

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
-40V	80mΩ @ V _{GS} = -10V	-3.4A
	100mΩ @ V _{GS} = -4.5V	-3.0A

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.

- Battery Charging
- Power Management Functions
- DC-DC Converters
- Portable Power Adaptors

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMP4065SQ](#))**

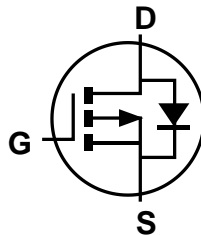
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (Ⓢ)
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

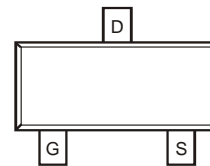
SOT23 (Standard)



Top View



Internal Schematic



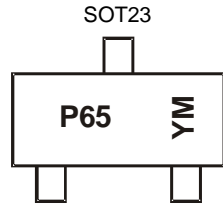
Top View

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP4065S-7	SOT23 (Standard)	3,000/Tape & Reel
DMP4065S-13	SOT23 (Standard)	10,000/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



P65 = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: 1 = 2021)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

Year	2015	...	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	C	...	I	J	K	L	M	N	O	P	R	S

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

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	-40	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (Note 5) V _{GS} = -10V	Steady State	T _A = +25°C	-2.4
		T _A = +70°C	-1.9
Continuous Drain Current (Note 6) V _{GS} = -10V	Steady State	T _A = +25°C	-3.4
		T _A = +70°C	-2.7
Pulsed Drain Current	I _{DM}	-20	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	0.72	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	R _{θJA}	171	°C/W
Power Dissipation (Note 6)	P _D	1.4	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 6)	R _{θJA}	90	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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}	-40	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	-1.0	μA	V _{DS} = -40V, 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)}	-1.0	—	-3.0	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	64	80	mΩ	V _{GS} = -10V, I _D = -4.2A
			85	100		V _{GS} = -4.5V, I _D = -3.3A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	587	—	pF	V _{DS} = -20V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	88	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	40	—	pF	
Gate Resistance	R _g	—	4	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	6.1	—	nC	V _{DS} = -20V, I _D = -4.2A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	12.2	—	nC	
Gate-Source Charge	Q _{gs}	—	1.8	—	nC	
Gate-Drain Charge	Q _{gd}	—	2.4	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	3.6	—	ns	
Turn-On Rise Time	t _R	—	2.9	—	ns	V _{DD} = -15V, V _{GS} = -10V, I _D = -1.0A, R _G = 6Ω
Turn-Off Delay Time	t _{D(OFF)}	—	36.3	—	ns	
Turn-Off Fall Time	t _F	—	15.3	—	ns	

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

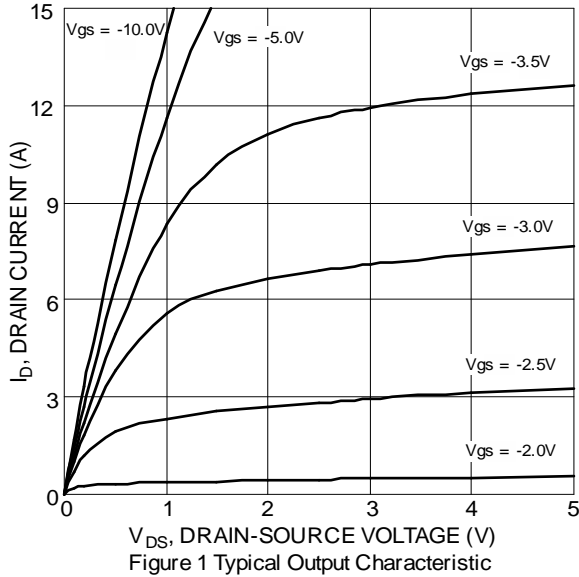


Figure 1 Typical Output Characteristic

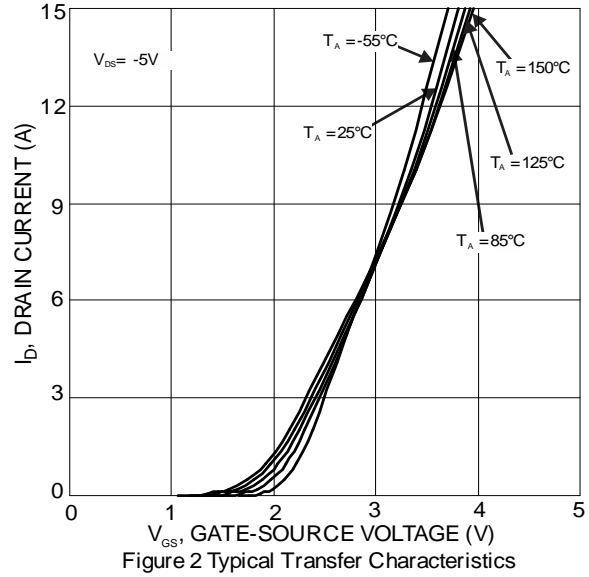


Figure 2 Typical Transfer Characteristics

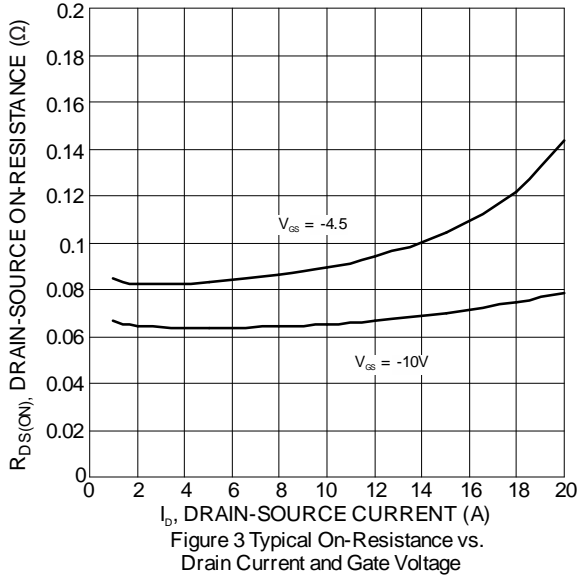


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

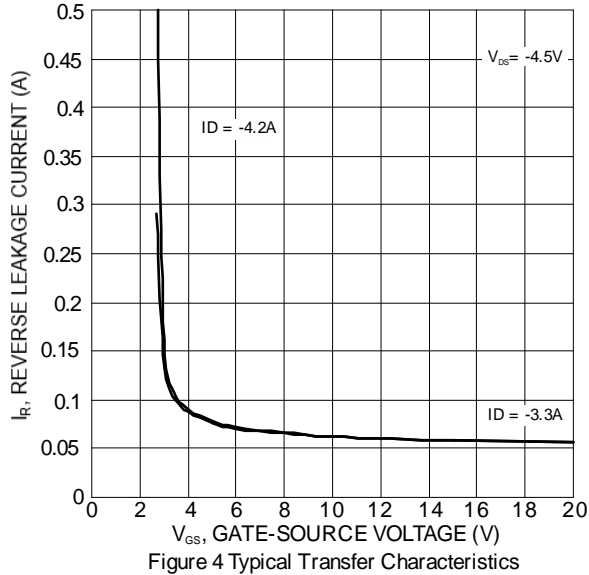


Figure 4 Typical Transfer Characteristics

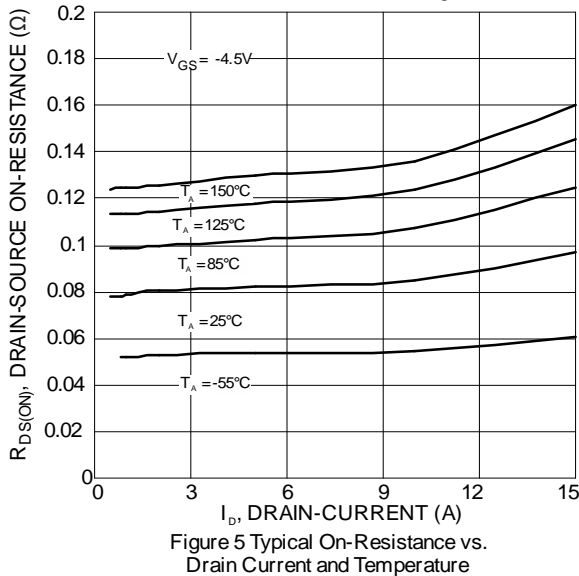


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

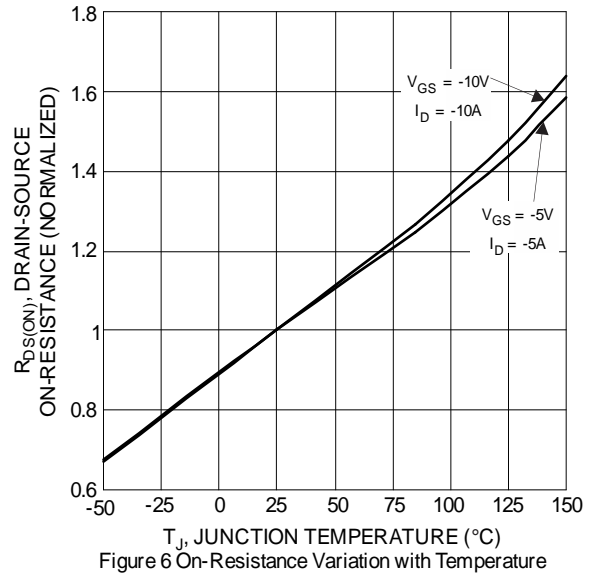


Figure 6 On-Resistance Variation with Temperature

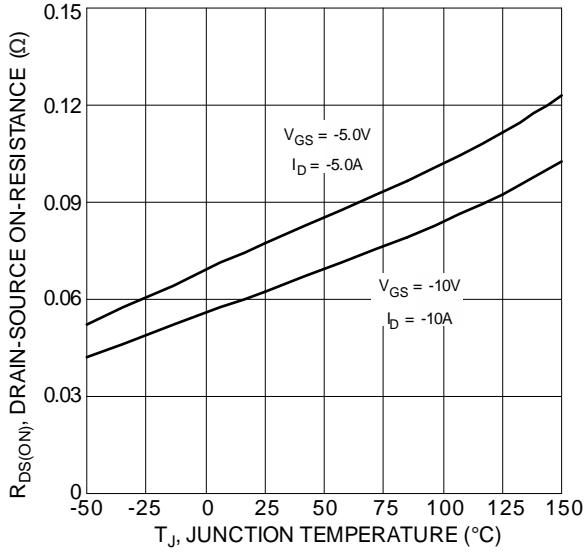


Figure 7 On-Resistance Variation with Temperature

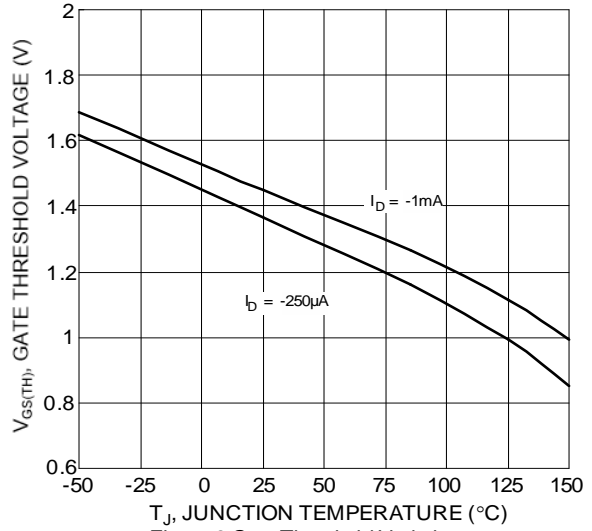


Figure 8 Gate Threshold Variation vs. Junction Temperature

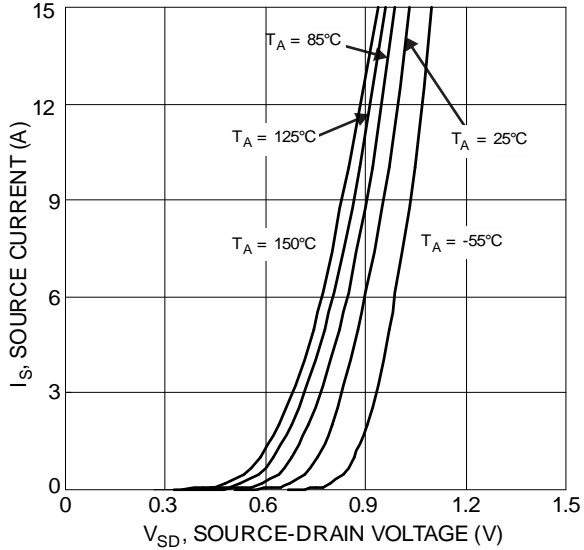


Figure 9 Diode Forward Voltage vs. Current

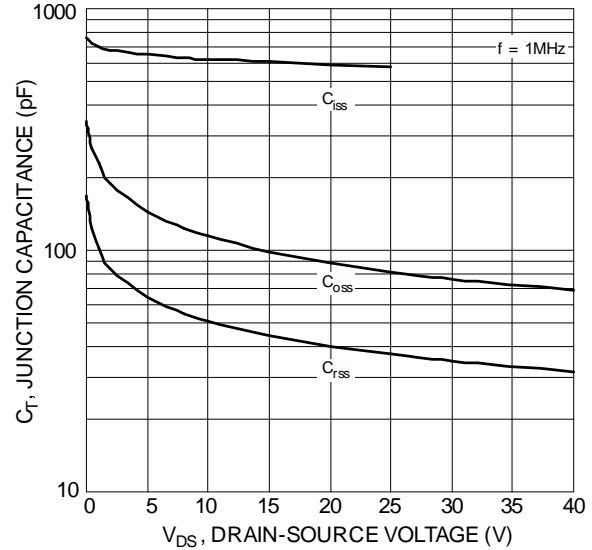


Figure 10 Typical Junction Capacitance

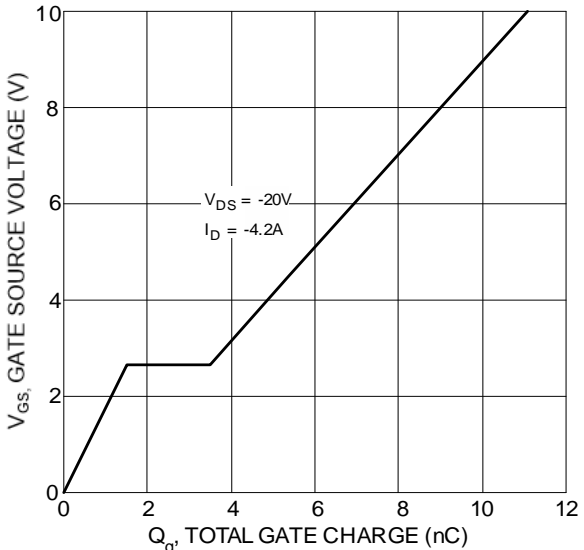


Figure 11 Gate Charge

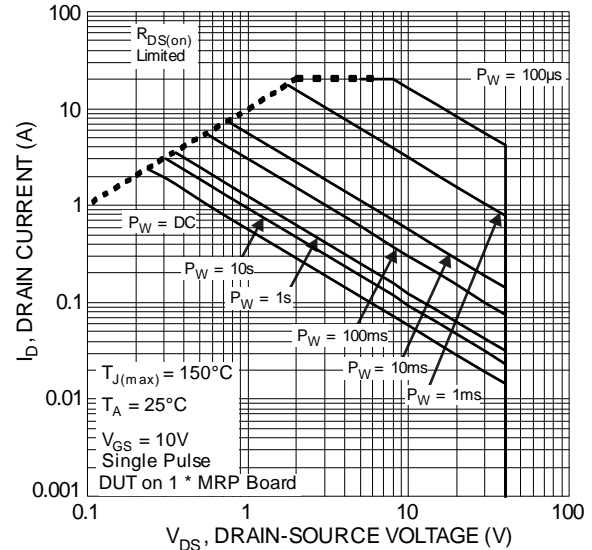
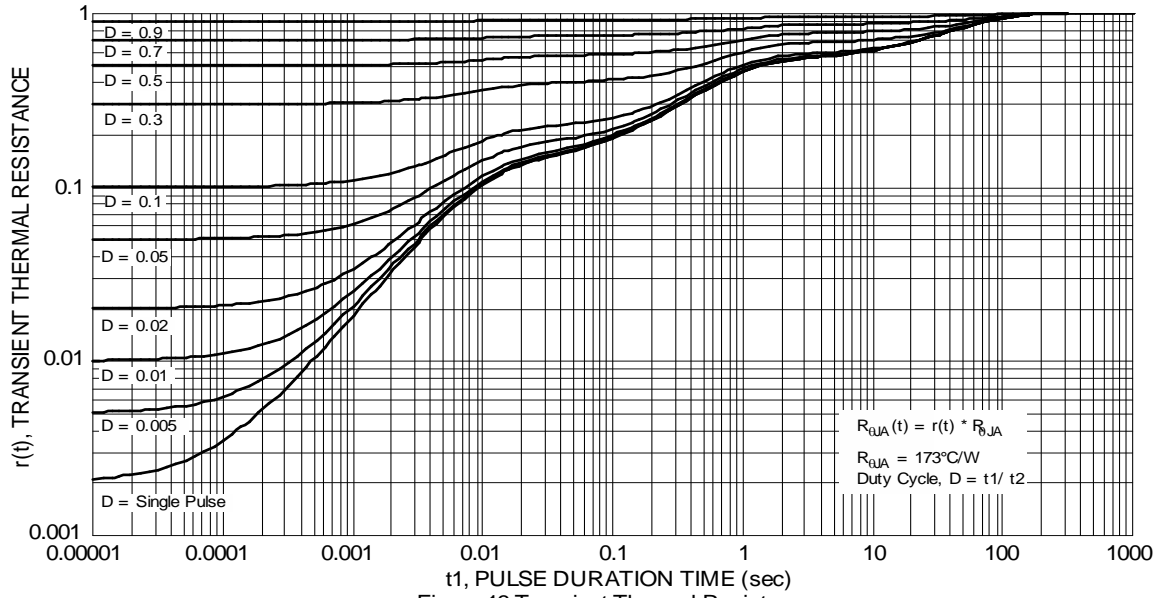


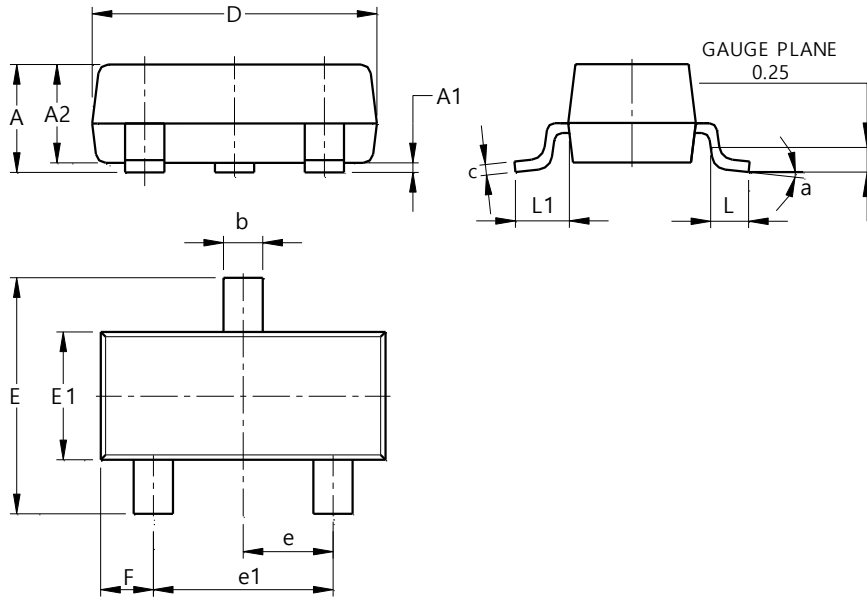
Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

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

SOT23 (Standard)

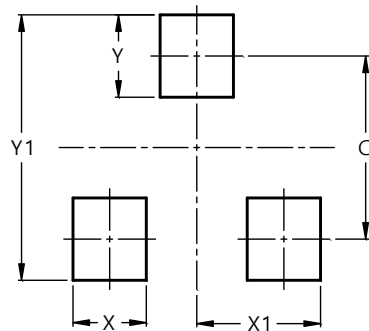


SOT23 (Standard)			
Dim	Min	Max	Typ
A	0.90	1.15	1.025
A1	0.00	0.10	0.05
A2	0.85	1.10	0.975
b	0.30	0.51	0.40
c	0.080	0.202	0.11
D	2.80	3.00	2.90
E	2.25	2.55	2.40
E1	1.20	1.40	1.30
e	0.89	1.03	0.915
e1	1.78	2.05	1.83
F	0.40	0.60	0.535
L1	0.45	0.61	0.55
L	0.25	0.55	0.40
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT23 (Standard)



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

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