



**THE DATASHEET OF  
DMPH6250SQ-7**



## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$ Max	$I_D$ Max $T_A = +25^\circ\text{C}$
-60V	155m $\Omega$ @ $V_{GS} = -10\text{V}$	-2.4A
	240m $\Omega$ @ $V_{GS} = -4.5\text{V}$	-1.9A

## Features and Benefits

- Rated to +175°C—Ideal for High Ambient Temperature Environments
- 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

## 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:

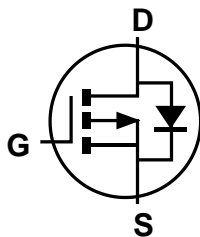
- Battery Charging
- Power Management Functions
- DC-DC Converters
- Load Switch

## Mechanical Data

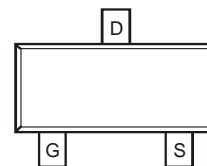
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish—Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Terminals Connections: See Diagram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



Top View



Internal Schematic



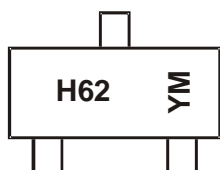
Top View

## Ordering Information (Note 5)

Part Number	Case	Packaging
DMPH6250SQ-7	SOT23	3000/Tape & Reel
DMPH6250SQ-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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



H62 = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: F = 2018)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2017	2018	2019	2020	2021	2022	2023	2024
Code	E	F	G	H	I	J	K	L

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>	-60	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 7) V <sub>GS</sub> = -10V	I <sub>D</sub>	Steady State T <sub>A</sub> = +25°C	-2.4
		T <sub>A</sub> = +100°C	-1.5
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	-13	A
Maximum Continuous Body Diode Forward Current (Note 7)	I <sub>S</sub>	-1.6	A
Pulsed Body Diode Forward Current (380µs Pulse, Duty Cycle = 1%)	I <sub>SM</sub>	-13	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P <sub>D</sub>	0.92	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 6)	R <sub>θJA</sub>	165	°C/W
Power Dissipation (Note 7)	P <sub>D</sub>	1.62	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 7)	R <sub>θJA</sub>	93.1	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +175	°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>	-60	—	—	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> = -60V, 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 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-1.0	-1.9	-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>	—	112	155	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -2A
		—	149	240		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2A
Diode Forward Voltage	V <sub>SD</sub>	—	-0.8	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	512	—	pF	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	31.3	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	23.2	—	pF	
Gate Resistance	R <sub>g</sub>	—	11.9	—	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>	—	4.0	—	nC	V <sub>DS</sub> = -30V, I <sub>D</sub> = -2A
Total Gate Charge (V <sub>GS</sub> = -10V)	Q <sub>g</sub>	—	8.3	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	1.2	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	1.7	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	12.5	—	ns	V <sub>DD</sub> = -30V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -1.0A, R <sub>G</sub> = 50Ω
Turn-On Rise Time	t <sub>R</sub>	—	13.4	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	96.0	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	39.1	—	ns	
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	9.6	—	ns	I <sub>F</sub> = -1A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	3.1	—	nC	I <sub>F</sub> = -1A, di/dt = 100A/µs

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

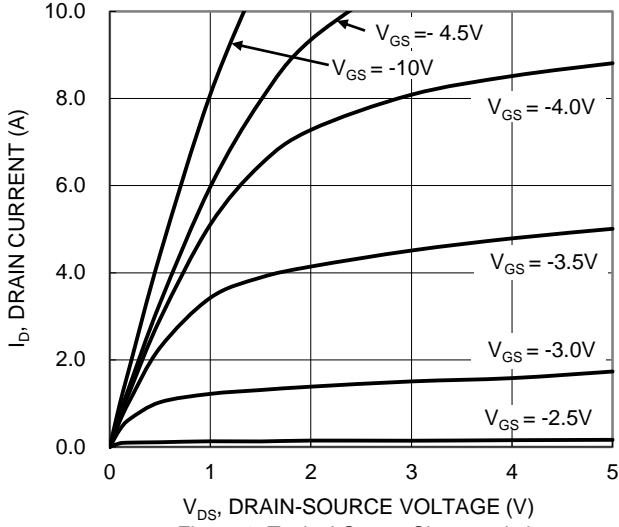


Figure 1. Typical Output Characteristic

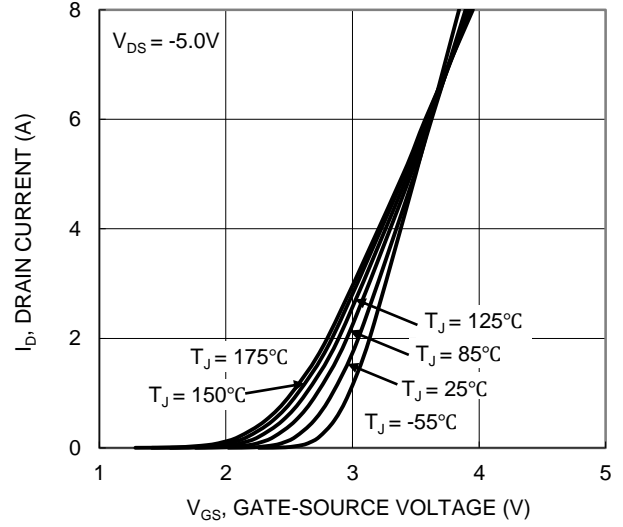


Figure 2. Typical Transfer Characteristic

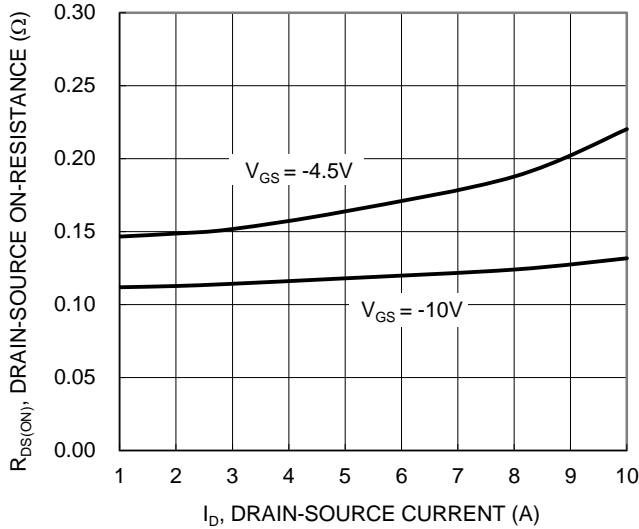


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

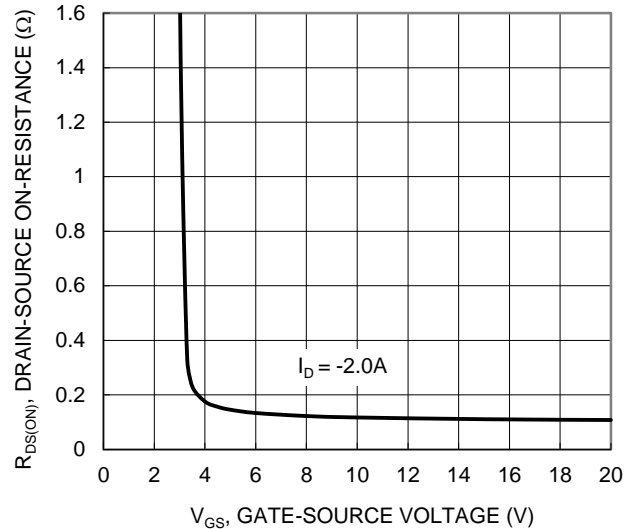


Figure 4. Typical Transfer Characteristic

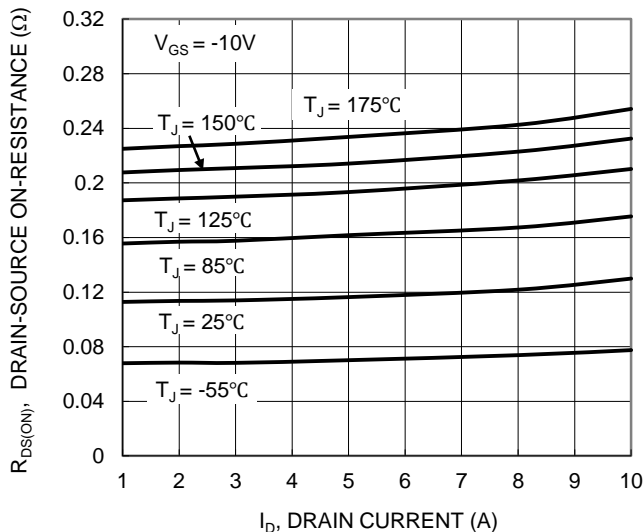


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

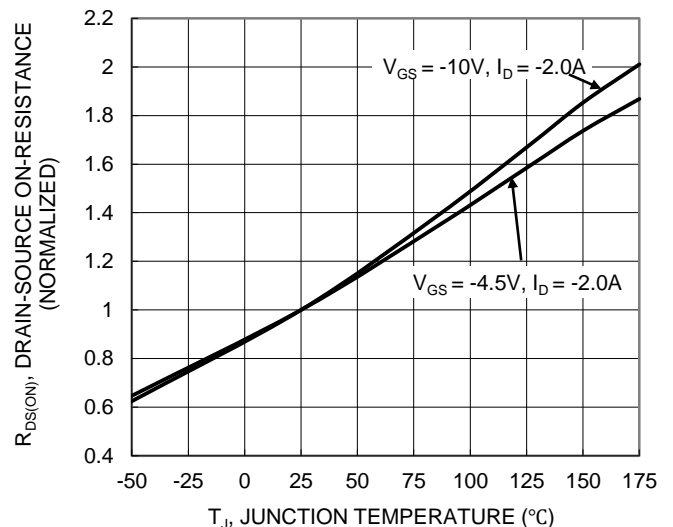
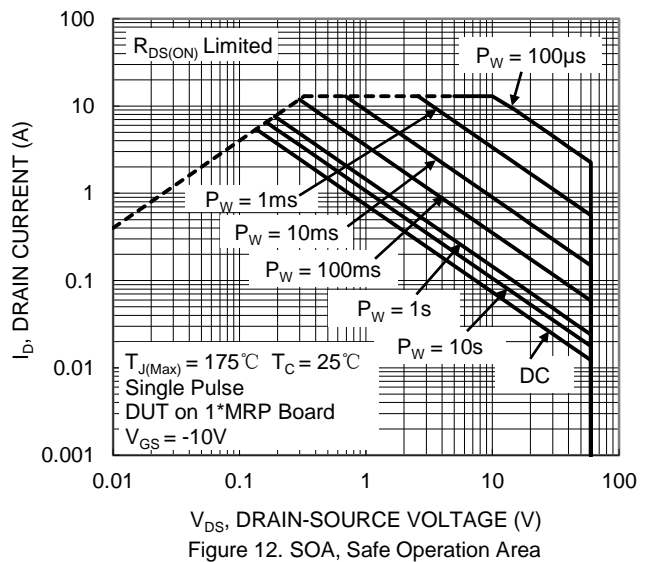
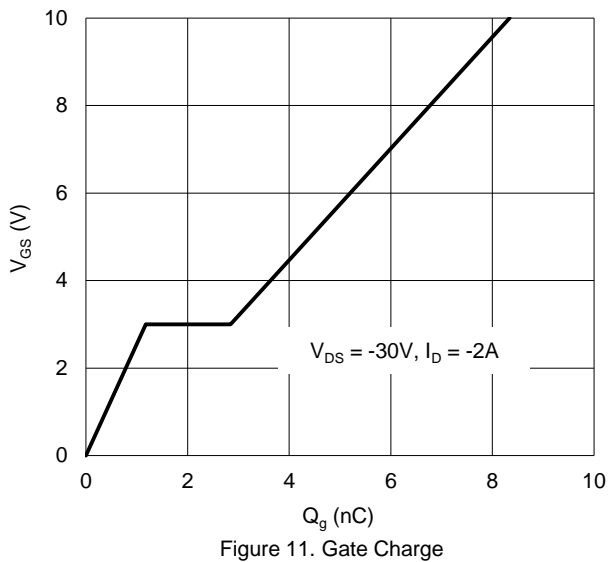
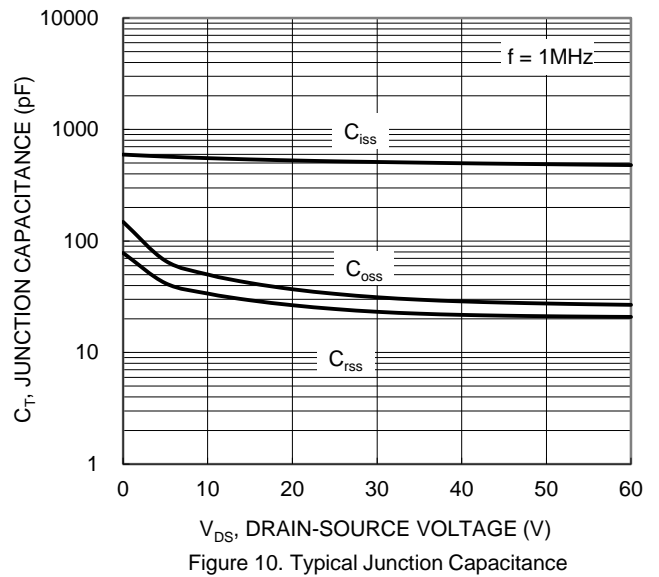
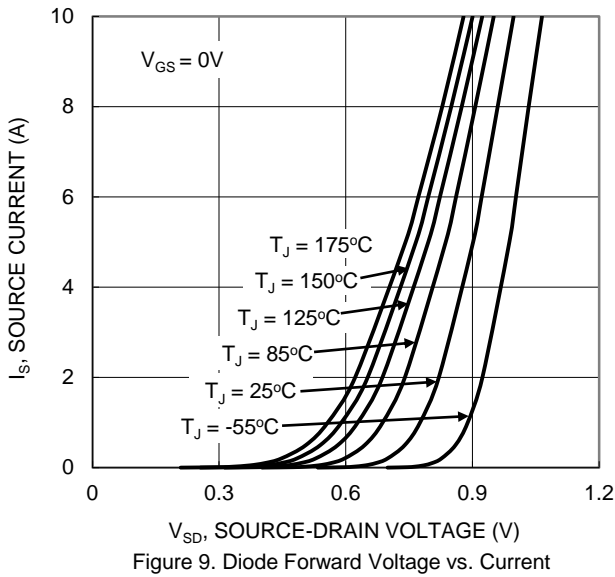
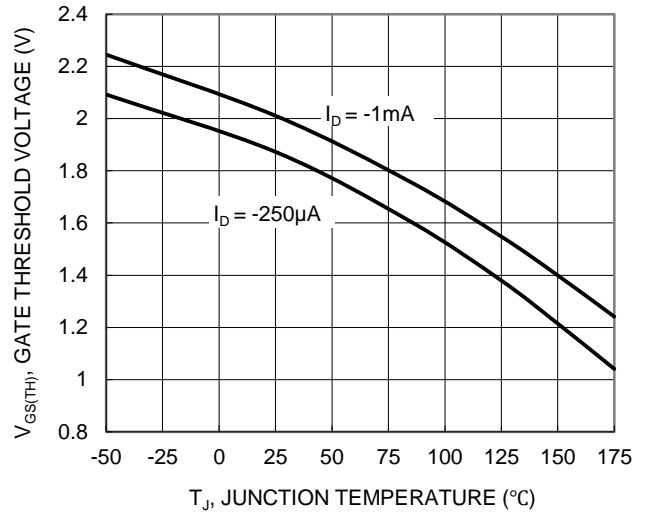
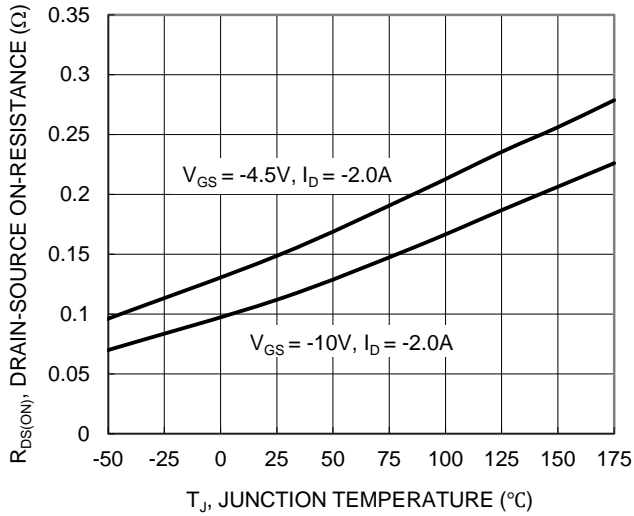


Figure 6. On-Resistance Variation with Temperature



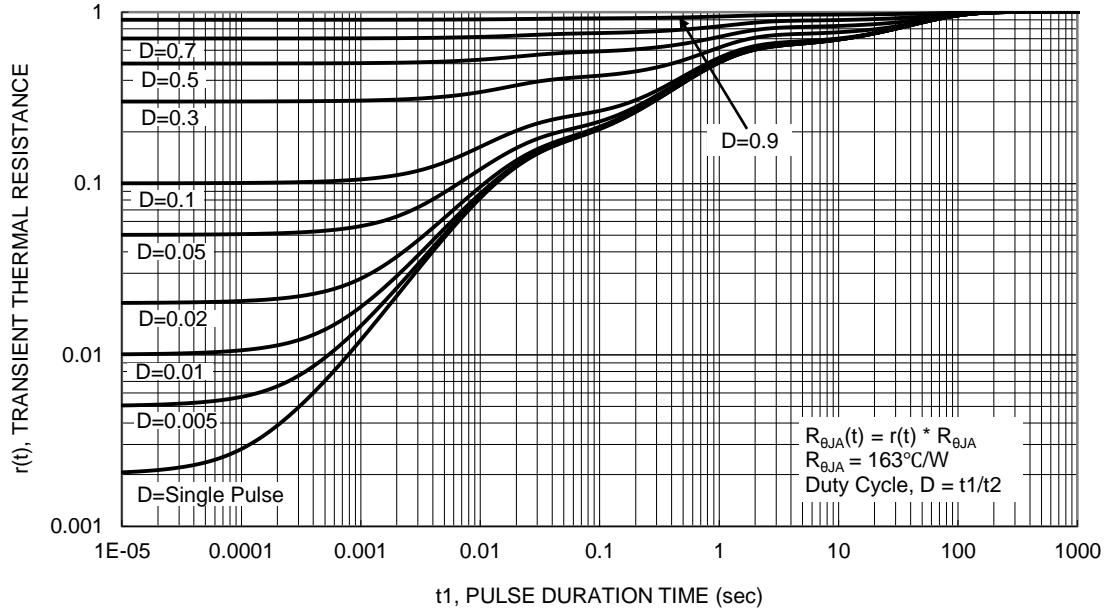
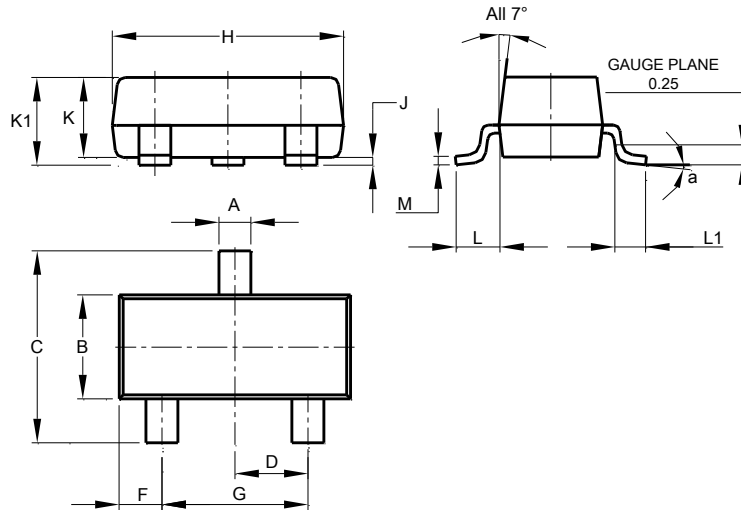


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

**SOT23**

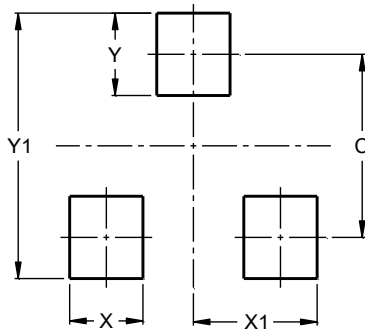


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

## 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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