

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D T _A = +25°C (Notes 7 & 9)
-60V	125mΩ @ V _{GS} = -10V	-3.4A
	190mΩ @ V _{GS} = -4.5V	-2.8A

Description

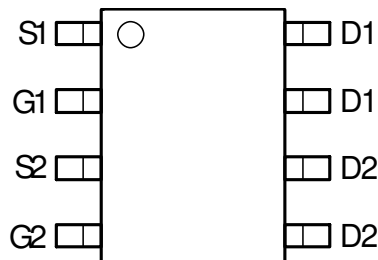
This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control



Top View



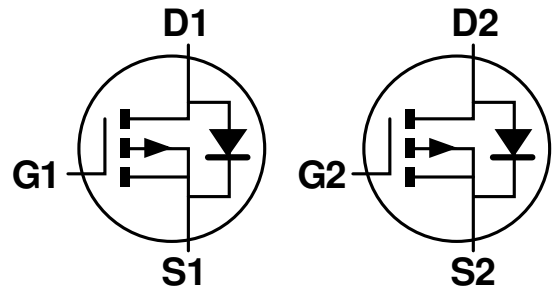
Top View

Features

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- Low Profile SOIC Package
- **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**
- **PPAP Capable (Note 4)**

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: Matte Tin Finish; Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.074 grams (Approximate)



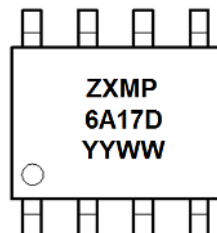
Equivalent Circuit

Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZXMP6A17DN8TA	AEC-Q101	ZXMP6A17D	7	12	500
ZXMP6A17DN8TC	AEC-Q101	ZXMP6A17D	13	12	2,500
ZXMP6A17DN8QTC	Automotive	ZXMP6A17D	13	12	2,500

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/product_compliance_definitions.html.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



ZXMP6A17D = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 17 = 2017)
 WW = Week (01 to 53)

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

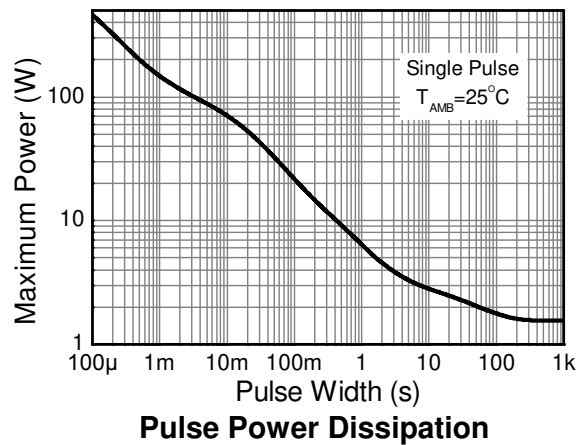
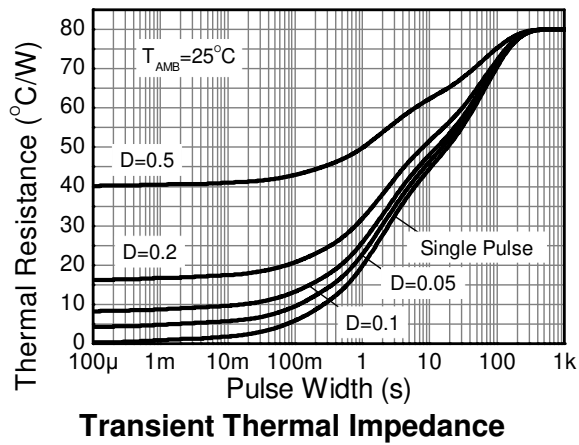
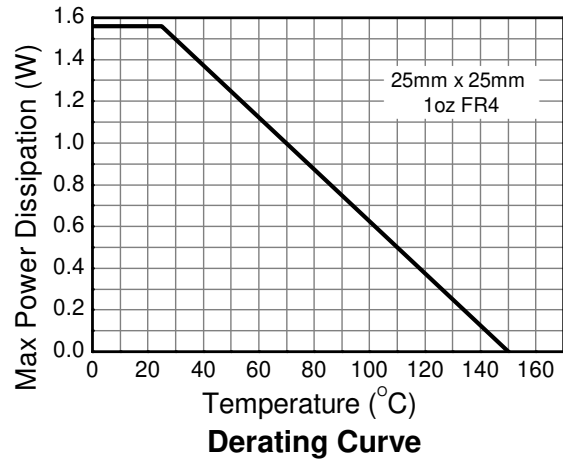
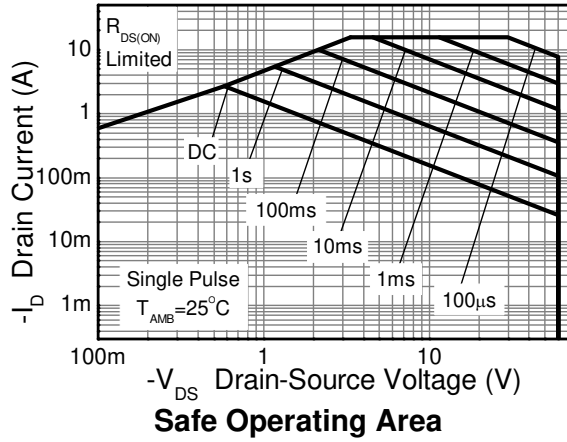
Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V _{DSS}	-60	V
Gate-Source Voltage		V _{GS}	±20	V
Continuous Drain Current	V _{GS} = 10V	(Notes 7 & 9)	-3.42	A
		T _A = +70°C (Notes 7 & 9)	-2.73	
		(Notes 6 & 9)	-2.7	
Pulsed Drain Current		I _{DM}	-15.6	A
Continuous Source Current (Body Diode)		I _S	-3.4	A
Pulsed Source Current (Body Diode)		I _{SM}	-15.6	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 6 & 9)	P _D	1.25	W mW/°C
			10.0	
	(Notes 6 & 10)		1.81	
			14.5	
Thermal Resistance, Junction to Ambient	(Notes 7 & 9)	R _{θJA}	2.15	°C/W
	(Notes 6 & 9)		17	
	(Notes 6 & 10)		100	
Thermal Resistance, Junction to Lead	(Notes 7 & 9)	R _{θJL}	70	°C/W
	(Notes 9 & 11)		60	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

- Notes:
6. For a device surface mounted on 25mm x 25mm x 1.6mm FR-4 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 ≤ 10 sec.
 8. Same as note (6), except the device is pulsed with D = 0.02 and pulse width 300μs. 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 die running at equal power.
 11. Thermal resistance from junction to solder-point.

Thermal Characteristics

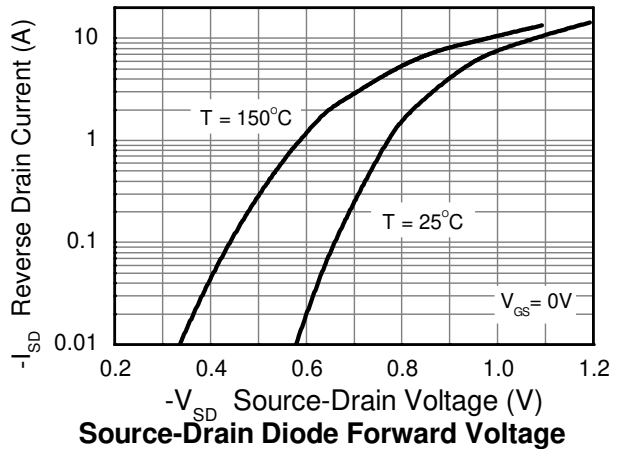
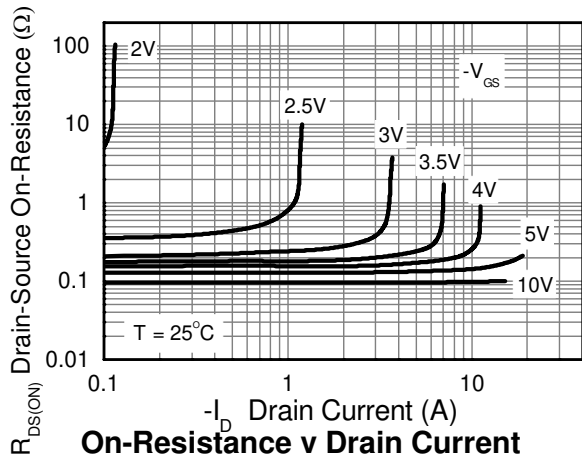
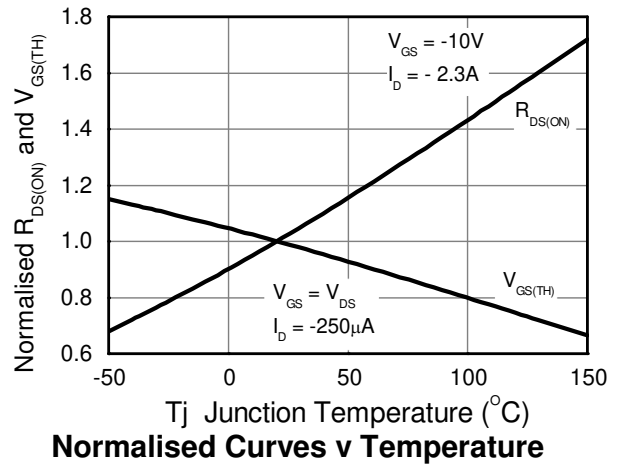
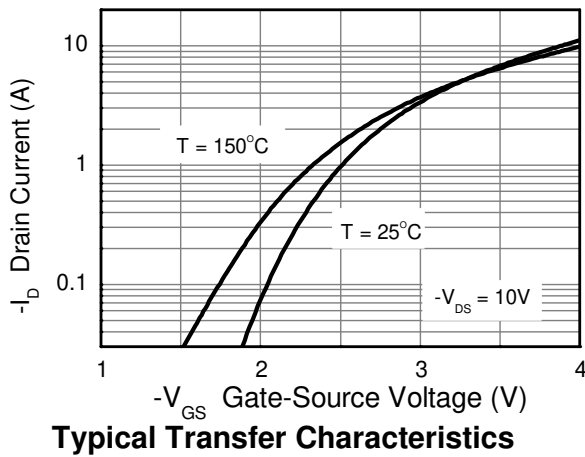
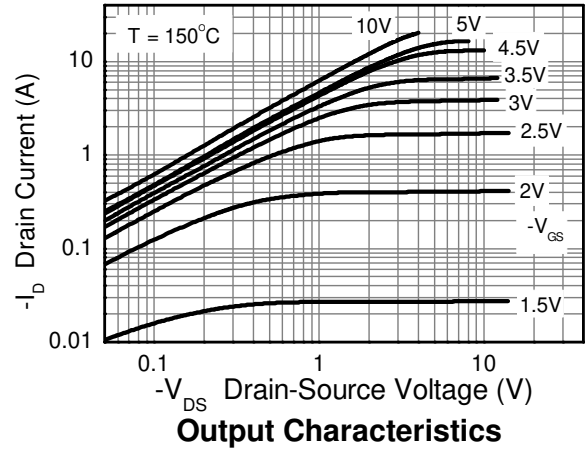
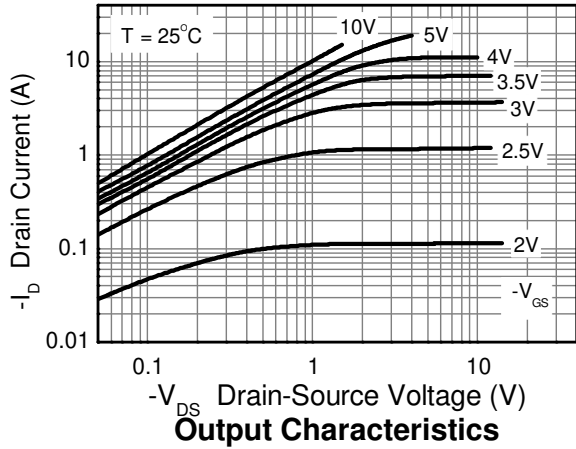


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

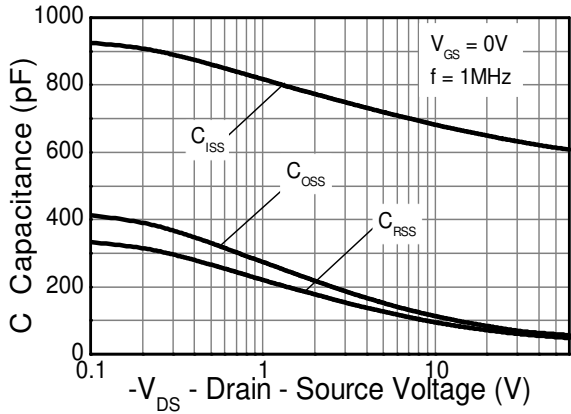
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-60	—	—	V	$I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-0.5	μA	$V_{DS} = -60\text{V}$, $V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.0	—	—	V	$I_D = -250\mu\text{A}$, $V_{DS} = V_{GS}$
Static Drain-Source On-Resistance (Note 12)	$R_{DS(ON)}$	—	—	0.125	Ω	$V_{GS} = -10\text{V}$, $I_D = -2.3\text{A}$
				0.190		$V_{GS} = -4.5\text{V}$, $I_D = -1.9\text{A}$
Forward Transconductance (Notes 12 & 13)	g_{fs}	—	4.7	—	s	$V_{DS} = -15\text{V}$, $I_D = -2.3\text{A}$
Diode Forward Voltage (Note 12)	V_{SD}	—	-0.85	-0.95	V	$I_S = -2.0\text{A}$, $V_{GS} = 0\text{V}$
Reverse Recovery Time (Note 13)	t_{RR}	—	25.1	—	ns	$I_S = -1.7\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge (Note 13)	Q_{RR}	—	27.2	—	nC	
DYNAMIC CHARACTERISTICS (Note 13)						
Input Capacitance	C_{iss}	—	637	—	pF	$V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	70	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	53	—	pF	
Total Gate Charge (Note 14)	Q_g	—	9.0	—	nC	$V_{GS} = -4.5\text{V}$
Total Gate Charge (Note 14)	Q_g	—	17.7	—	nC	$V_{GS} = -10\text{V}$ $V_{DS} = -30\text{V}$ $I_D = -2.2\text{A}$
Gate-Source Charge (Note 14)	Q_{gs}	—	1.6	—	nC	
Gate-Drain Charge (Note 14)	Q_{gd}	—	4.4	—	nC	
Turn-On Delay Time (Note 14)	$t_{D(ON)}$	—	2.6	—	ns	$V_{DD} = -30\text{V}$, $V_{GS} = -10\text{V}$ $I_D = -1\text{A}$, $R_g \cong 6.0\Omega$
Turn-On Rise Time (Note 14)	t_R	—	3.4	—	ns	
Turn-Off Delay Time (Note 14)	$t_{D(OFF)}$	—	26.2	—	ns	
Turn-Off Fall Time (Note 14)	t_F	—	11.3	—	ns	

- Notes:
12. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.
 13. For design aid only, not subject to production testing.
 14. Switching characteristics are independent of operating junction temperatures.

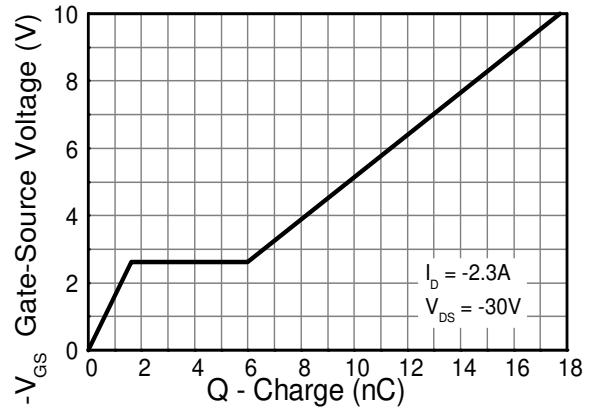
Typical Characteristics



Typical Characteristics (Cont.)

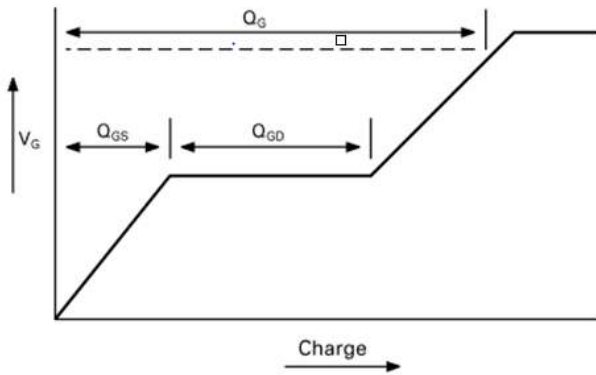


Capacitance v Drain-Source Voltage

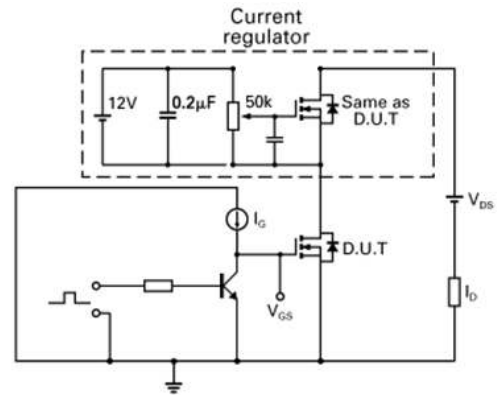


Gate-Source Voltage v Gate Charge

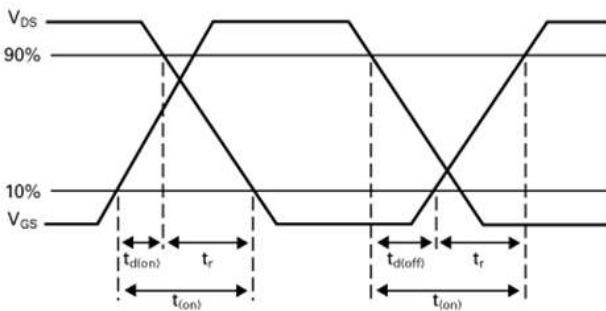
Test Circuits



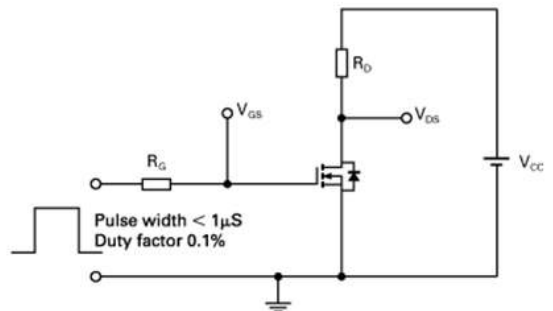
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms

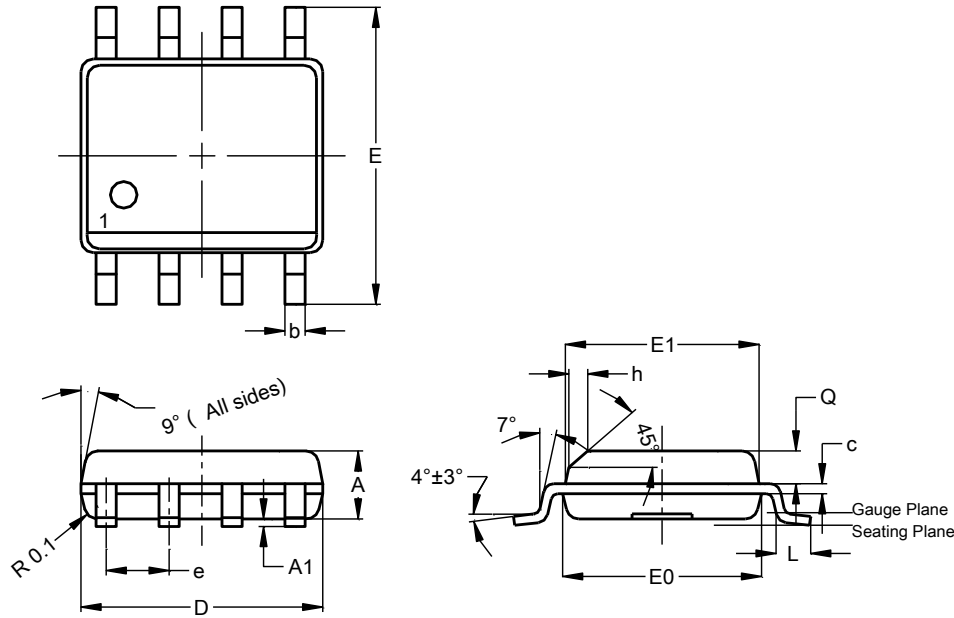


Switching time test circuit

Package Outline Dimensions

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

SO-8

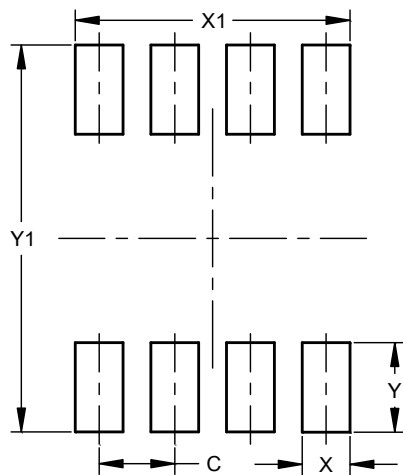


SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

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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