

Product Summary

BV _{DSS}	R _{DSON} Max	I _D Max TA = +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_{DSON}) 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](#))

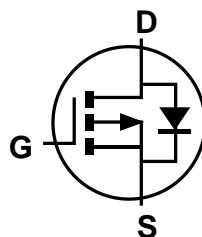
Mechanical Data

- 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 (E3)
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

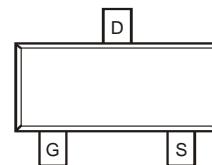
SOT23 (Standard)



Top View



Internal Schematic



Top View

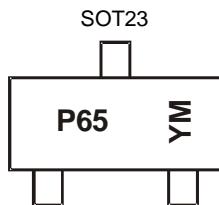
Ordering Information (Note 4)

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: I = 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 (@ $T_A = +25^\circ\text{C}$, 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) $V_{GS} = -10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$T_A = +70^\circ\text{C}$	I_D	-2.4 -1.9
Continuous Drain Current (Note 6) $V_{GS} = -10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$T_A = +70^\circ\text{C}$	I_D	-3.4 -2.7
Pulsed Drain Current				I_{DM}	-20

Thermal Characteristics

Characteristic	Symbol			Value	Unit
Power Dissipation (Note 5)	P_D			0.72	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 5)	$R_{\theta JA}$			171	°C/W
Power Dissipation (Note 6)	P_D			1.4	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 6)	$R_{\theta JA}$			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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-40	—	—	V	$\text{V}_{GS} = 0\text{V}$, $\text{I}_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DSS}	—	—	-1.0	μA	$\text{V}_{DS} = -40\text{V}$, $\text{V}_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$\text{V}_{GS} = \pm 20\text{V}$, $\text{V}_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$\text{V}_{GS(\text{TH})}$	-1.0	—	-3.0	V	$\text{V}_{DS} = \text{V}_{GS}$, $\text{I}_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{DS(\text{ON})}$	—	64 85 100	80	$\text{m}\Omega$	$\text{V}_{GS} = -10\text{V}$, $\text{I}_D = -4.2\text{A}$ $\text{V}_{GS} = -4.5\text{V}$, $\text{I}_D = -3.3\text{A}$
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	$\text{V}_{GS} = 0\text{V}$, $\text{I}_S = -1\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	587	—	pF	$\text{V}_{DS} = -20\text{V}$, $\text{V}_{GS} = 0\text{V}$, $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	88	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	40	—	pF	
Gate Resistance	R_g	—	4	—	Ω	
Total Gate Charge ($\text{V}_{GS} = -4.5\text{V}$)	Q_g	—	6.1	—	nC	
Total Gate Charge ($\text{V}_{GS} = -10\text{V}$)	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	$t_{D(\text{ON})}$	—	3.6	—	ns	
Turn-On Rise Time	t_r	—	2.9	—	ns	
Turn-Off Delay Time	$t_{D(\text{OFF})}$	—	36.3	—	ns	$\text{V}_{DD} = -15\text{V}$, $\text{V}_{GS} = -10\text{V}$, $\text{I}_D = -1.0\text{A}$, $R_g = 6\Omega$
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.

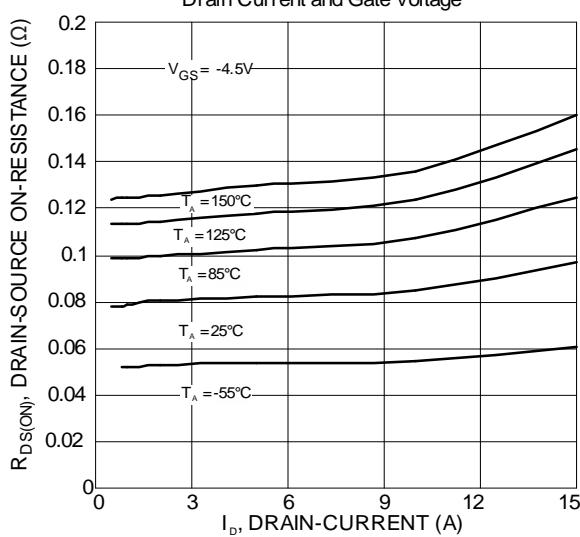
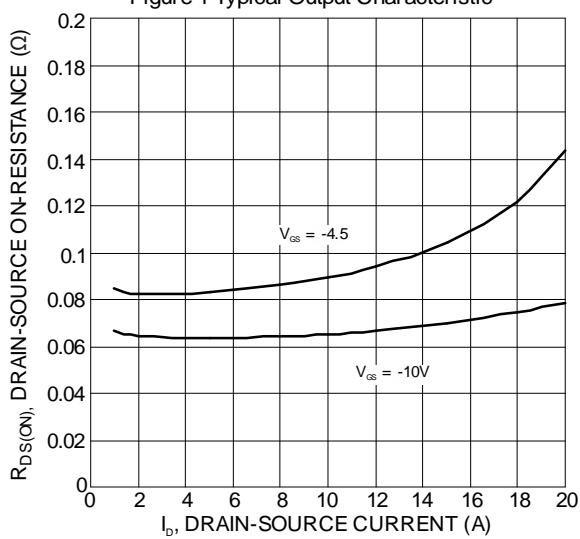
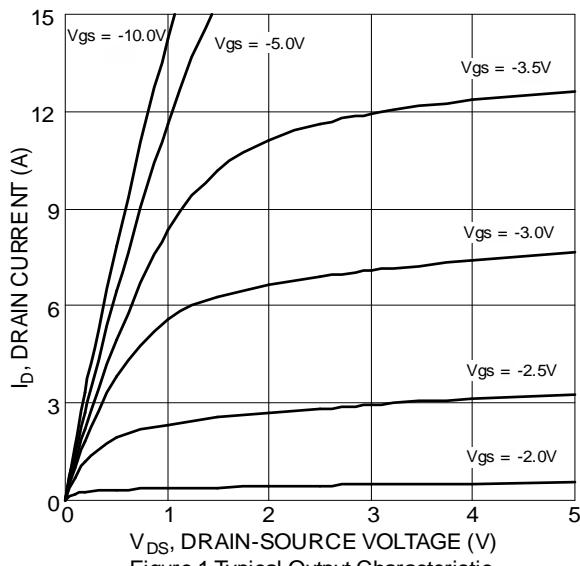
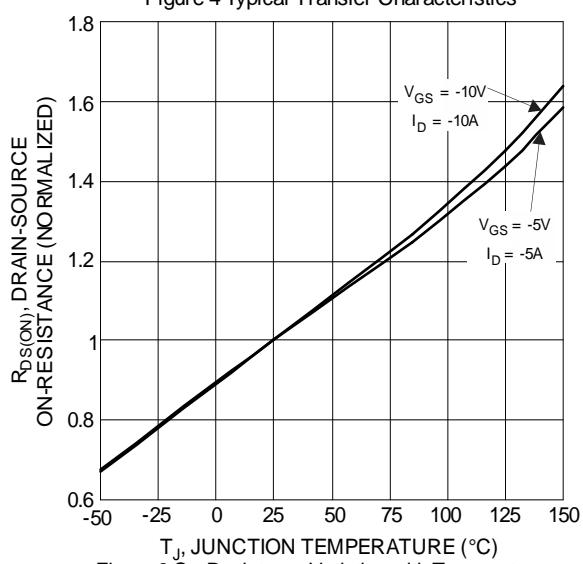
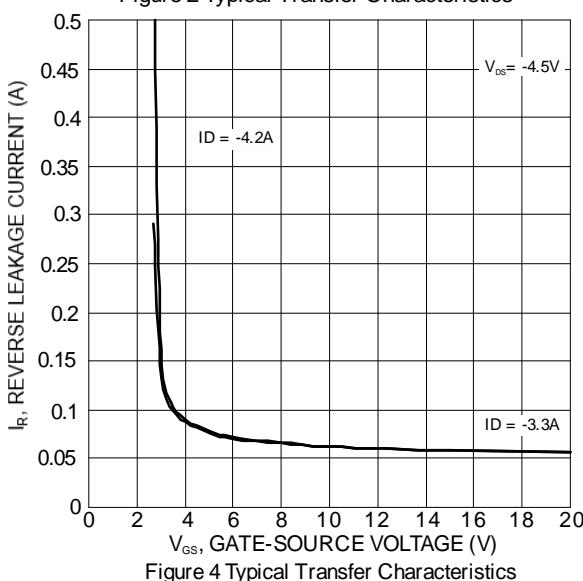
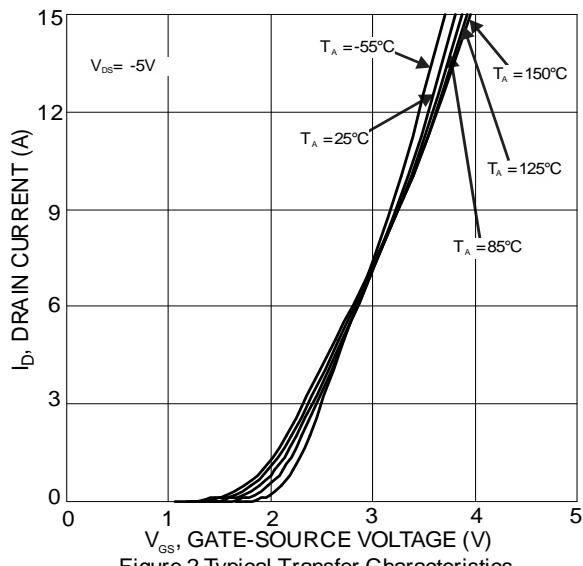


Figure 1
Figure 3
Figure 5



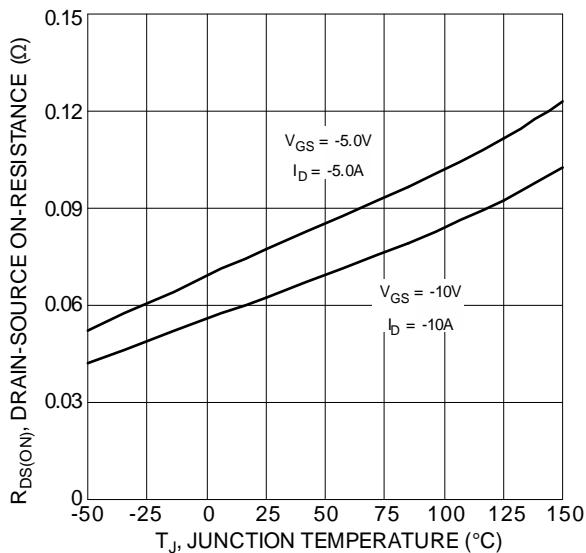


Figure 7 On-Resistance Variation with Temperature

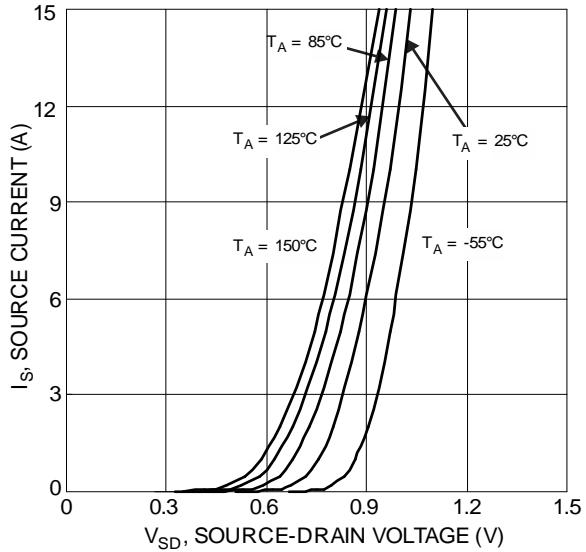


Figure 9 Diode Forward Voltage vs. Current

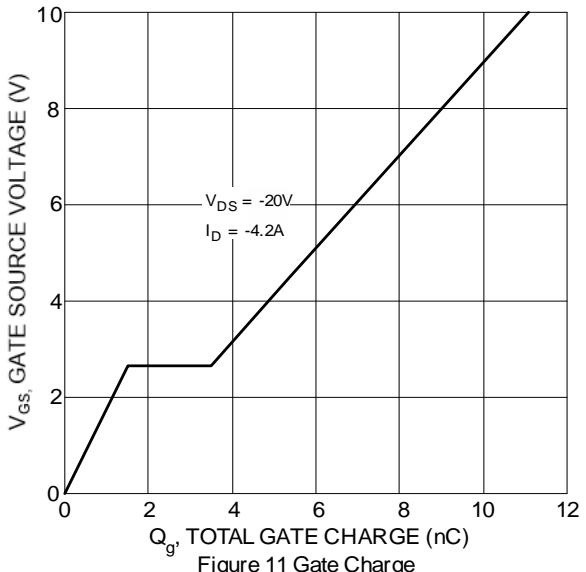


Figure 11 Gate Charge

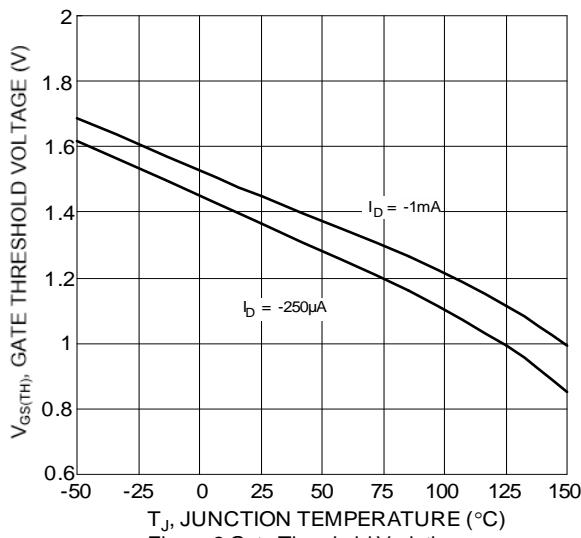


Figure 8 Gate Threshold Variation vs.

Junction Temperature

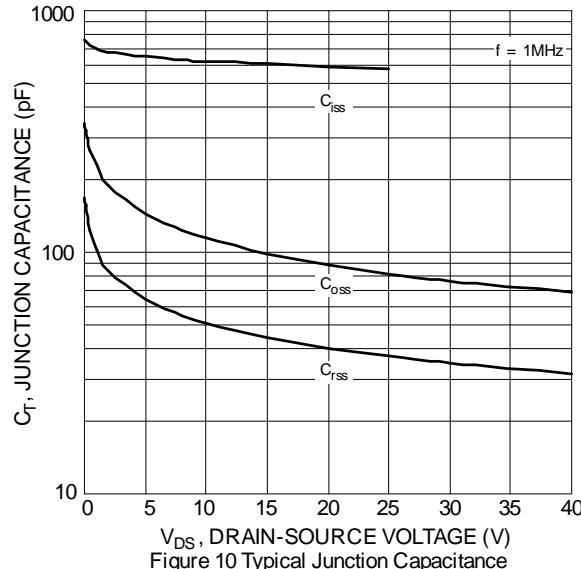


Figure 10 Typical Junction Capacitance

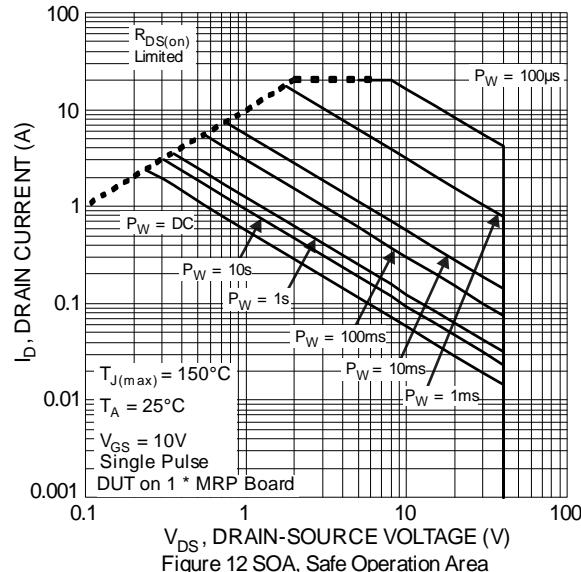


Figure 12 SOA, Safe Operation Area

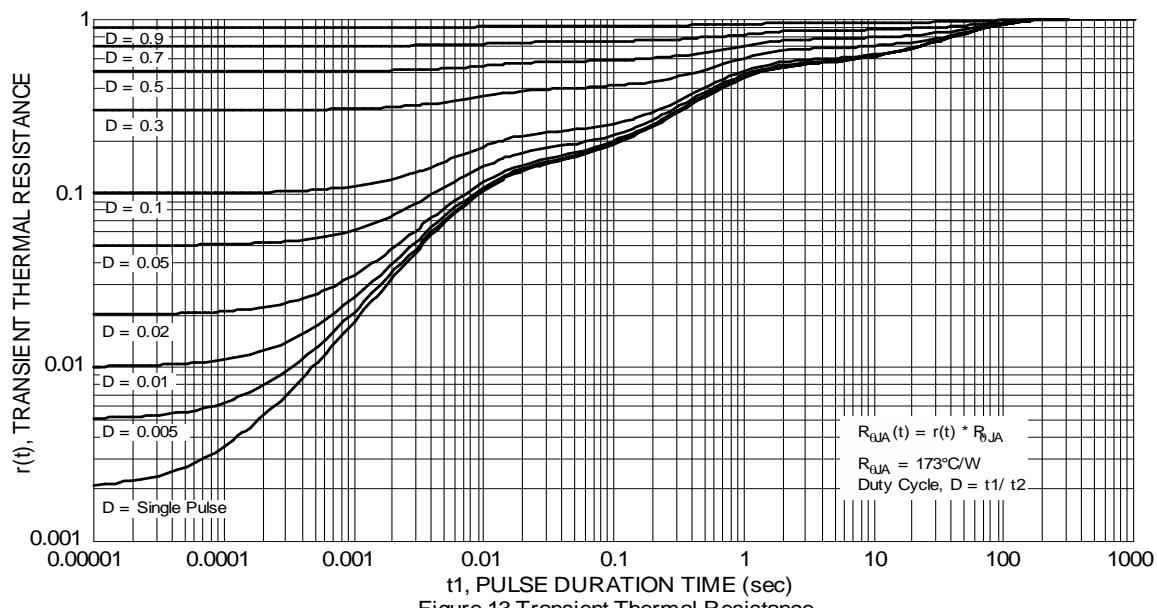
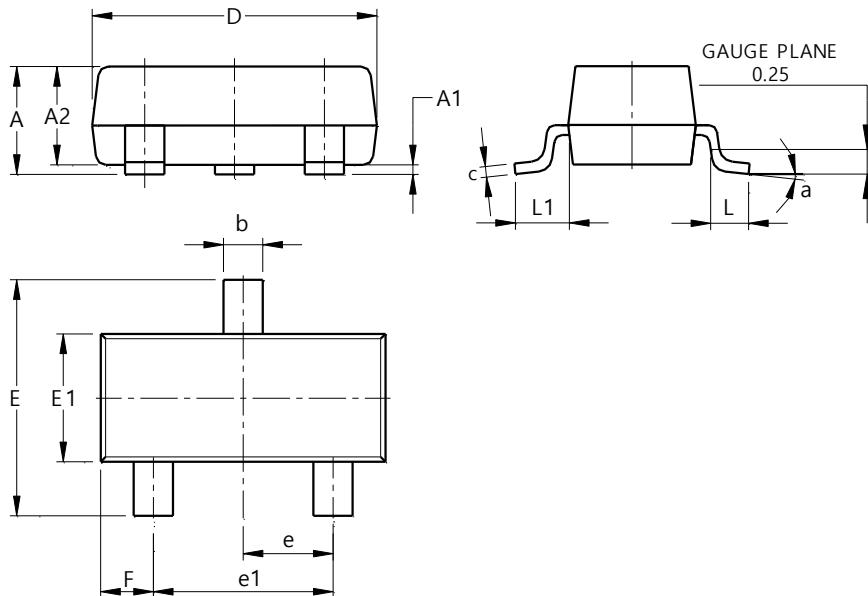


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

SOT23 (Standard)



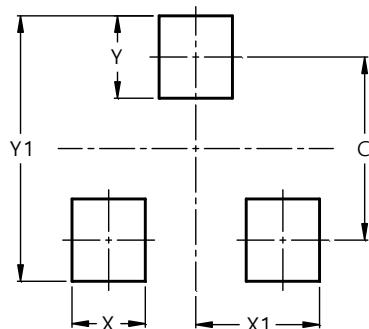
SOT23 (Standard)			
Dim	Min	Max	Typ
A	0.90	1.15	1.025
A1	0.00	0.10	0.05
A2	0.85	1.10	0.975
b	0.30	0.51	0.40
c	0.080	0.202	0.11
D	2.80	3.00	2.90
E	2.25	2.55	2.40
E1	1.20	1.40	1.30
e	0.89	1.03	0.915
e1	1.78	2.05	1.83
F	0.40	0.60	0.535
L1	0.45	0.61	0.55
L	0.25	0.55	0.40
a	0°	8°	--

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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