

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>A</sub> = +25°C
240V	11Ω @ V <sub>GS</sub> = 10V	0.27A
	12Ω @ V <sub>GS</sub> = 4.5V	0.26A

## 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

## Features and Benefits

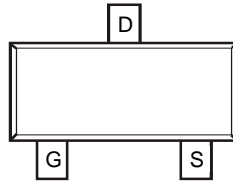
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Small Surface Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

## Mechanical Data

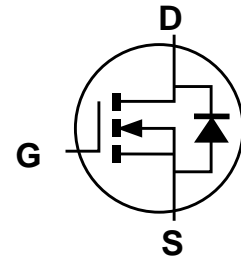
- Case: SOT23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Lead Free Plating (Matte Tin Finish Annealed over Alloy 42 Leadframe). Solderable per MIL-STD-202, Method 208e3
- Terminal Connections: See Diagram
- Weight: 0.006 grams (Approximate)



Top View



Top View  
Pin Configuration



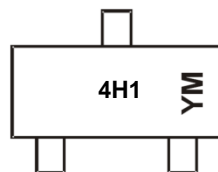
Equivalent Circuit

## Ordering Information (Note 5)

Part Number	Case	Packaging
DMN24H11DSQ-7	SOT23	3,000/Tape & Reel
DMN24H11DSQ-13	SOT23	10,000/Tape & Reel

- 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](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. Refer to [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



4H1 = Product Type Marking Code  
 YM or YM = Date Code Marking  
 Y or Y = Year (ex: E = 2017)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2011	~	2017	2018	2019	2020	2021
Code	Y	~	E	F	G	H	I

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>	240	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 7) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	0.27	A
		T <sub>A</sub> = +70°C		0.22	
Pulsed Drain Current (10µs Pulse, Duty Cycle ≤1%)			I <sub>DM</sub>	0.8	A
Maximum Body Diode Continuous Current (Note 6)			I <sub>S</sub>	0.8	A
Peak Diode Recovery dv/dt			dv/dt	6.0	V/ns

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation	(Note 6)	P <sub>D</sub>	0.75	W
	(Note 7)		1.2	
Thermal Resistance, Junction to Ambient	(Note 6)	R <sub>θJA</sub>	166	°C/W
	(Note 7)		104	
Thermal Resistance, Junction to Case	(Note 7)	R <sub>θJC</sub>	35	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	240	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	100	nA	V <sub>DS</sub> = 240V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.0	2.0	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>	—	3.7	11	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.3A
		—	4.0	12		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.2A
Diode Forward Voltage	V <sub>SD</sub>	—	0.7	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 0.1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iSS</sub>	—	76.8	—	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	6.9	—		
Reverse Transfer Capacitance	C <sub>rSS</sub>	—	4.1	—		
Gate Resistance	R <sub>G</sub>	—	17	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge	Q <sub>g</sub>	—	3.7	—	nC	V <sub>DS</sub> = 192V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.1A
Gate-Source Charge	Q <sub>gs</sub>	—	0.3	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	2.1	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	4.8	—	ns	V <sub>DS</sub> = 120V, I <sub>D</sub> = 0.1A, V <sub>GS</sub> = 10V, R <sub>G</sub> = 6.0Ω
Turn-On Rise Time	t <sub>r</sub>	—	4.7	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	17.5	—		
Turn-Off Fall Time	t <sub>f</sub>	—	102.3	—		
Reverse Recovery Time	t <sub>RR</sub>	—	45.6	—	ns	V <sub>R</sub> = 100V, I <sub>F</sub> = 1.0A, di/dt = 100A/µs
Reverse Recovery Charge	Q <sub>RR</sub>	—	51.6	—	nC	

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

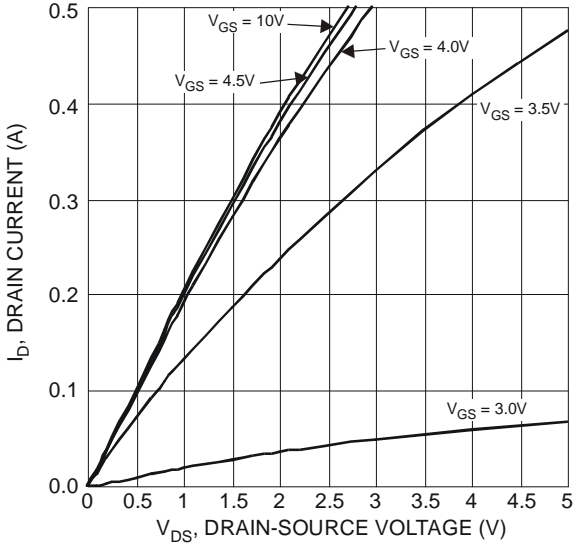


Figure 1 Typical Output Characteristics

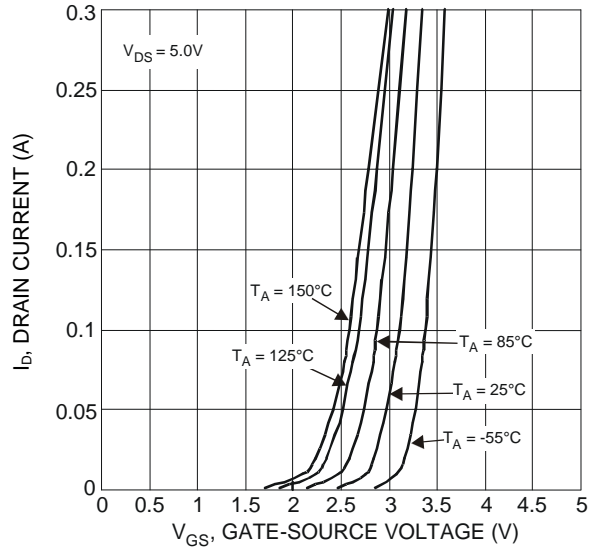


Figure 2 Typical Transfer Characteristics

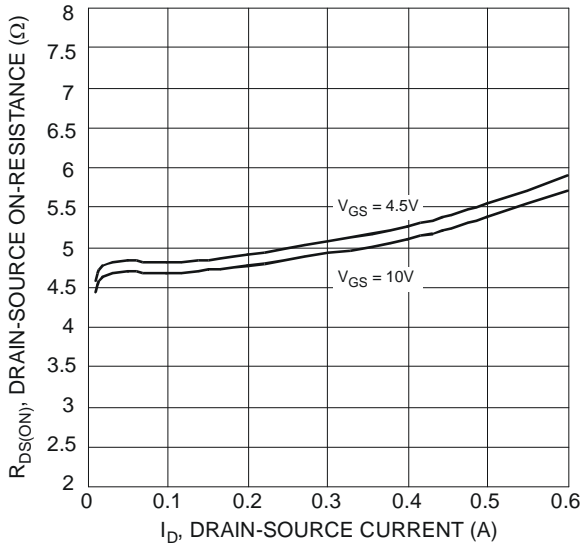


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

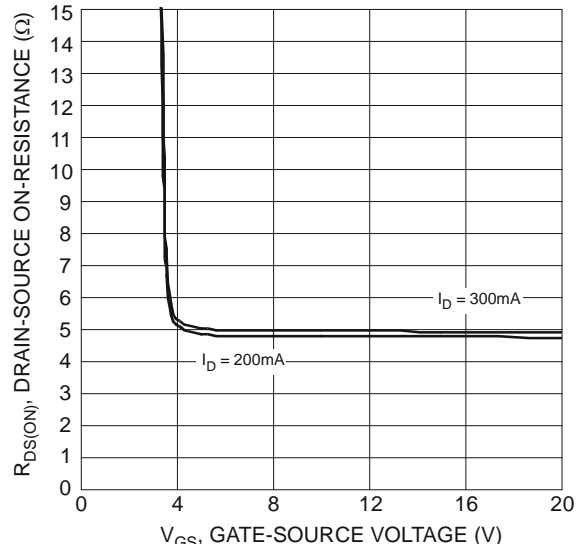


Figure 4 Typical Transfer Characteristics

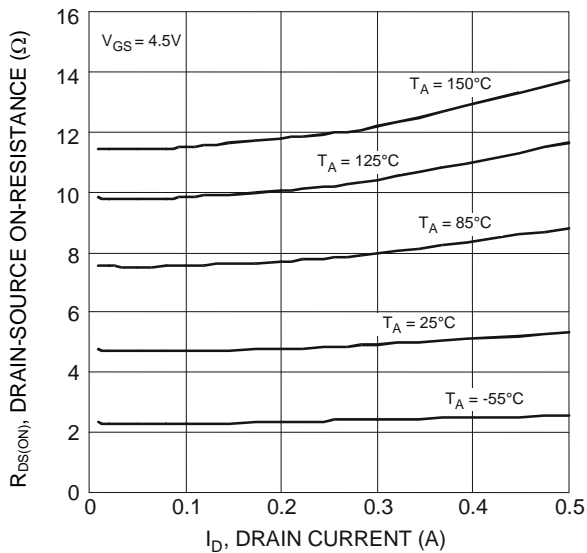


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

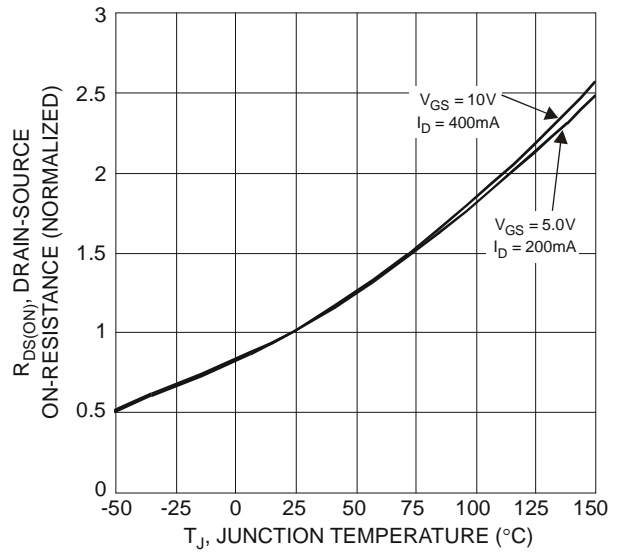


Figure 6 On-Resistance Variation with Temperature

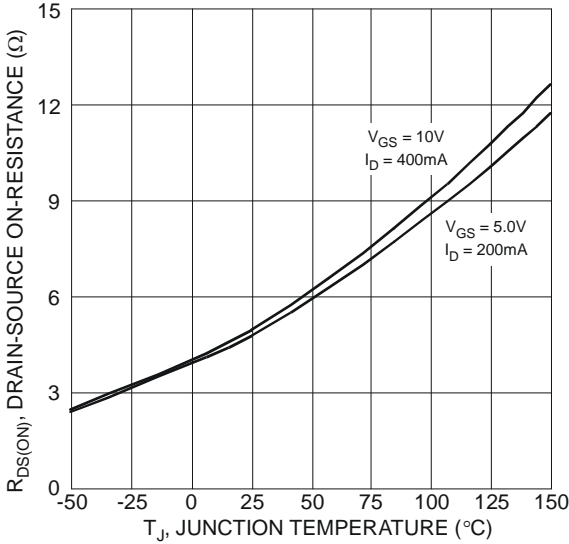


Figure 7 On-Resistance Variation with Temperature

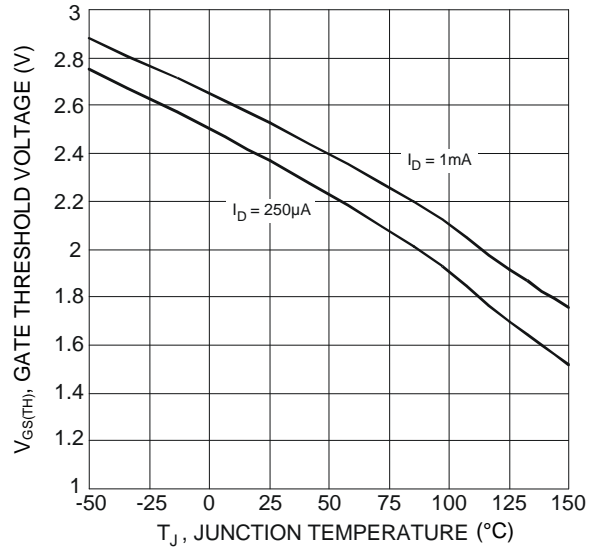


Figure 8 Gate Threshold Variation vs. Junction Temperature

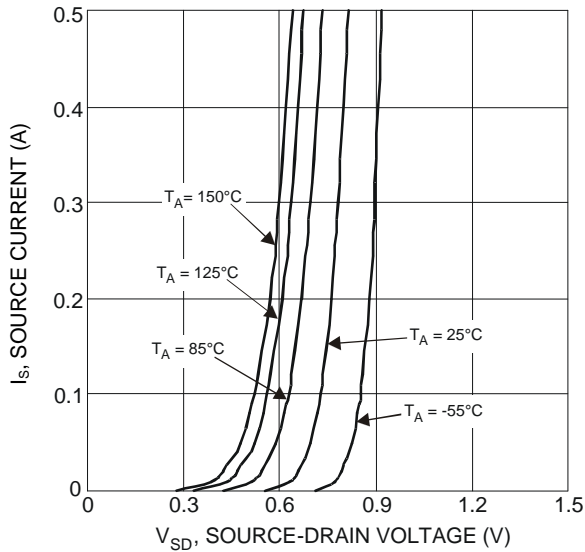


Figure 9 Diode Forward Voltage vs. Current

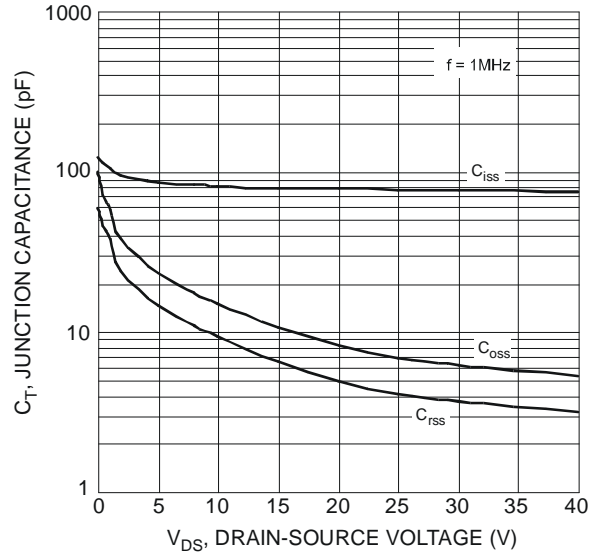


Figure 10 Typical Junction Capacitance

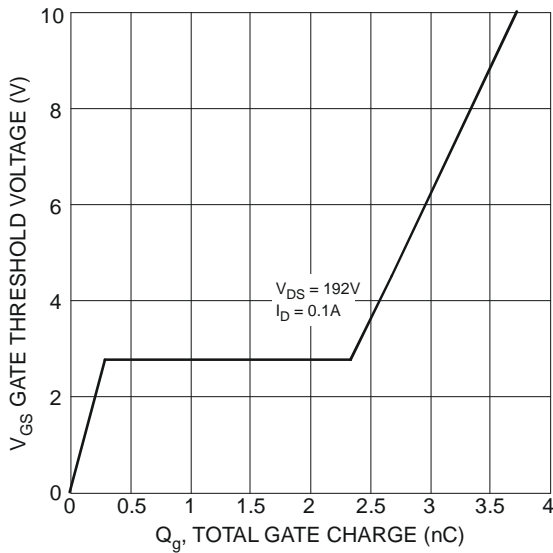


Figure 11 Gate Charge

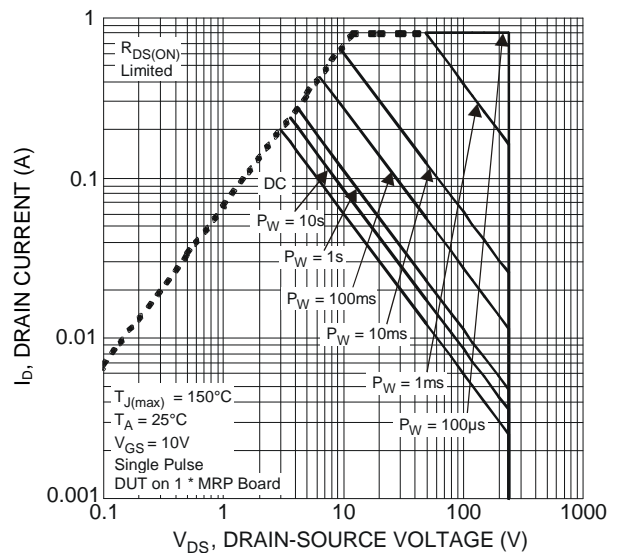


Figure 12 SOA, Safe Operation Area

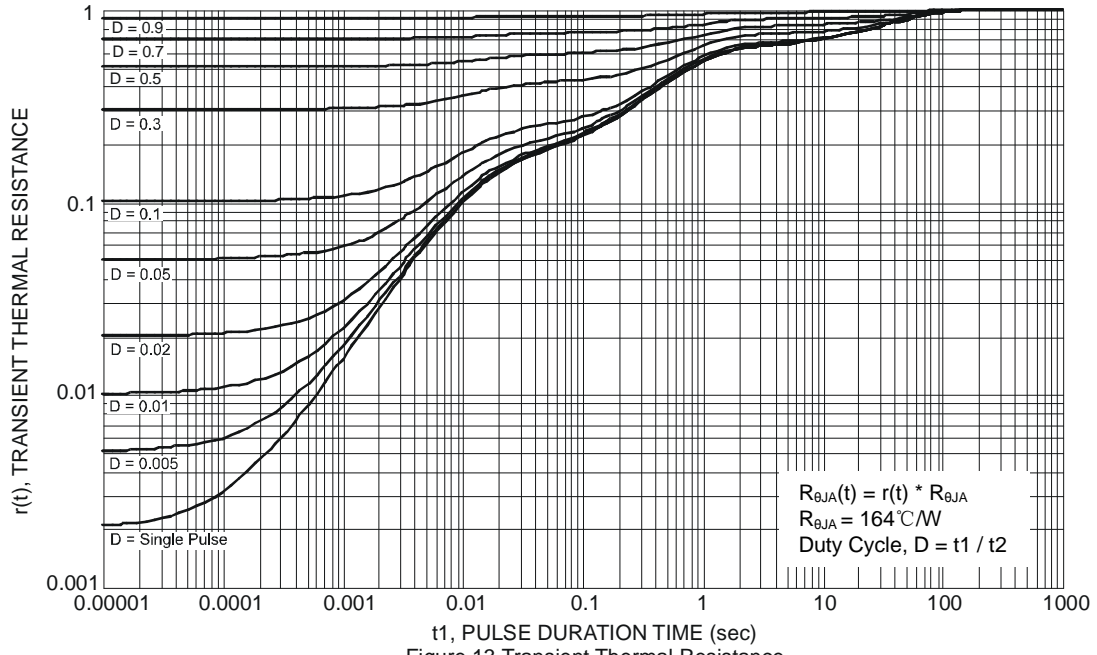
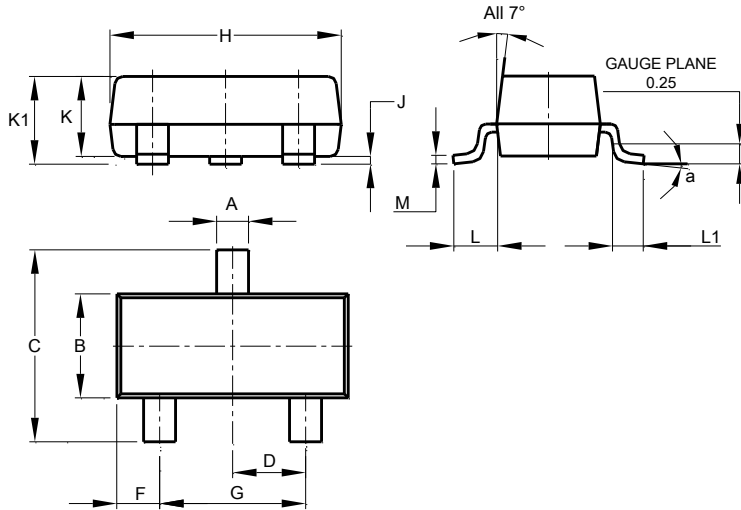


Figure 13 Transient Thermal Resistance

**Package Outline Dimensions**

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

**SOT23**

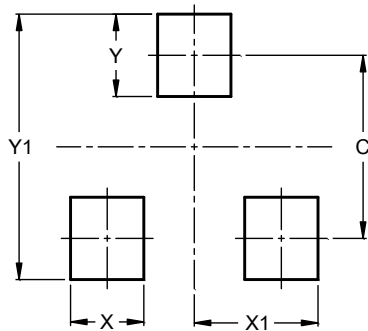


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

**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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