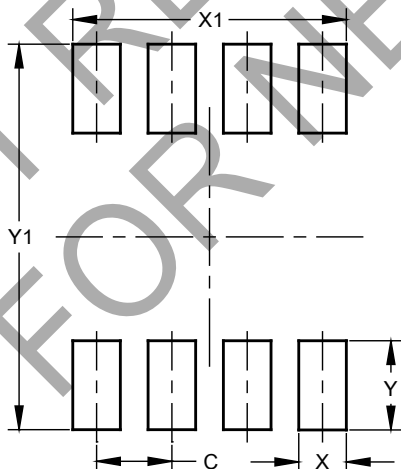


SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	—	—	1.27
h	—	—	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SO-8



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

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