

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> Max T <sub>A</sub> = +25°C
-40V	80mΩ @ V <sub>GS</sub> = -10V	-3.4A
	100mΩ @ V <sub>GS</sub> = -4.5V	-3.0A

## 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:

- 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)**
- **The DIODES™ DMP4065SQ 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/>

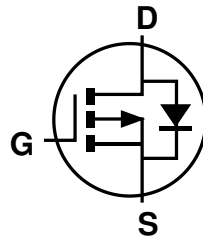
## Mechanical Data

- Package: SOT23
- Package 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)

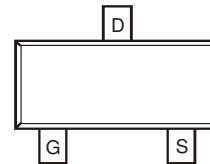
SOT23



Top View



Internal Schematic



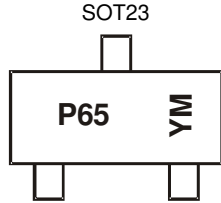
Top View

## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMP4065SQ-7	SOT23	3,000	Tape & Reel
DMP4065SQ-13	SOT23	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: J = 2022)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2017	....	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	E	....	J	K	L	M	N	O	P	R	S	T

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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit	
Drain-Source Voltage		V <sub>DSS</sub>	-40	V	
Gate-Source Voltage		V <sub>GSS</sub>	±20	V	
Continuous Drain Current (Note 5) V <sub>GS</sub> = -10V	Steady State	I <sub>D</sub>	T <sub>A</sub> = +25°C	-2.4	A
			T <sub>A</sub> = +70°C	-1.9	
Continuous Drain Current (Note 6) V <sub>GS</sub> = -10V	Steady State	I <sub>D</sub>	T <sub>A</sub> = +25°C	-3.4	A
			T <sub>A</sub> = +70°C	-2.7	
Pulsed Drain Current		I <sub>DM</sub>	-20	A	
Avalanche Current, L = 0.1mH		I <sub>AS</sub>	-14	A	
Avalanche Energy, L = 0.1mH		E <sub>AS</sub>	9.8	mJ	

## Thermal Characteristics

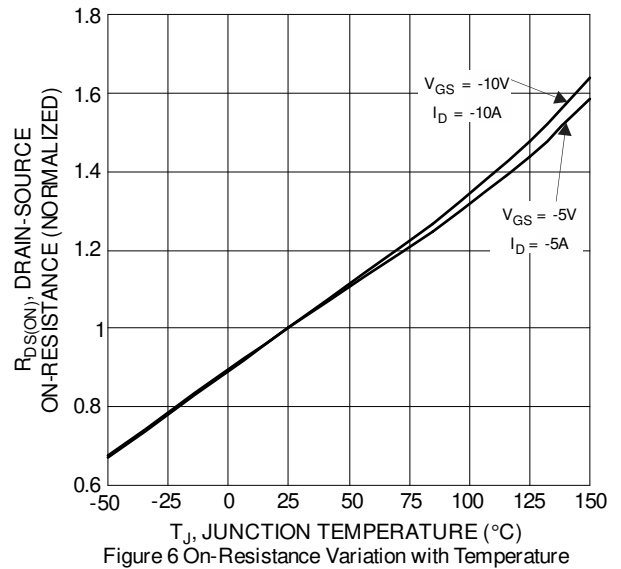
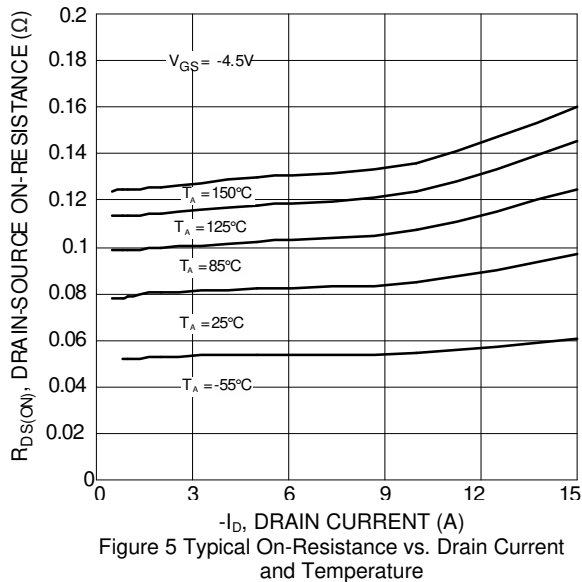
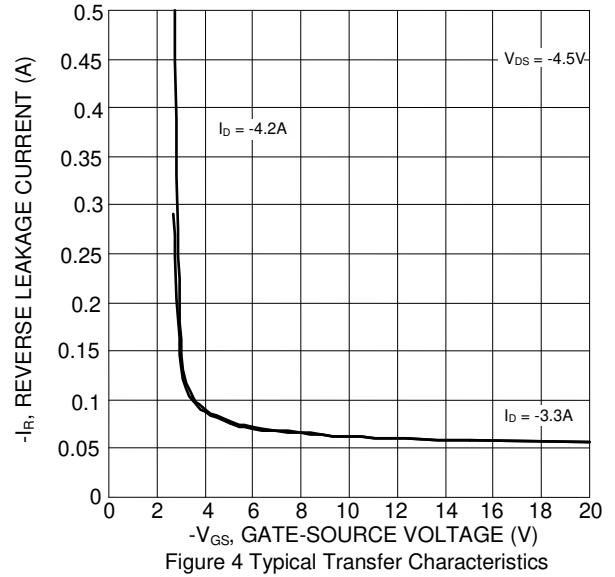
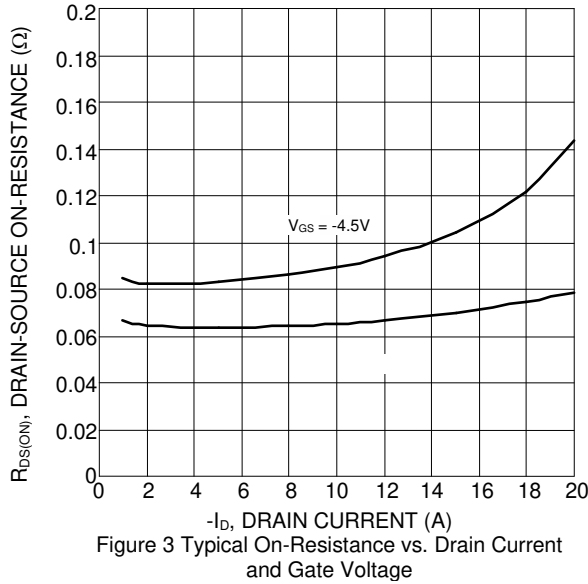
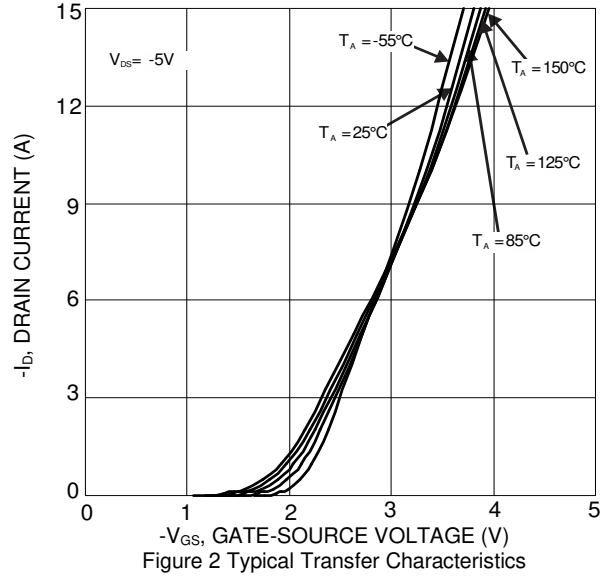
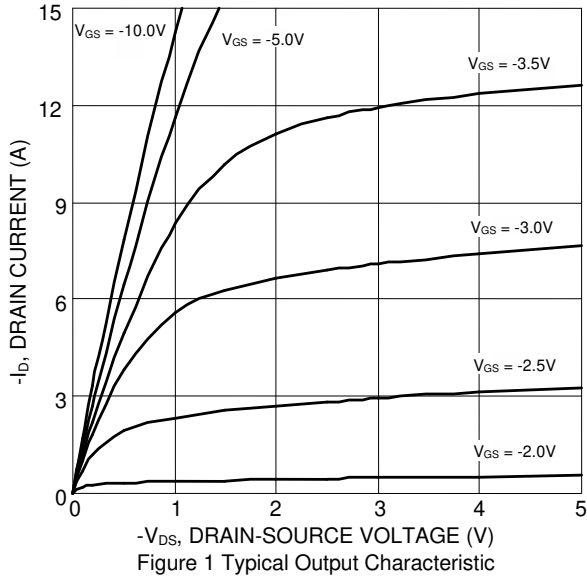
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	0.72	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 5)	R <sub>θJA</sub>	171	°C/W
Power Dissipation (Note 6)	P <sub>D</sub>	1.4	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 6)	R <sub>θJA</sub>	90	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-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 1 inch square copper plate.

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-40	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	-1.0	μA	V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-1.0	—	-3.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	64	80	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.2A
			85	100		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3.3A
Diode Forward Voltage	V <sub>SD</sub>	—	-0.7	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	587	—	pF	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	88	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	40	—	pF	
Gate Resistance	R <sub>g</sub>	—	14.4	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = -4.5V)	Q <sub>g</sub>	—	6.1	—	nC	V <sub>DS</sub> = -20V, I <sub>D</sub> = -4.2A
Total Gate Charge (V <sub>GS</sub> = -10V)	Q <sub>g</sub>	—	12.2	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	1.8	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	2.4	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	3.6	—	ns	
Turn-On Rise Time	t <sub>R</sub>	—	2.9	—	ns	V <sub>DD</sub> = -15V, V <sub>GS</sub> = -10V I <sub>D</sub> = -1.0A, R <sub>G</sub> = 6Ω
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	36.3	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	15.3	—	ns	

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



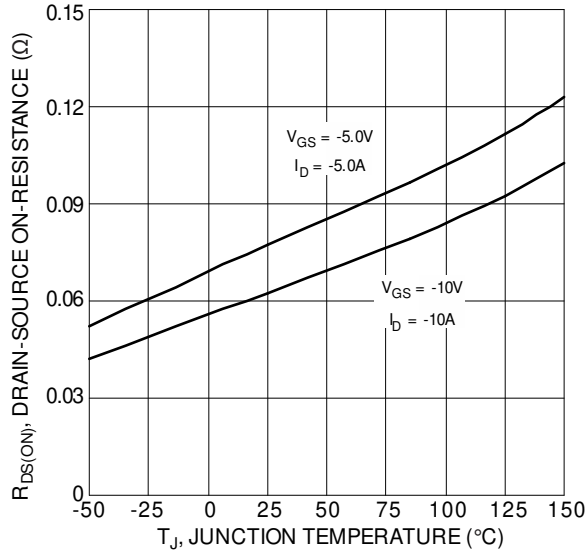


Figure 7 On-Resistance Variation with Temperature

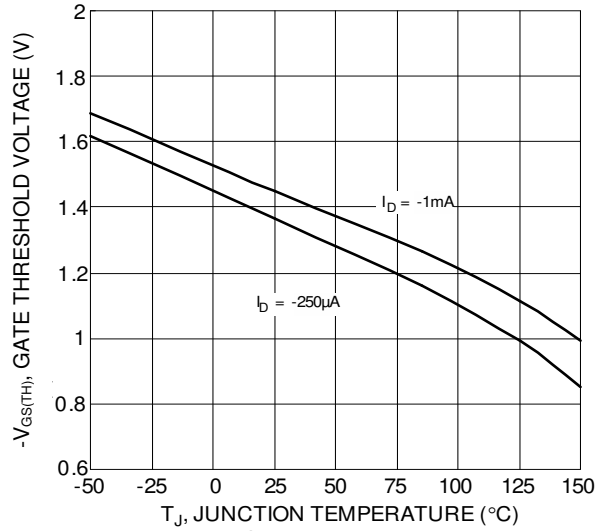


Figure 8 Gate Threshold Variation vs. Junction Temperature

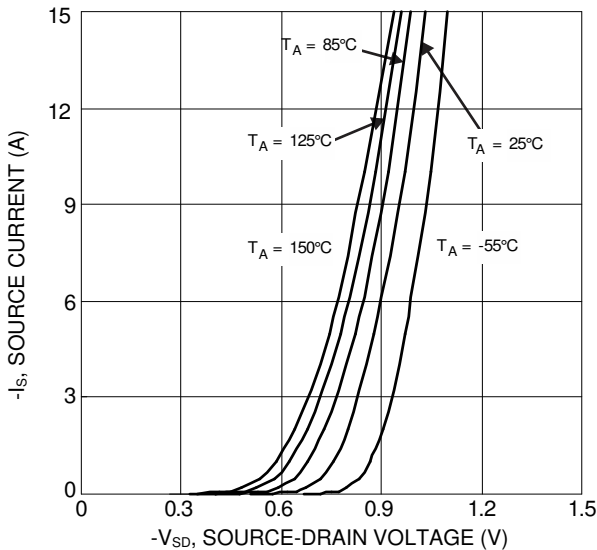


Figure 9 Diode Forward Voltage vs. Current

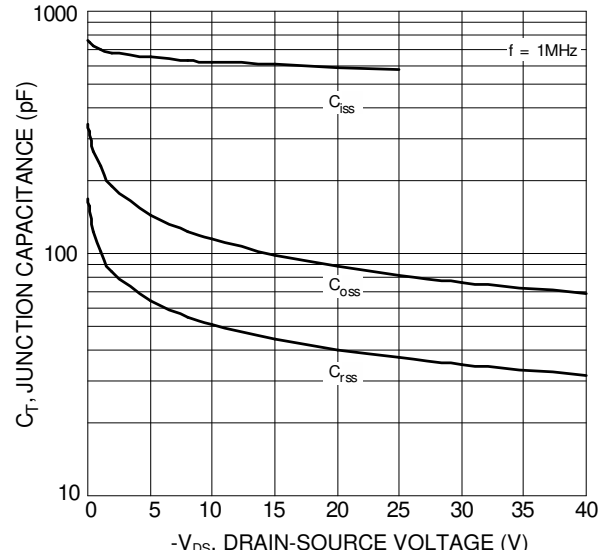


Figure 10 Typical Junction Capacitance

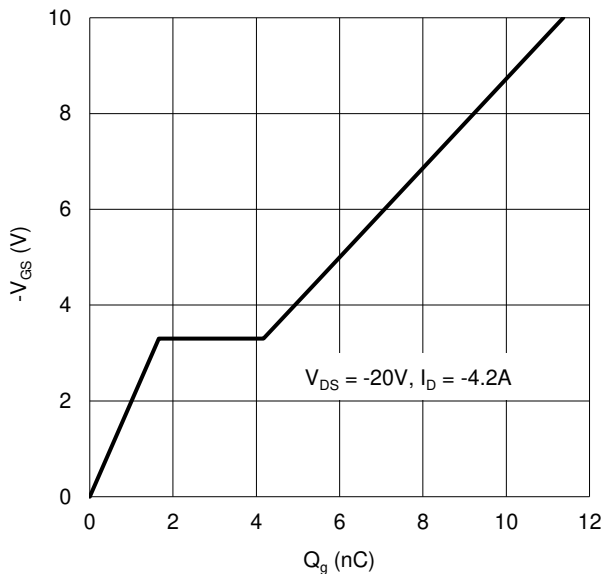


Figure 11 Gate Charge

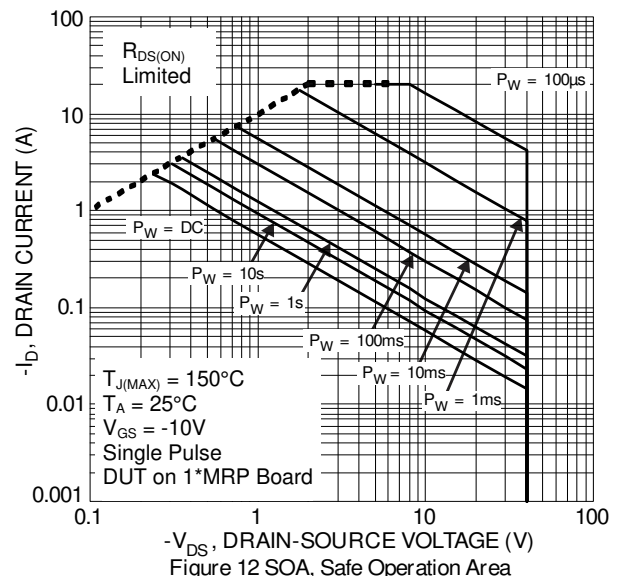


Figure 12 SOA, Safe Operation Area

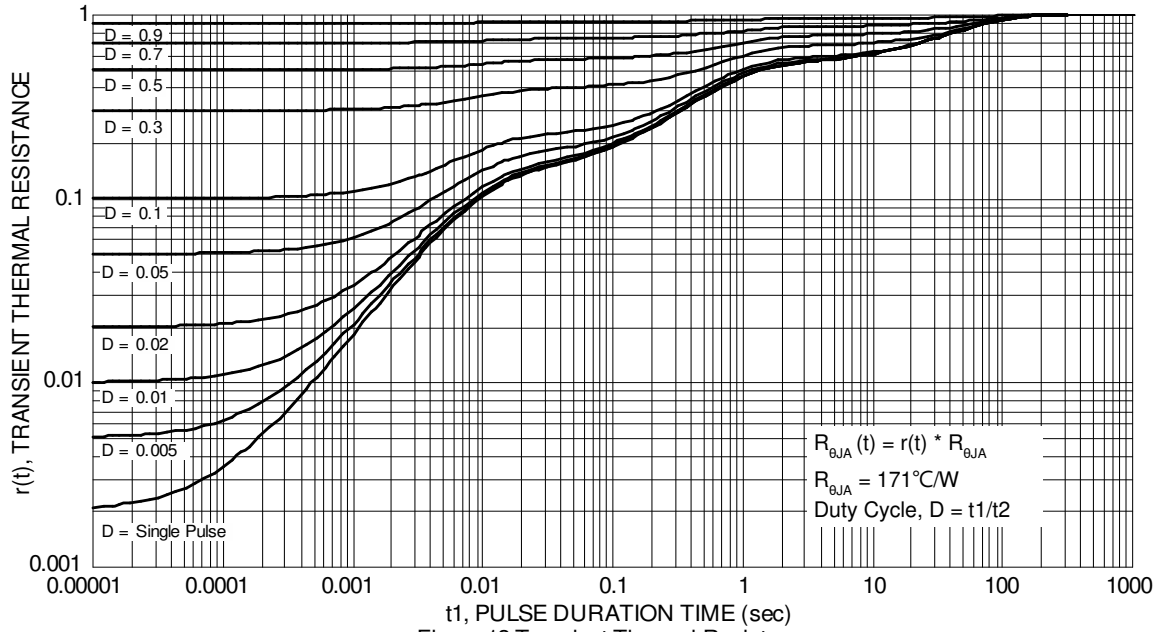
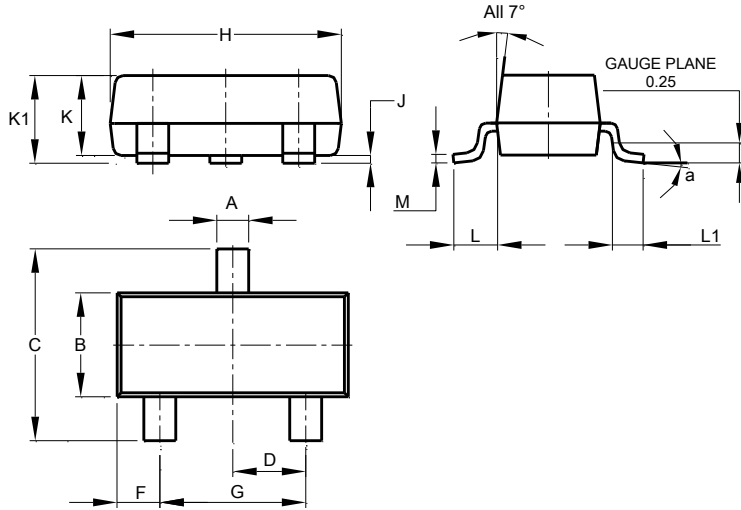


Figure 13 Transient Thermal Resistance

**Package Outline Dimensions**

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

**SOT23**

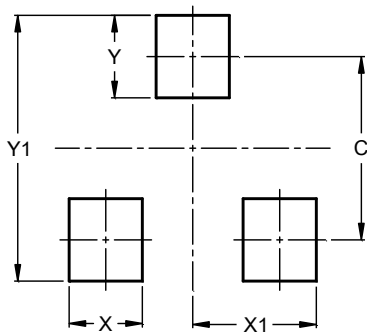


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

**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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