

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	Package	I_D $T_A = +25^\circ C$
60V	3Ω @ $V_{GS} = 10V$	SOT23	310mA
	4Ω @ $V_{GS} = 5V$		270mA

Description

This new generation 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.

Applications

- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.

Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Small Surface Mount Package
- 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**
- PPAP Capable (Note 4)**

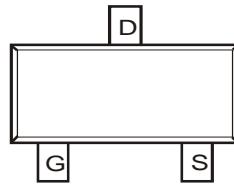
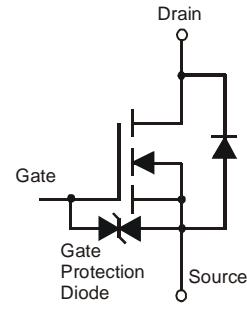
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating - Matte Tin Finish Annealed over Alloy 42 Leadframe). (E3)
- Weight: 0.006 grams (Approximate)



Top View

SOT23


 Top View
 Pin Configuration


Equivalent Circuit

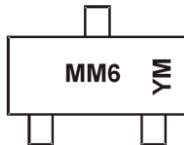
Ordering Information (Note 5)

Part Number	Case	Packaging
DMN65D8LQ-7	SOT23	3,000/Tape & Reel
DMN65D8LQ-13	SOT23	10,000/Tape & Reel

Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 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.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
- For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



MM6 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: Y = 2011)
 M = Month (ex: 9 = September)

Date Code Key

Year	2011	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Code	Y	C	D	E	F	G	H	I	J	K	
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	Units
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 7) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	310 240	mA
Continuous Drain Current (Note 7) $V_{GS} = 5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	270 210	mA
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	800	mA
Maximum Body Diode Continuous Current (Note 6)			I_S	500	mA

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation	(Note 7)	P_D	370	mW
	(Note 6)		540	
Thermal Resistance, Junction to Ambient	(Note 7)	$R_{\theta JA}$	348	$^\circ\text{C}/\text{W}$
	(Note 6)		241	
Thermal Resistance, Junction to Case	(Note 6)	$R_{\theta JC}$	91	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Notes: 6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
 7. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1.0	μA	$\text{V}_{\text{DS}} = 60\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Body Leakage	I_{GSS}	—	—	± 5	μA	$\text{V}_{\text{GS}} = \pm 20\text{V}$, $\text{V}_{\text{DS}} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$\text{V}_{\text{GS}(\text{th})}$	1.2	—	2.0	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$, $\text{I}_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS}(\text{ON})}$	—	2	3	Ω	$\text{V}_{\text{GS}} = 10\text{V}$, $\text{I}_D = 0.115\text{A}$
		—	2.5	4	Ω	$\text{V}_{\text{GS}} = 5\text{V}$, $\text{I}_D = 0.115\text{A}$
Forward Transconductance	g_{FS}	80	290	—	mS	$\text{V}_{\text{DS}} = 10\text{V}$, $\text{I}_D = 0.115\text{A}$
Diode Forward Voltage	V_{SD}	—	0.8	1.2	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_S = 115\text{mA}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	22.0	—	pF	$\text{V}_{\text{DS}} = 25\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	3.2	—		
Reverse Transfer Capacitance	C_{rss}	—	2.0	—	nC	$\text{V}_{\text{GS}} = 10\text{V}$, $\text{V}_{\text{DS}} = 30\text{V}$, $\text{I}_D = 150\text{mA}$
Gate Resistance	R_G	—	79.9	—		
Total Gate Charge $\text{V}_{\text{GS}} = 10\text{V}$	Q_g	—	0.87	—	nS	$\text{V}_{\text{DD}} = 30\text{V}$, $\text{I}_D = 0.115\text{A}$, $\text{V}_{\text{GEN}} = 10\text{V}$, $\text{R}_{\text{GEN}} = 25\Omega$
Total Gate Charge $\text{V}_{\text{GS}} = 4.5\text{V}$	Q_g	—	0.43	—		
Gate-Source Charge	Q_{gs}	—	0.11	—	nS	$\text{V}_{\text{DD}} = 30\text{V}$, $\text{I}_D = 0.115\text{A}$, $\text{V}_{\text{GEN}} = 10\text{V}$, $\text{R}_{\text{GEN}} = 25\Omega$
Gate-Drain Charge	Q_{gd}	—	0.11	—		
Turn-On Delay Time	$\text{t}_{\text{D(on)}}$	—	2.7	—	nS	$\text{V}_{\text{DD}} = 30\text{V}$, $\text{I}_D = 0.115\text{A}$, $\text{V}_{\text{GEN}} = 10\text{V}$, $\text{R}_{\text{GEN}} = 25\Omega$
Turn-On Rise Time	t_r	—	2.8	—		
Turn-Off Delay Time	$\text{t}_{\text{D(off)}}$	—	12.6	—	nS	$\text{V}_{\text{DD}} = 30\text{V}$, $\text{I}_D = 0.115\text{A}$, $\text{V}_{\text{GEN}} = 10\text{V}$, $\text{R}_{\text{GEN}} = 25\Omega$
Turn-Off Fall Time	t_f	—	7.3	—		

Notes: 8. Short duration pulse test used to minimize self-heating effect.

9. Guaranteed by design. Not subject to production testing.

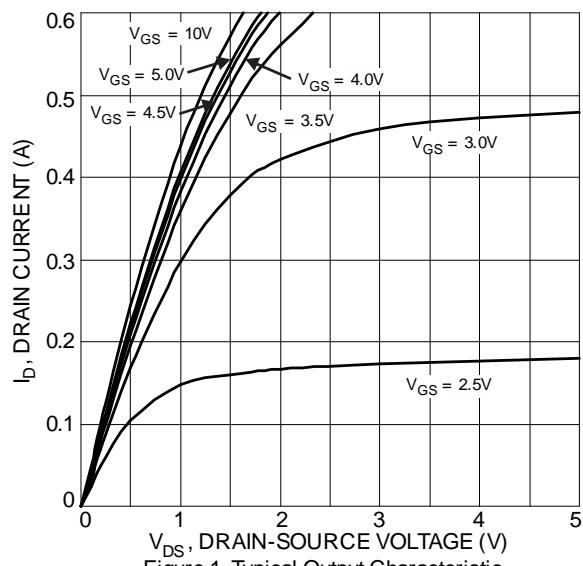


Figure 1. Typical Output Characteristic

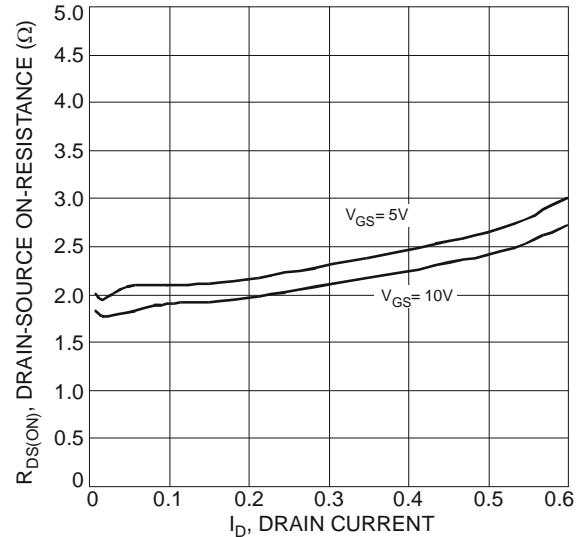


Figure 3. Typical On-Resistance vs.
Drain Current and Temperature

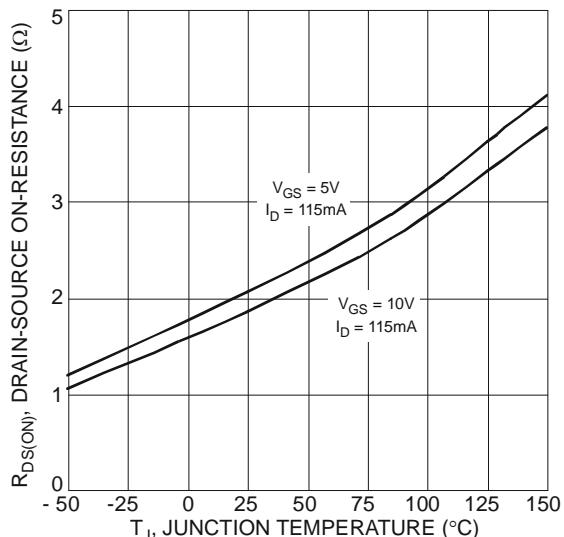


Figure 5. On-Resistance Variation with Temperature

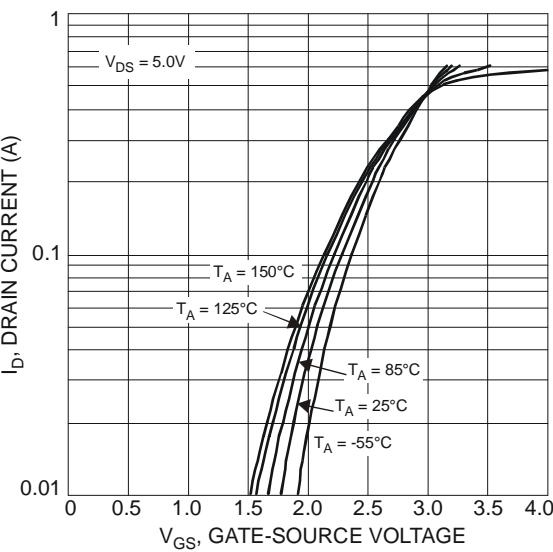


Figure 2. Typical Transfer Characteristics

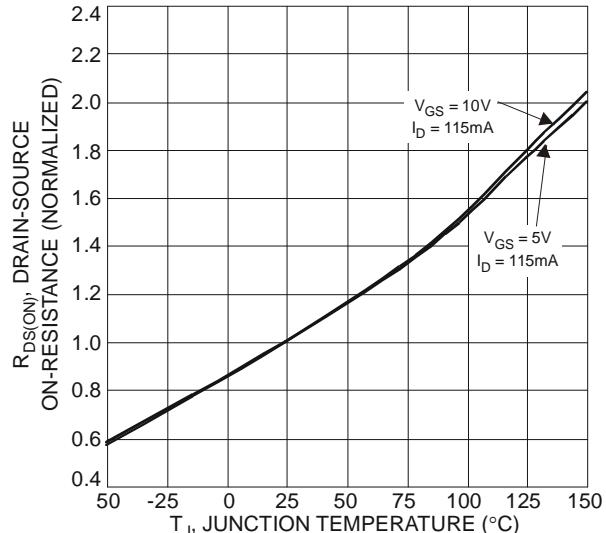


Figure 4. On-Resistance Variation with Temperature

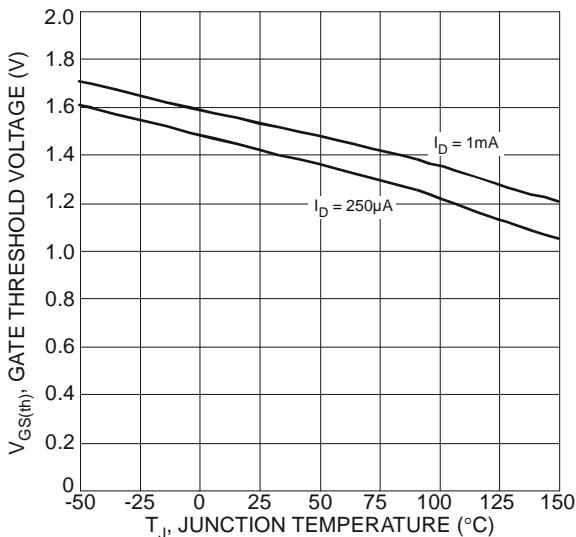
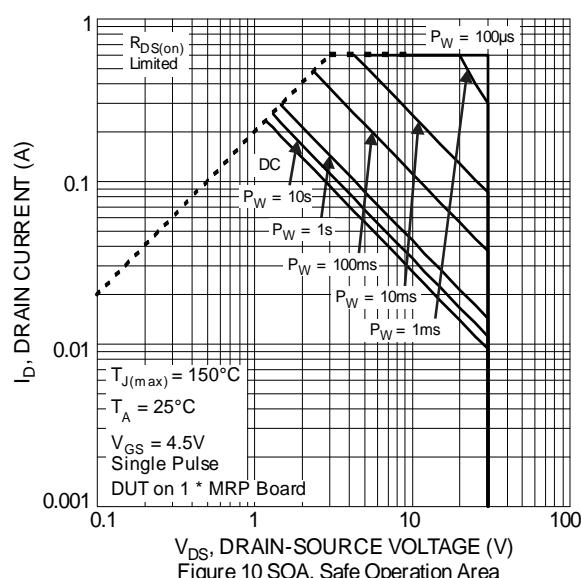
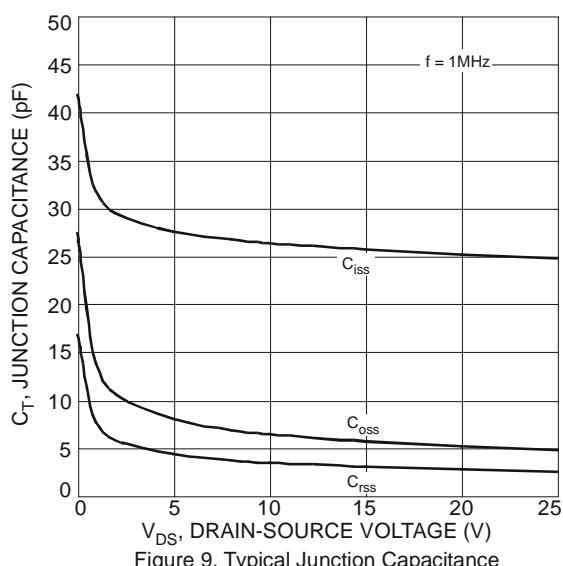
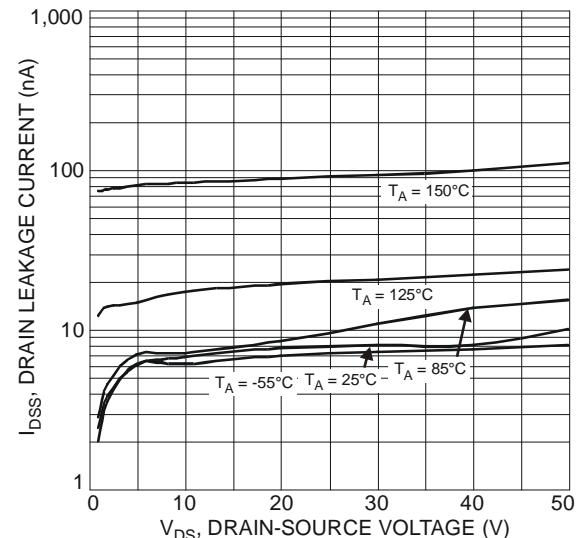
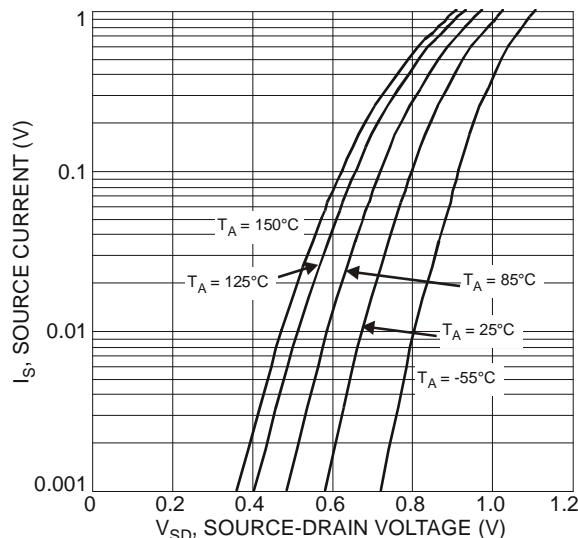


Figure 6. Gate Threshold Variation vs. Ambient Temperature



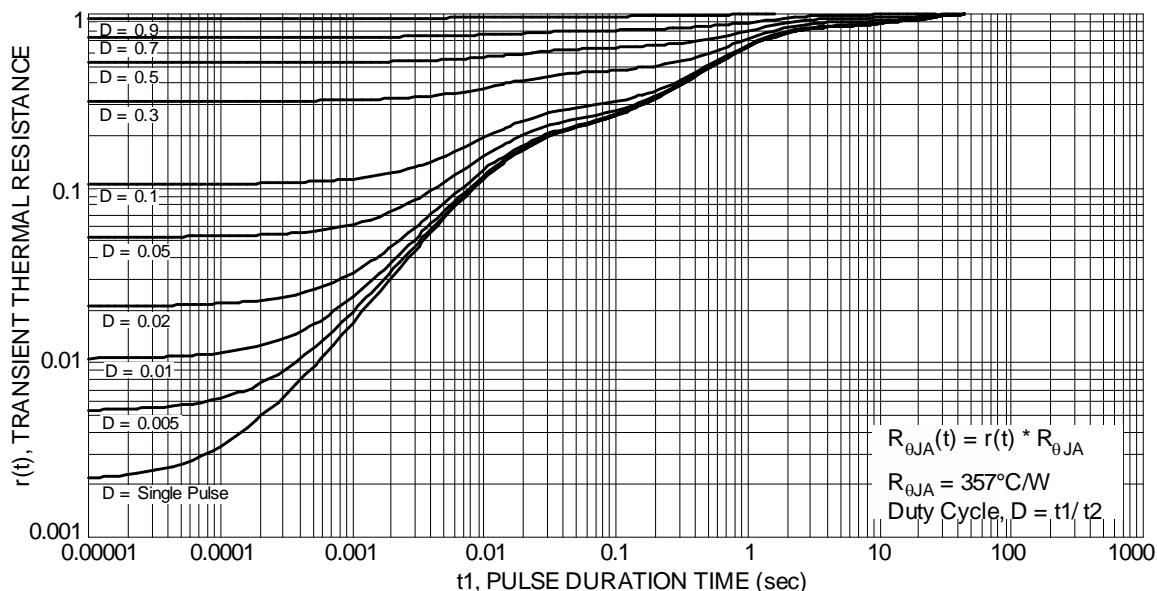
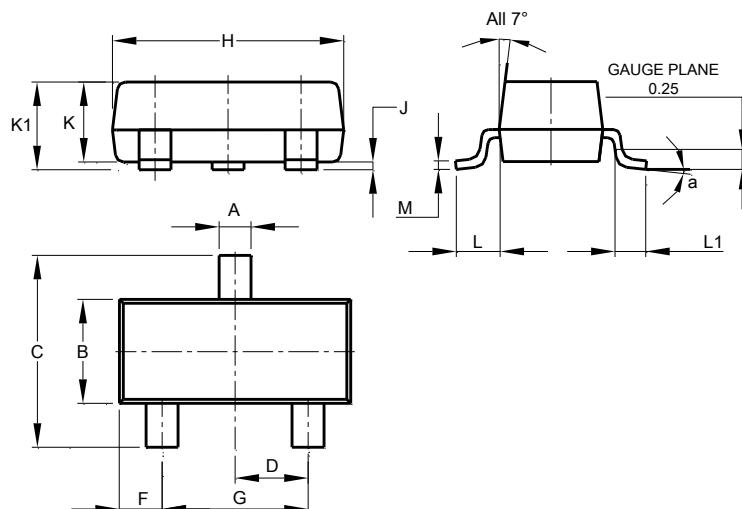


Figure 11 Transient Thermal Resistance

Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

SOT23



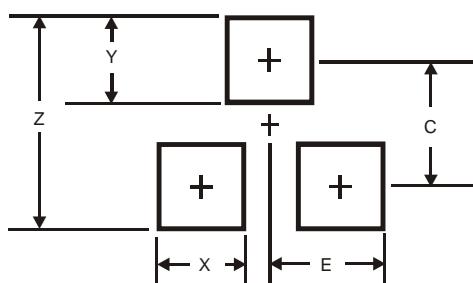
SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		

All Dimensions in mm

Suggested Pad Layout

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

SOT23



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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