Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max
-200V	80Ω @ V_{GS} = -10V	-65mA

Features and Benefits

- Low Input Capacitance
- Low Input/Output Leakage
- Small Surface Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The ZVP1320FQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.

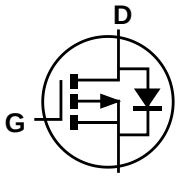
Mechanical Data

- Case: SOT23
- 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 Annealed over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208 e3
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

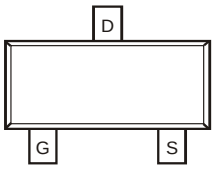
SOT23



Top View



Equivalent Circuit



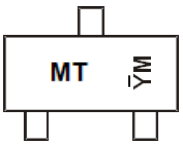
Top View
Pin Out Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
ZVP1320FQTA	SOT23	3000/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 https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



MT = Product Type Marking Code
$\overline{Y}$M = Date Code Marking
$\overline{Y}$ = Year (ex: I = 2021)
M = Month (ex: 9 = September)

Date Code Key

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	I	J	K	L	M	N	O	P	R	S	T	U

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	-200	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current (Note 6)	I_D	-65	mA
Maximum Body Diode Forward Current (Note 6)	I_S	-65	mA
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I_{DM}	-212	mA
Pulsed Source Current (10µs Pulse, Duty Cycle = 1%)	I_{SM}	-212	mA

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Power Dissipation (Note 5)		P_D	0.5	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	240	°C/W
Power Dissipation (Note 6)		P_D	0.7	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	180	°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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-200	—	—	V	V_{GS} = 0V, I_D = -1mA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	µA	V_{DS} = -200V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.5	—	-3.5	V	V_{DS} = V_{GS}, I_D = -1mA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	51	80	Ω	V_{GS} = -10V, I_D = -30mA
Diode Forward Voltage	V_{SD}	—	-0.7	-1.5	V	V_{GS} = 0V, I_S = -30mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	25	—	pF	V_{DS} = -100V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	9	—		
Reverse Transfer Capacitance	C_{rss}	—	4	—		
Gate Resistance	R_g	—	11.5	—	Ω	f = 1MHz, Level = 50mV, V_{GS} = 5V, V_{DS} = 0V
Total Gate Charge	Q_g	—	1.2	—	nC	V_{GS} = -10V, V_{DS} = -100V I_D = -30mA
Gate-Source Charge	Q_{gs}	—	0.1	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.5	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	4.7	—	ns	V_{DS} = -100V, I_D = -30mA V_{GS} = -10V, R_g = 1Ω
Turn-On Rise Time	t_R	—	7.5	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	18.5	—		
Turn-Off Fall Time	t_F	—	140	—		
Body Diode Reverse Recovery Time	t_{RR}	—	81	—	ns	I_F = -1A, di/dt = -100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	210	—	nC	

Notes: 5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

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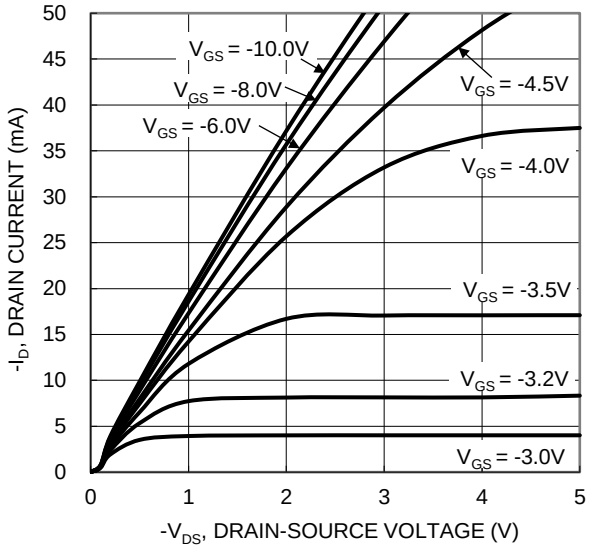


Figure 1. Typical Output Characteristic

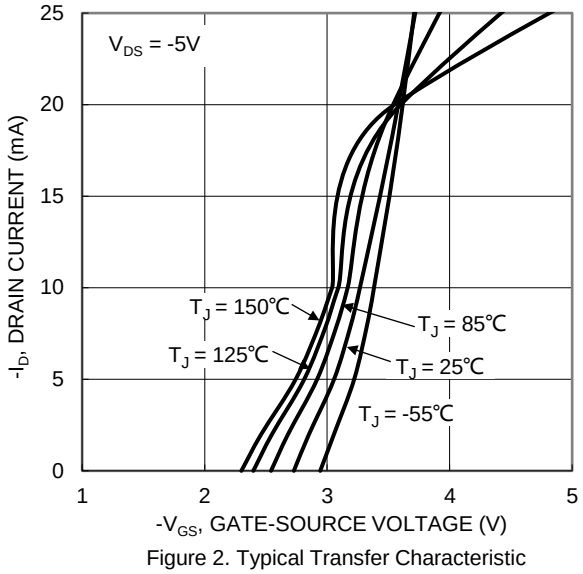


Figure 2. Typical Transfer Characteristic

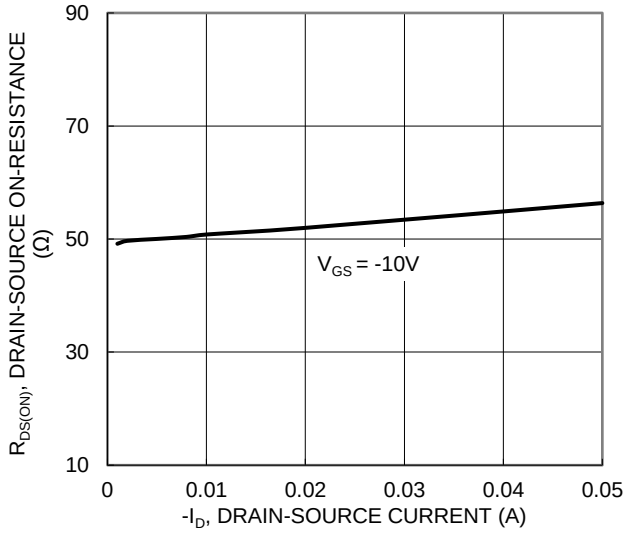


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

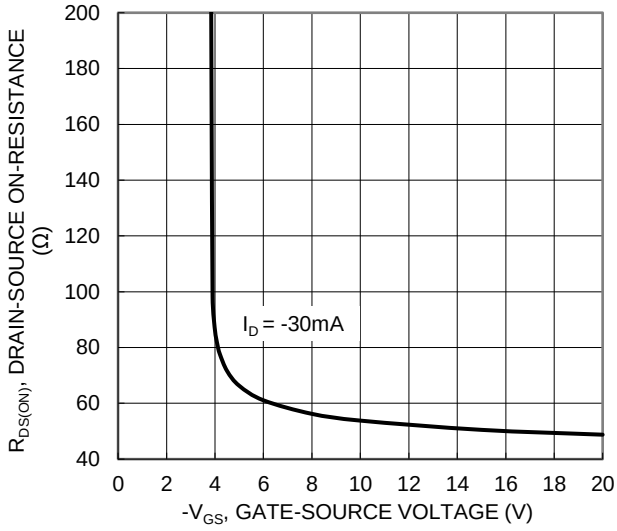


Figure 4. Typical Transfer Characteristic

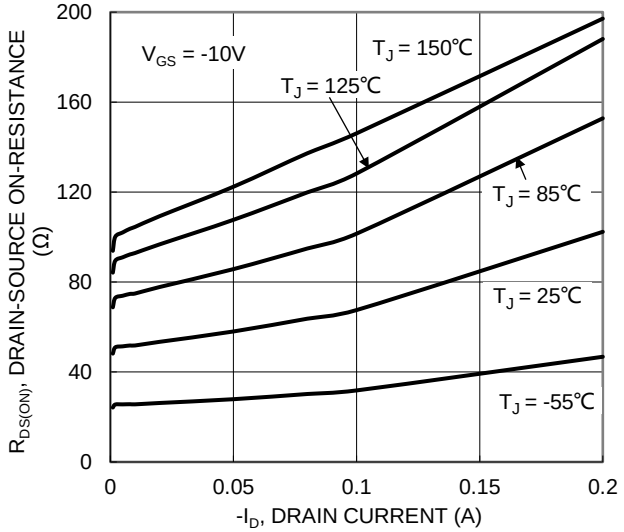


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

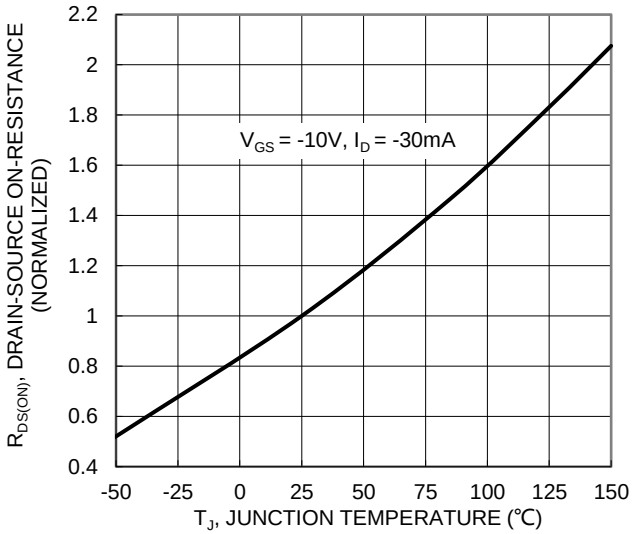


Figure 6. On-Resistance Variation with Junction Temperature

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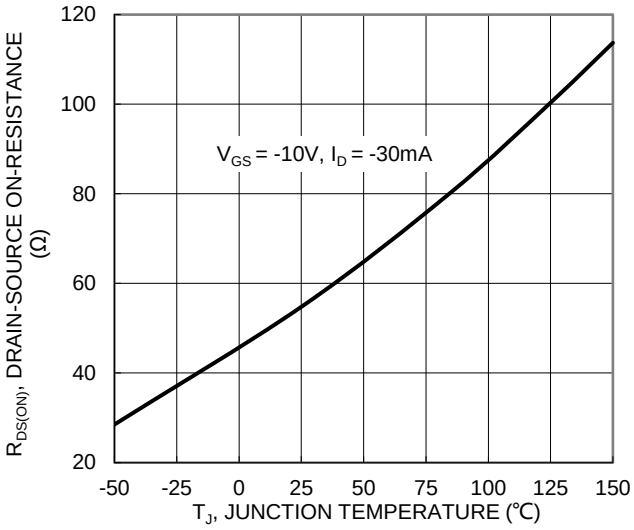


Figure 7. On-Resistance Variation with Temperature

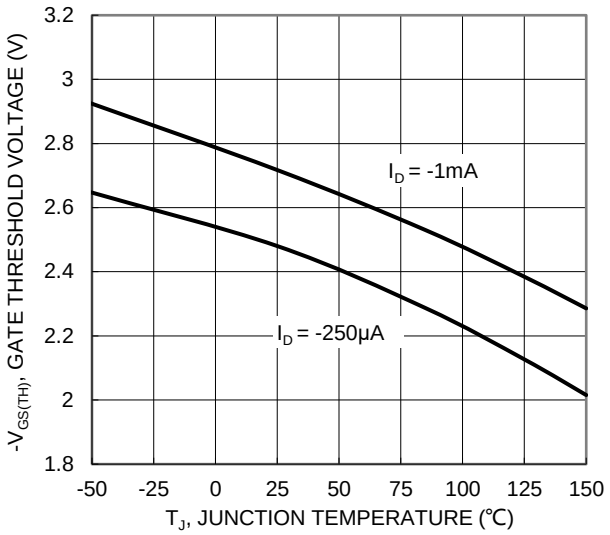


Figure 8. Gate Threshold Variation vs. Junction Temperature

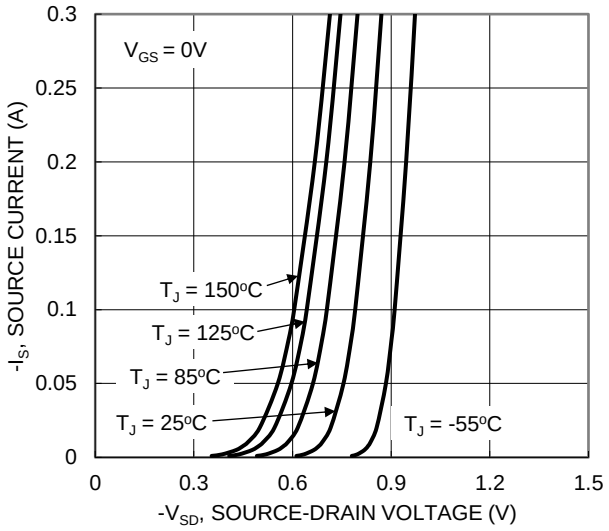


Figure 9. Diode Forward Voltage vs. Current

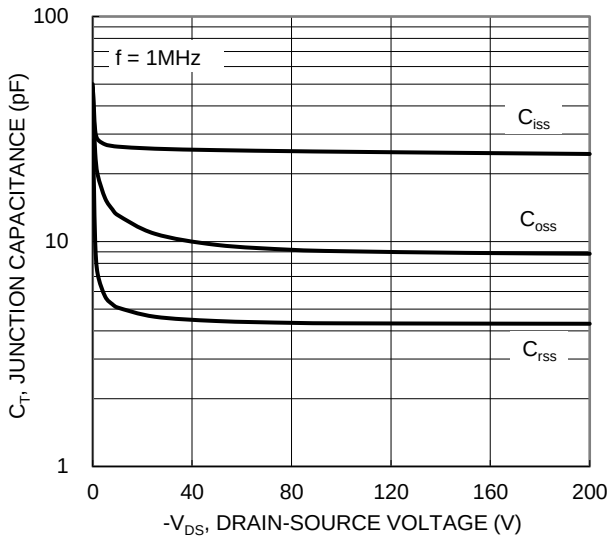


Figure 10. Typical Junction Capacitance

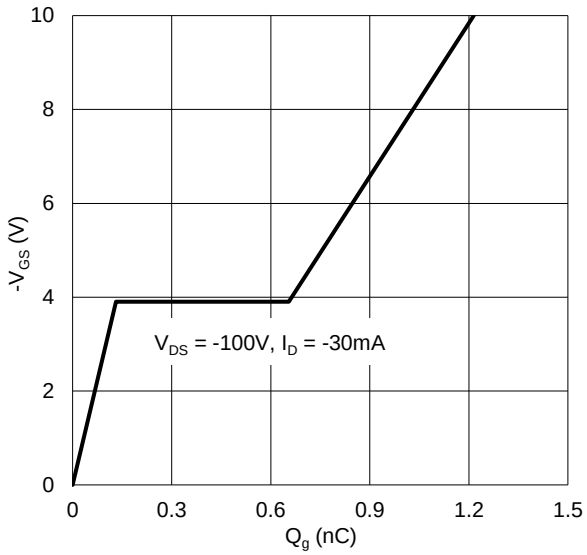


Figure 11. Gate Charge

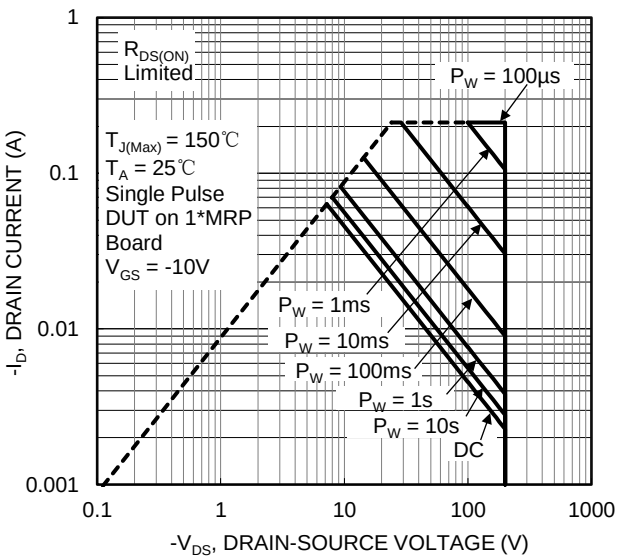


Figure 12. SOA, Safe Operation Area

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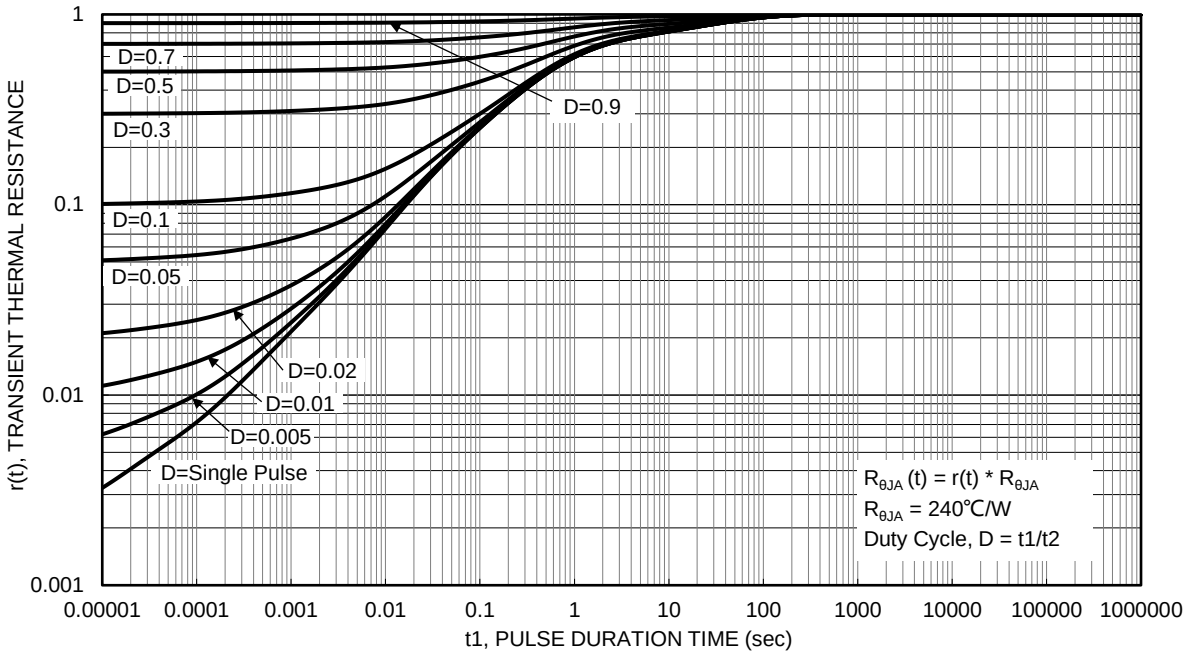


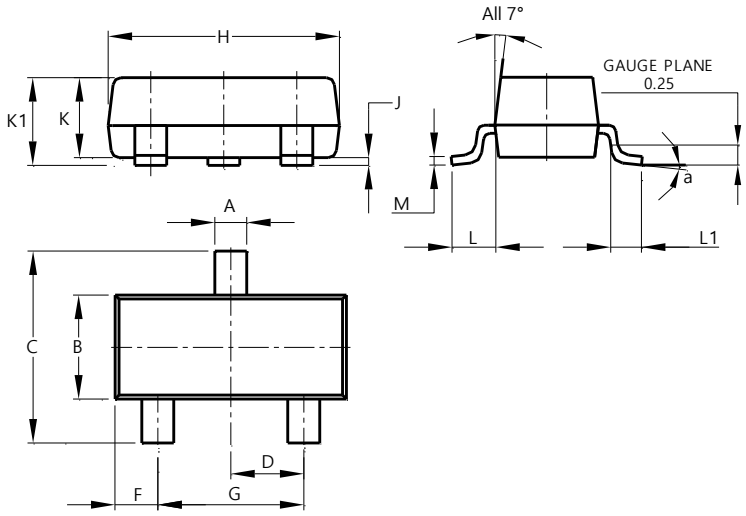
Figure 13. Transient Thermal Resistance

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Package Outline Dimensions

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SOT23

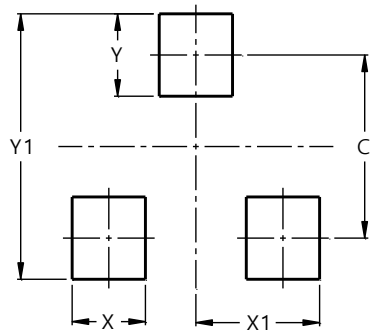


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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