

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	I_D Max $T_A = +25^\circ\text{C}$
20V	90m Ω @ $V_{GS} = 4.5\text{V}$	2.8A
	120m Ω @ $V_{GS} = 2.5\text{V}$	2.4A

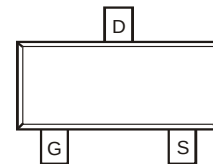
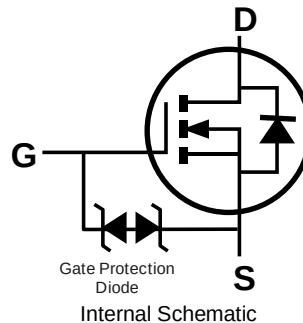
Description and Applications

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 Control



Top View



Top View

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)**
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

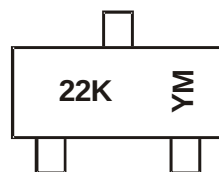
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe.
Solderable per MIL-STD-202, Method 208 (B3)
- Terminals Connections: See Diagram Below
- Weight: 0.009 grams (Approximate)

Ordering Information (Note 4)

Part Number	Case	Packaging
DMG2302UK-7	SOT23	3,000/Tape & Reel
DMG2302UK-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 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 <http://www.diodes.com/products/packages.html>.

Marking Information



22K = Product Type Marking Code
YM = Date Code Marking
Y or Y= Year (ex: C = 2015)
M = Month (ex: 9 = September)

Date Code Key

Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021	2022
Code	C	D	E	F	G	H	I	J

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	Units	
Drain-Source Voltage			V _{DSS}	20	V	
Gate-Source Voltage			V _{GSS}	±12	V	
Continuous Drain Current (Note 6) V _{GS} = 4.5V	Steady State	T _A = +25°C	I _D	2.8	A	
		T _A = +70°C		2.2		
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	1.1	A	
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	12	A	

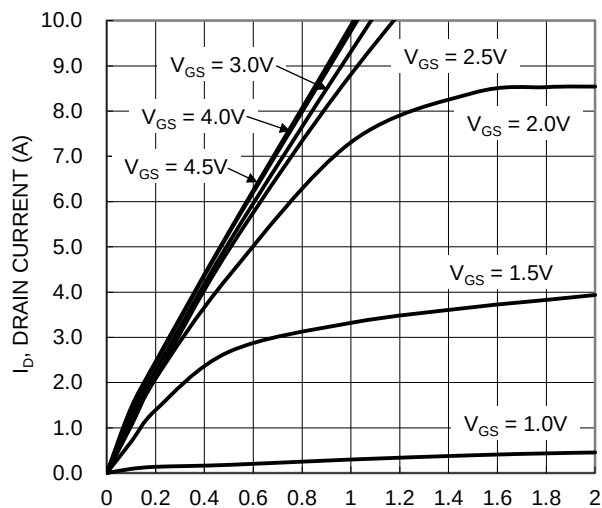
Thermal Characteristics

Characteristic			Symbol	Value	Units
Total Power Dissipation (Note 5)			P _D	0.66	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State		R _{θJA}	192	°C/W
Total Power Dissipation (Note 6)			P _D	1.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R _{θJA}	115	°C/W
Operating and Storage Temperature Range			T _J , T _{STG}	-55 to +150	°C

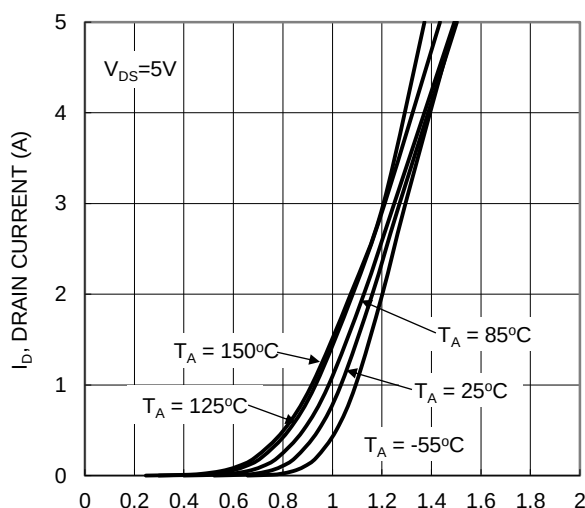
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

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)}	—	61	90	mΩ	V _{GS} = 4.5V, I _D = 3.6A
			80	120		V _{GS} = 2.5V, I _D = 3.1A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 1.0A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{ISS}	—	130	—	pF	V _{DS} = 10V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{OSS}	—	26	—	pF	
Reverse Transfer Capacitance	C _{RSS}	—	18	—	pF	
Gate Resistance	R _G	—	2.7	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _G	—	1.4	—	nC	V _{DS} = 10V, I _D = 3.6A
Total Gate Charge (V _{GS} = 10V)	Q _G	—	2.8	—	nC	
Gate-Source Charge	Q _{GS}	—	0.1	—	nC	
Gate-Drain Charge	Q _{GD}	—	0.5	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	0.6	—	ns	V _{DS} = 10V, V _{GS} = 4.5V, R _G = 1Ω, R _L = 2.78Ω
Turn-On Rise Time	t _R	—	2.7	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	4.2	—	ns	
Turn-Off Fall Time	t _F	—	1.7	—	ns	
Reverse Recovery Time	t _{RR}	—	5.3	—	ns	I _F = 3.6A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{RR}	—	0.5	—	nC	I _F = 3.6A, di/dt = 100A/μs

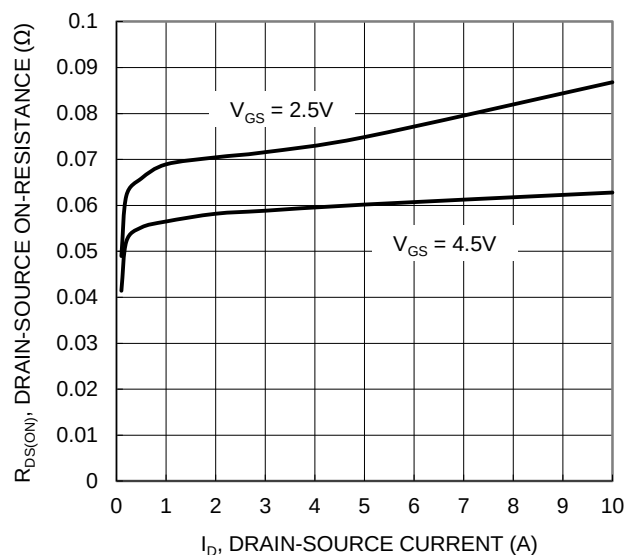
- Notes:
5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
 6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to product testing.



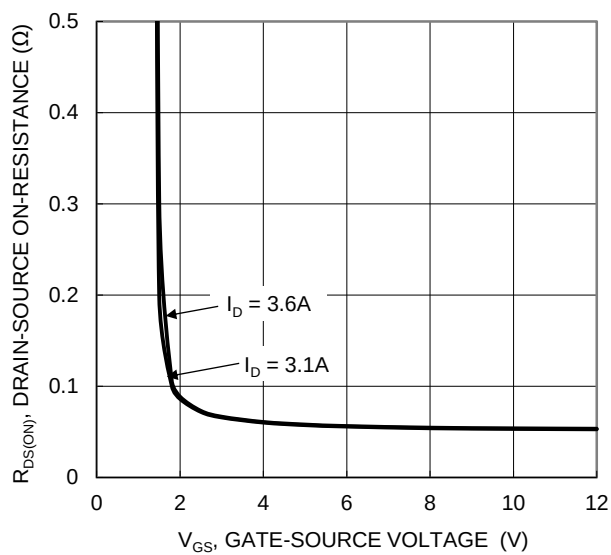
V_{DS} , DRAIN-SOURCE VOLTAGE (V)
Figure 1. Typical Output Characteristic



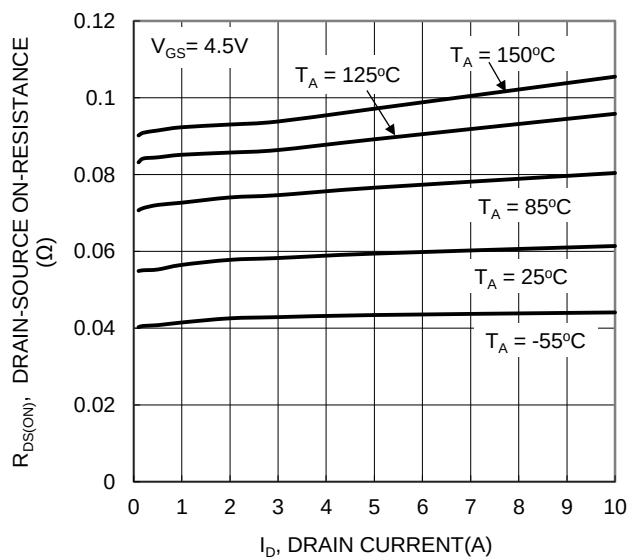
V_{GS} , GATE-SOURCE VOLTAGE (V)
Figure 2. Typical Transfer Characteristic



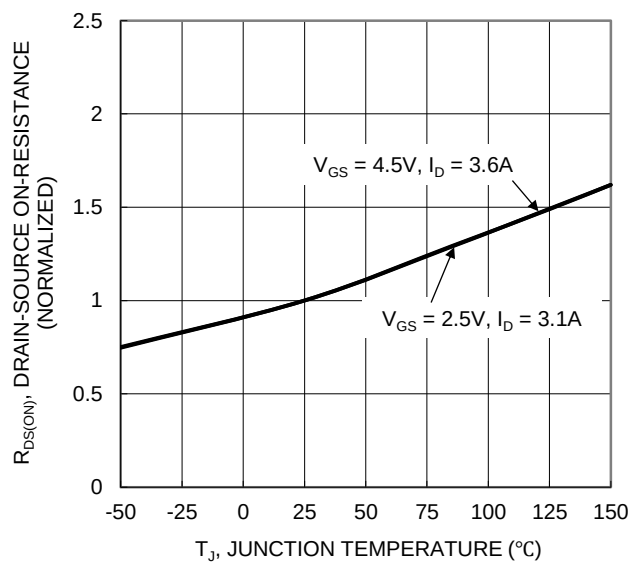
I_D , DRAIN-SOURCE CURRENT (A)
Figure 3. Typical On-Resistance vs Drain Current and Gate Voltage



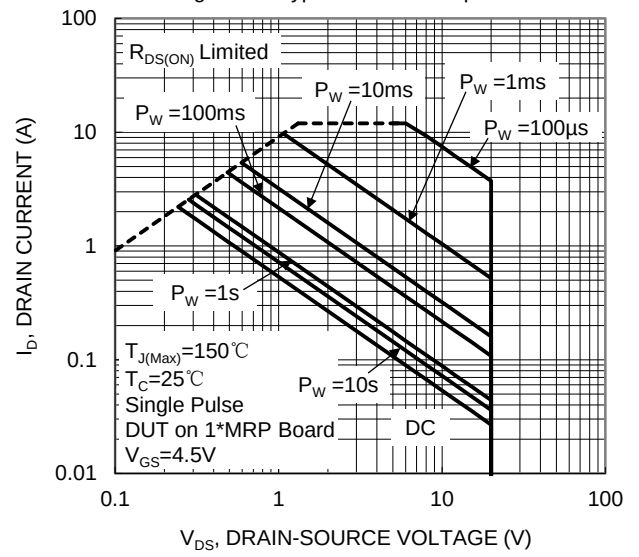
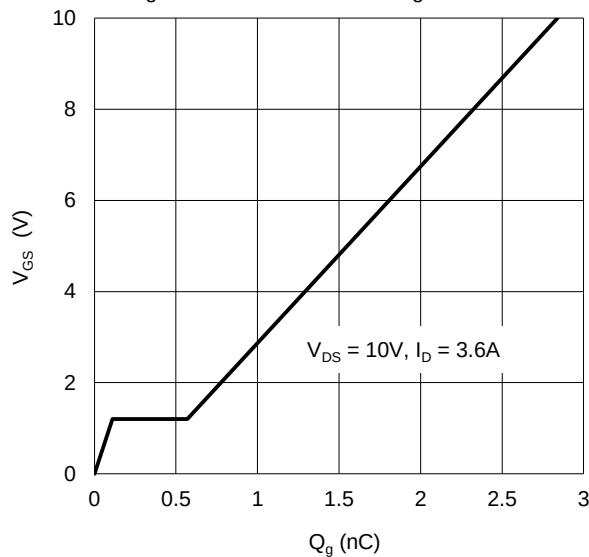
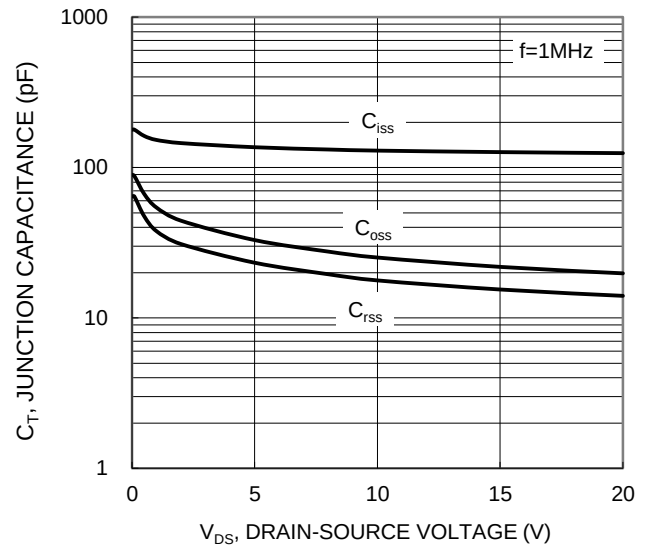
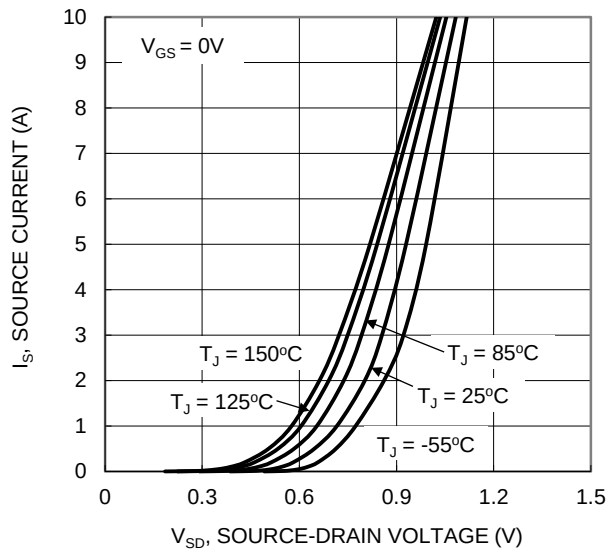
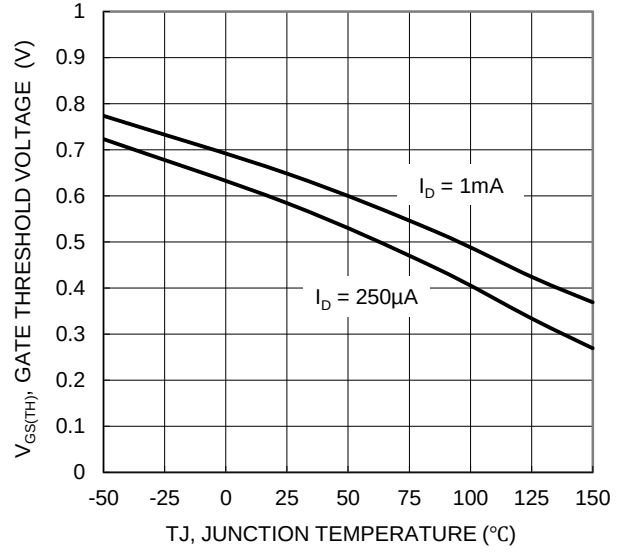
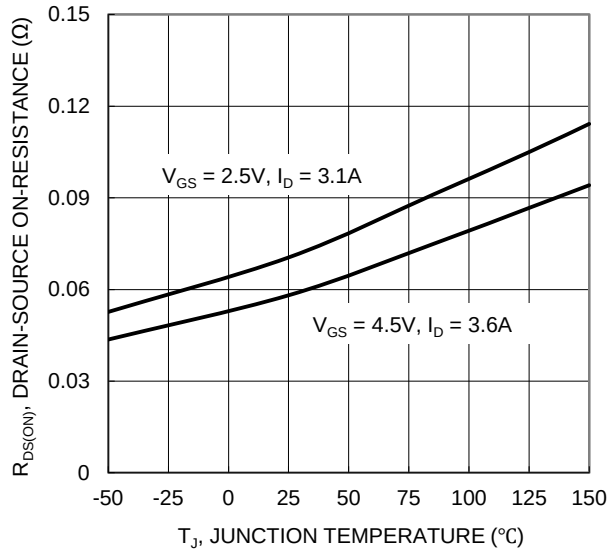
V_{GS} , GATE-SOURCE VOLTAGE (V)
Figure 4. Typical Transfer Characteristic



I_D , DRAIN CURRENT (A)
Figure 5. Typical On-Resistance vs Drain Current and Junction Temperature



T_J , JUNCTION TEMPERATURE (°C)
Figure 6. On-Resistance Variation with Junction Temperature



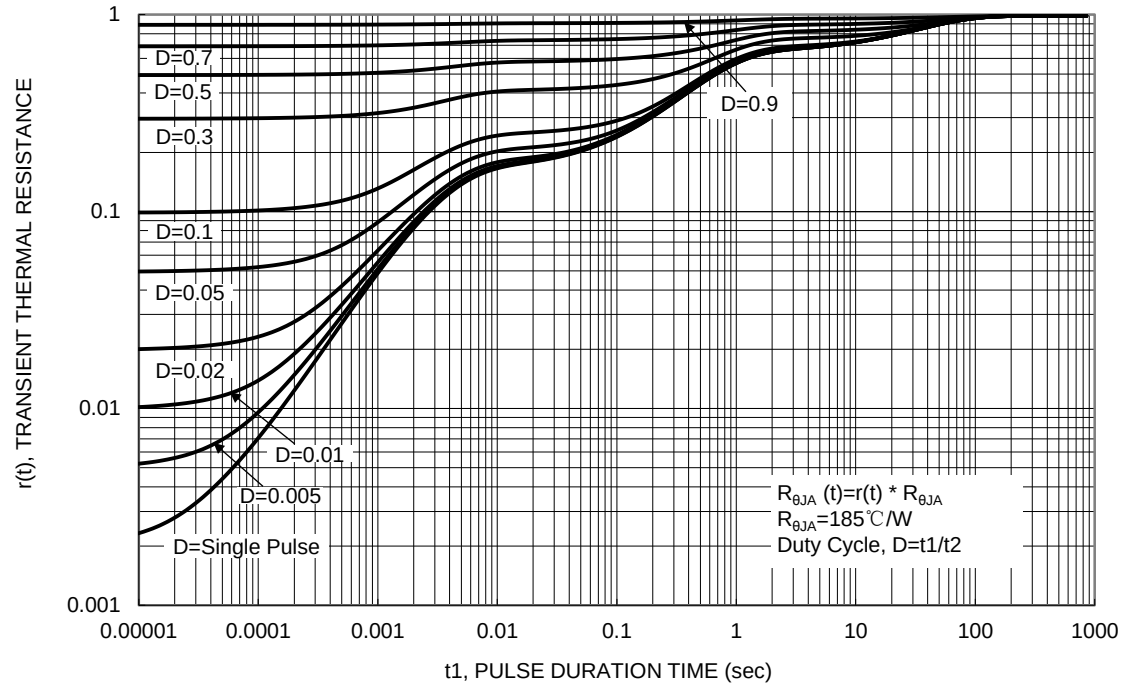
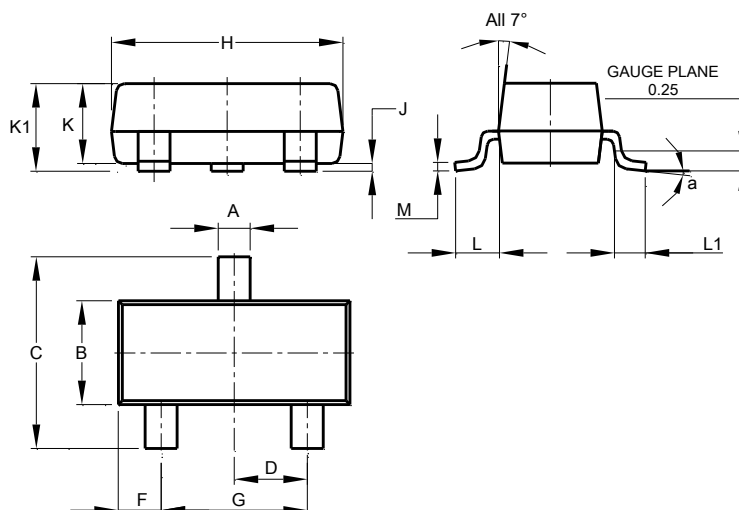


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

Please see AP02001 at http://www.diodes.com/_files/datasheets/ap02001.pdf for the latest version.

SOT23

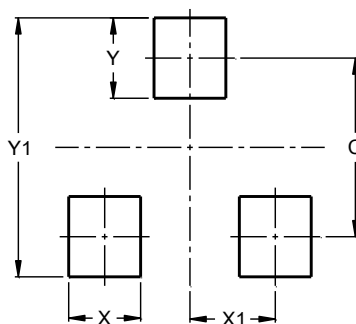


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	—
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/_files/datasheets/ap02001.pdf 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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