Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_A = +25°C
-20V	160mΩ @ V_{GS} = -4.5V	-2.4A
	210mΩ @ V_{GS} = -2.5V	-2.1A

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- ESD Protected Gate
- **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-Q100/101/104/200, 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/**

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.

- Backlighting
- Power management functions
- DC-DC converters
- Motor controls

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 e3
- Terminals Connections: See Diagram Below
- Weight: 0.009 grams (Approximate)

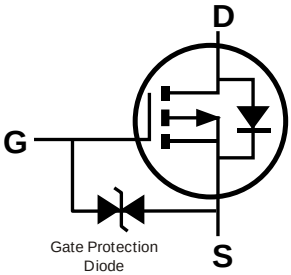


ESD Protected Gate

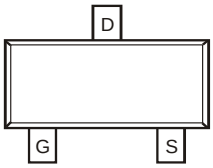
SOT23 (Standard)



Top View



Internal Schematic



Top View

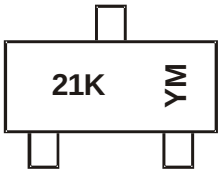
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMG2301LK-7	SOT23 (Standard)	3,000	Tape & Reel
DMG2301LK-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/.

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Marking Information



21K = Product Type Marking Code
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: J = 2022)
M = Month (ex: 9 = September)

Date Code Key

Year	2016	….	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	D	….	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_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-20	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Drain Current (Note 5) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-2.4 -1.9	A
Maximum Continuous Body Diode Forward Current (Note 5)			I_S	-1.12	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	-8	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)		P_D	0.84	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	150	°C/W
Total Power Dissipation (Note 5)		P_D	1.40	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	91	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes: 5. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. copper, single sided.
6. Device mounted on FR-4 PCB, with minimum recommended pad layout.

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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}	-20	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current (T_J = +25°C)	I_{DSS}	—	—	-10	µA	V_{DS} = -16V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±10V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.3	-0.6	-1.0	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	136	160	mΩ	V_{GS} = -4.5V, I_D = -1.0A
			183	210		V_{GS} = -2.5V, I_D = -1.0A
			229	298		V_{GS} = -1.8V, I_D = -0.2A
Diode Forward Voltage	V_{SD}	—	-0.8	-1.2	V	V_{GS} = 0V, I_S = -1.0A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	156	—	pF	V_{DS} = -6V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	36	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	28	—	pF	
Gate Resistance	R_g	—	41	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = -4.5V)	Q_g	—	1.6	—	nC	V_{DS} = -6V I_D = -2.2A
Total Gate Charge (V_{GS} = -10V)	Q_g	—	3.4	—	nC	
Gate-Source Charge	Q_{gs}	—	0.3	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.4	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	3.2	—	ns	V_{DS} = -6V, V_{GS} = -4.5V R_{GEN} = 6Ω, I_D = -1A
Turn-On Rise Time	t_R	—	7.4	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	11.0	—	ns	
Turn-Off Fall Time	t_F	—	10.5	—	ns	
Reverse Recovery Time	t_{RR}	—	6.5	—	ns	I_F = -1.0A, dI/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	0.8	—	nC	

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

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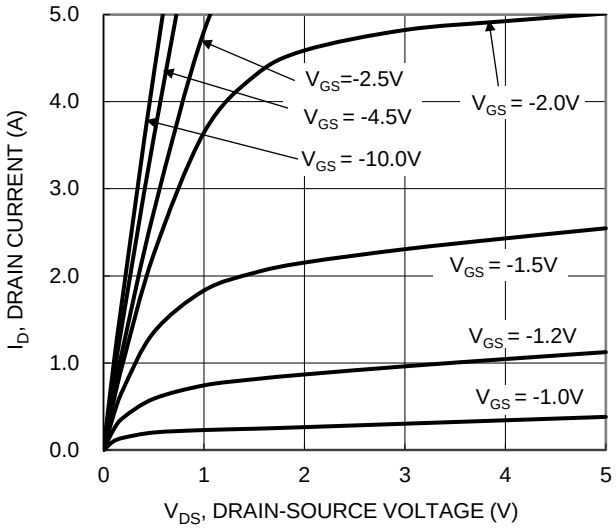


Figure 1. Typical Output Characteristic

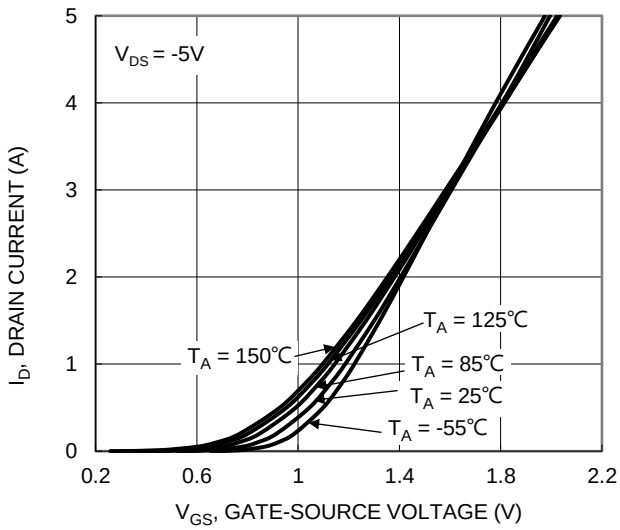


Figure 2. Typical Transfer Characteristic

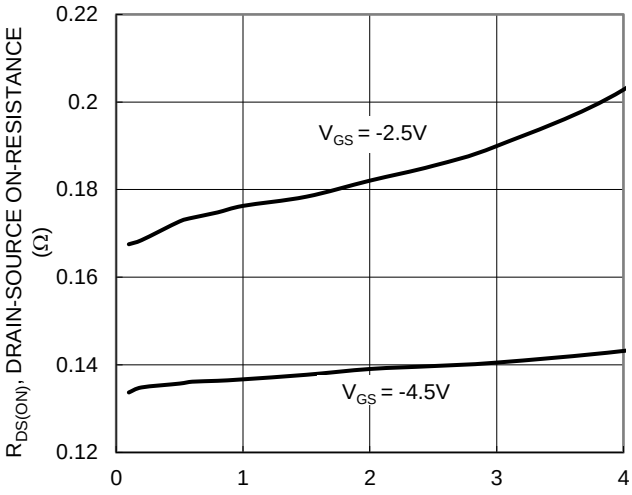


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

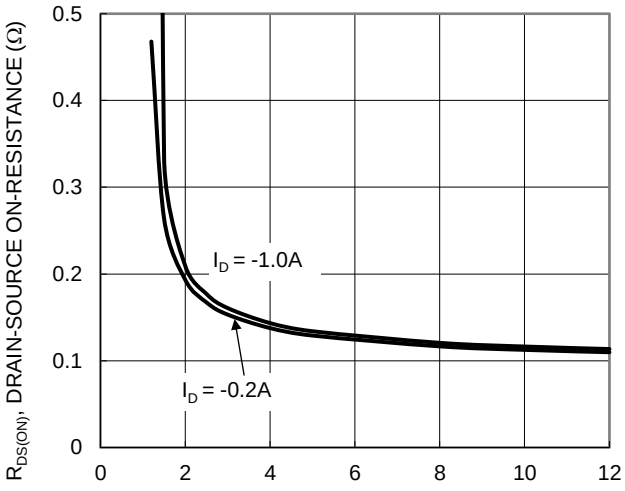


Figure 4. Typical Transfer Characteristic

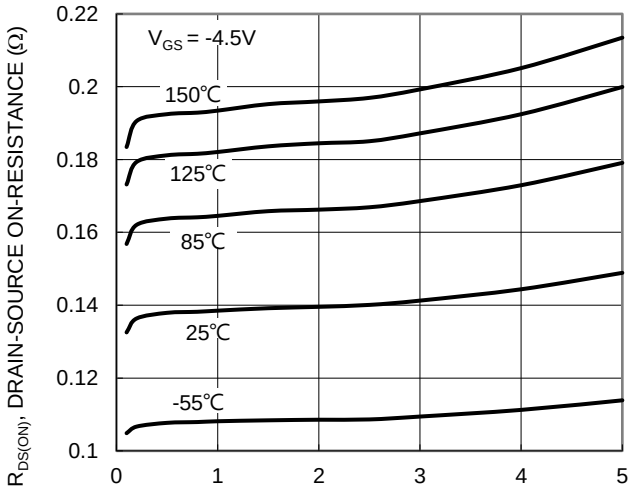


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

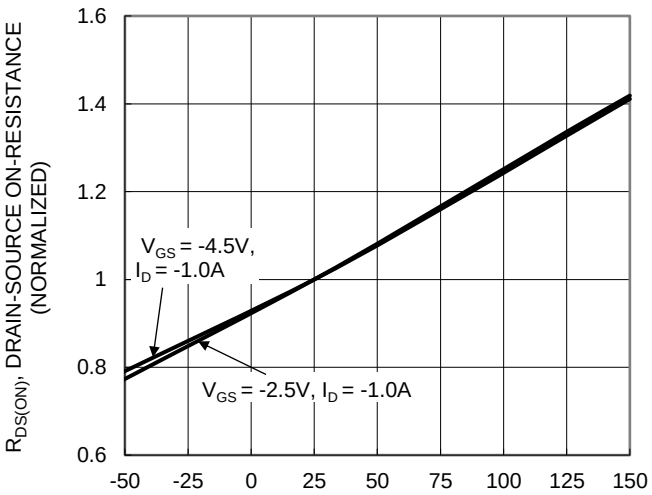


Figure 6. On-Resistance Variation with Junction Temperature

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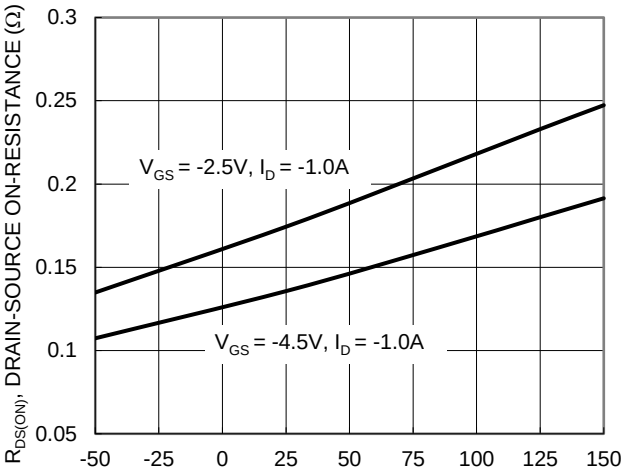


Figure 7. On-Resistance Variation with Junction Temperature

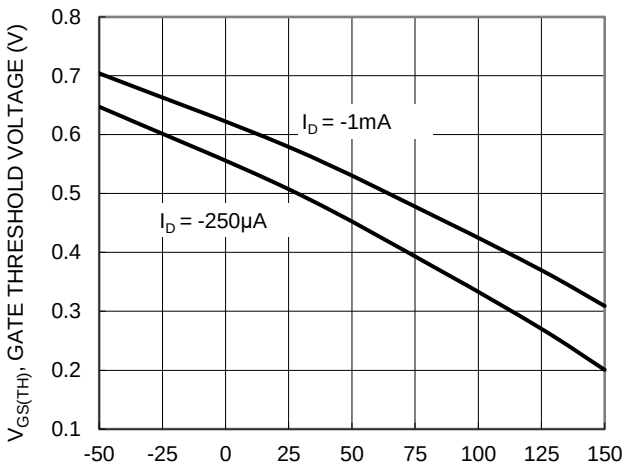


Figure 8. Gate Threshold Variation vs. Junction Temperature

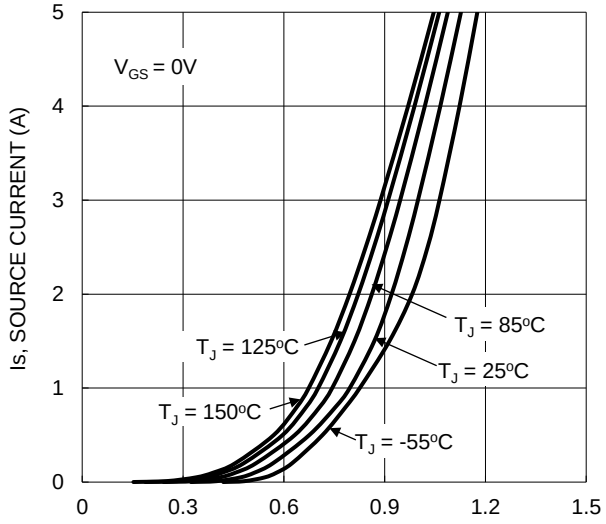


Figure 9. Diode Forward Voltage vs. Current

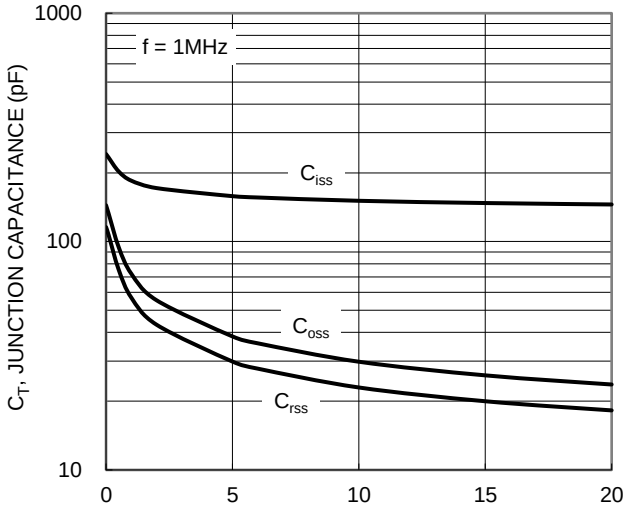


Figure 10. Typical Junction Capacitance

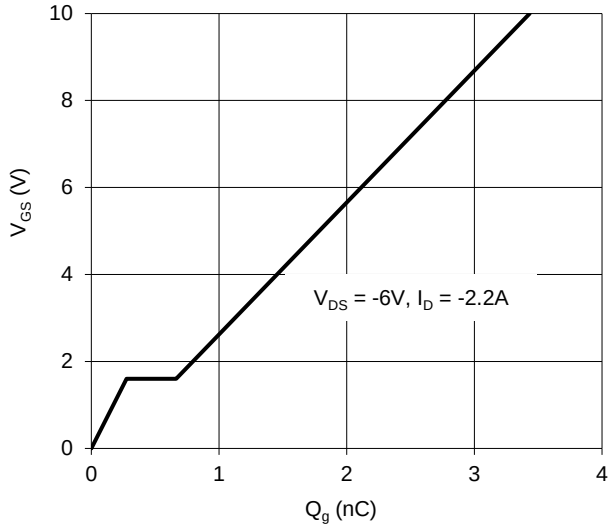


Figure 11. Gate Charge

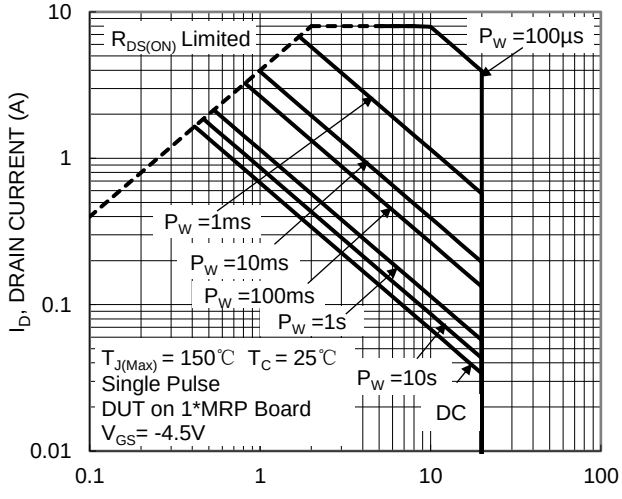


Figure 12. SOA, Safe Operation Area

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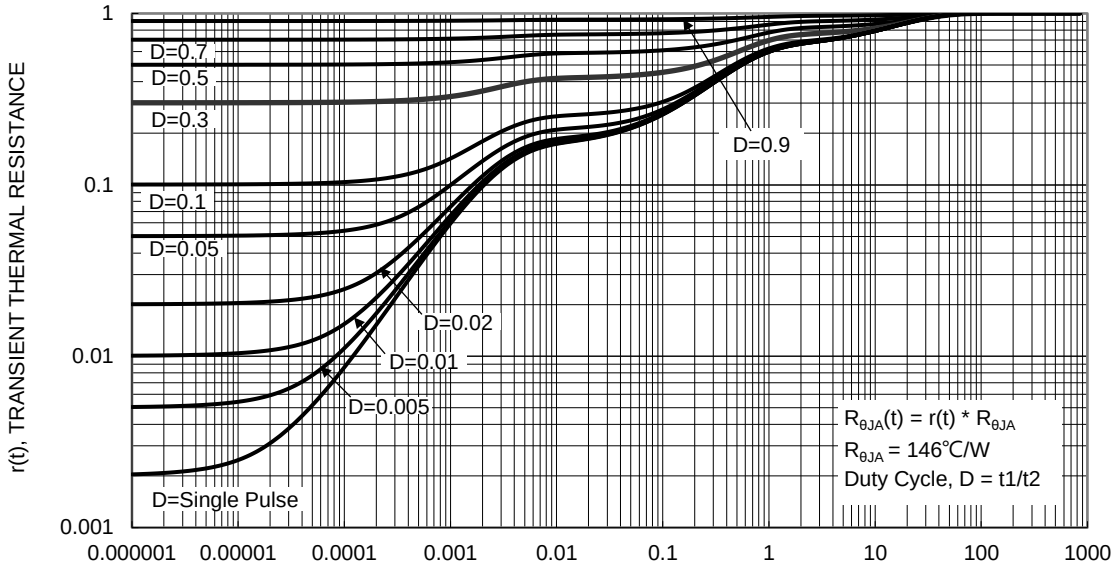


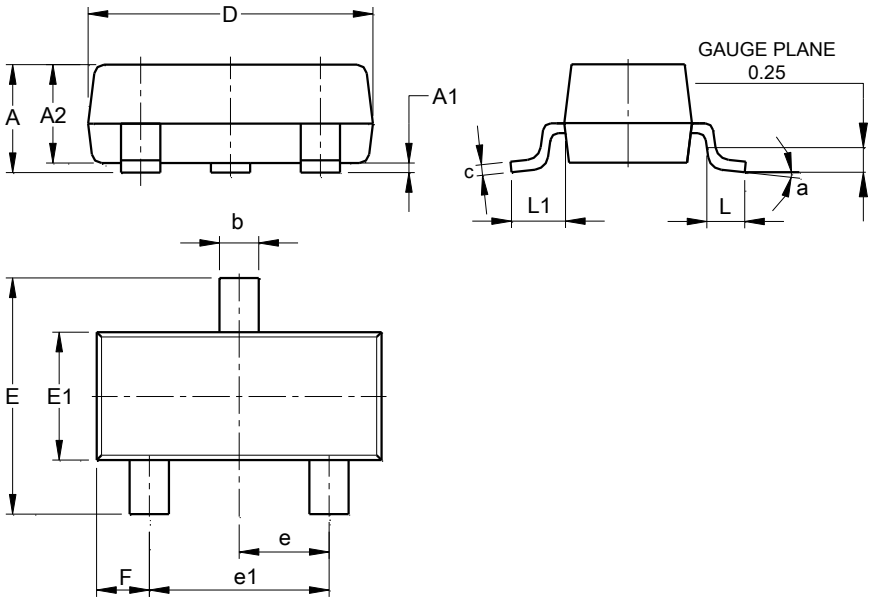
Figure 13. Transient Thermal Resistance

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Package Outline Dimensions

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SOT23 (Standard)

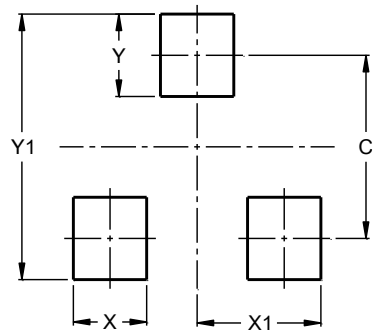


SOT23 (Standard)			
Dim	**Min**	**Max**	**Typ**
A	0.90	1.15	1.025
A1	0.00	0.10	0.05
A2	0.85	1.10	0.975
b	0.30	0.51	0.40
c	0.080	0.202	0.11
D	2.80	3.00	2.90
E	2.25	2.55	2.40
E1	1.20	1.40	1.30
e	0.89	1.03	0.915
e1	1.78	2.05	1.83
F	0.40	0.60	0.535
L1	0.45	0.61	0.55
L	0.25	0.55	0.40
a	0°	8°	--
All Dimensions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