

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_A = +25^\circ C$
60V	1.8Ω @ $V_{GS} = 10V$	440mA
	2.1Ω @ $V_{GS} = 4.5V$	410mA

Description

This new generation MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

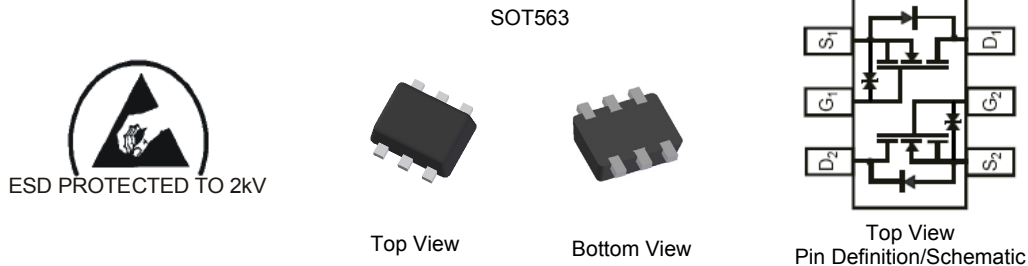
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- DC-DC Converters
- Power Management Functions

Features

- 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**

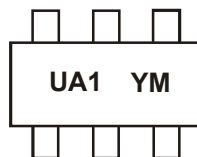
Mechanical Data

- Case: SOT563
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Weight: 0.006 grams (approximate)


Ordering Information (Note 4)

Part Number	Case	Packaging
DMG1026UV-7	SOT563	3000 / 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.
 - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information


UA1 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: X = 2010)
 M = Month (ex: 9 = September)

Date Code Key

Year	2009	2010	2011	2012	2013	2014	2015	2016
Code	W	X	Y	Z	A	B	C	D

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}	60	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	I_D	410	mA
		$T_A = +85^\circ\text{C}$		300	
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	$t \leq 10\text{s}$	$T_A = +25^\circ\text{C}$	I_D	440	mA
		$T_A = +85^\circ\text{C}$		320	
Continuous Drain Current (Note 5) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	I_D	380	mA
		$T_A = +85^\circ\text{C}$		270	
Continuous Drain Current (Note 6) $V_{GS} = 4.5\text{V}$	$t \leq 10\text{s}$	$T_A = +25^\circ\text{C}$	I_D	410	mA
		$T_A = +85^\circ\text{C}$		295	
Pulsed Drain Current (Note 7)			I_{DM}	1.0	A

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 5)	P_D	0.58	W
Thermal Resistance, Junction to Ambient @ $T_A = 25^\circ\text{C}$ (Note 5)	$R_{\theta JA}$	213	$^\circ\text{C/W}$
Power Dissipation (Note 6) $t \leq 10\text{s}$	P_D	0.65	W
Thermal Resistance, Junction to Ambient @ $T_A = 25^\circ\text{C}$ (Note 6) $t \leq 10\text{s}$	$R_{\theta JA}$	192	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DSS}	—	—	1.0	μA	$V_{DS} = 50\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 50	nA	$V_{GS} = \pm 5\text{V}, V_{DS} = 0\text{V}$
		—	—	± 150	nA	$V_{GS} = \pm 10\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	0.5	—	1.8	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	1.2	1.8	Ω	$V_{GS} = 10\text{V}, I_D = 500\text{mA}$
		—	1.4	2.1		$V_{GS} = 4.5\text{V}, I_D = 200\text{mA}$
Forward Transfer Admittance	$ Y_{fs} $	80	580	—	mS	$V_{DS} = 10\text{V}, I_D = 200\text{mA}$
Continuous Source Current (Note 8)	I_S	—	—	200	mA	—
Diode Forward Voltage	V_{SD}	—	0.8	1.3	V	$V_{GS} = 0\text{V}, I_S = 200\text{mA}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	32	—	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	4.4	—		
Reverse Transfer Capacitance	C_{rss}	—	2.9	—		
Gate Resistance	R_g	—	126	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge	Q_g	—	0.45	—	pC	$V_{GS} = 4.5\text{V}, V_{DS} = 10\text{V}, I_D = 250\text{mA}$
Gate-Source Charge	Q_{gs}	—	0.08	—		
Gate-Drain Charge	Q_{gd}	—	0.08	—		
Turn-On Delay Time	$t_{D(on)}$	—	3.4	—	ns	$V_{GS} = 10\text{V}, V_{DS} = 30\text{V}, R_L = 150\Omega, R_G = 25\Omega, I_D = 200\text{mA}$
Turn-On Rise Time	t_r	—	3.4	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	26.4	—	ns	
Turn-Off Fall Time	t_f	—	16.3	—	ns	

- Notes:
- Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 PCB with minimum recommended pad layout, measured in $t \leq 10\text{s}$.
 - Repetitive rating, pulse width limited by junction temperature, $10\mu\text{s}$ pulse, duty cycle = 1%
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

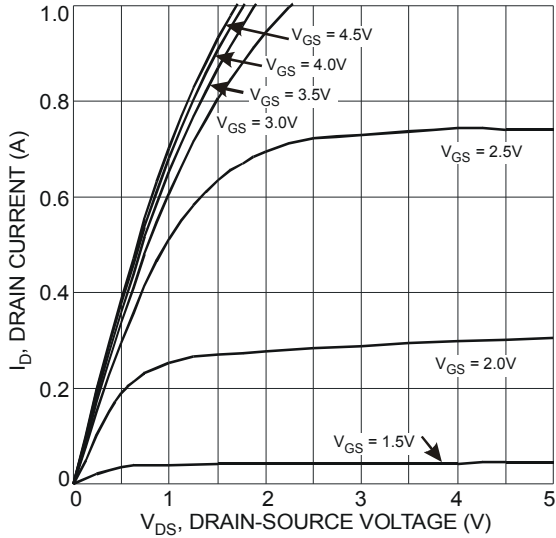


Figure 1 Typical Output Characteristic

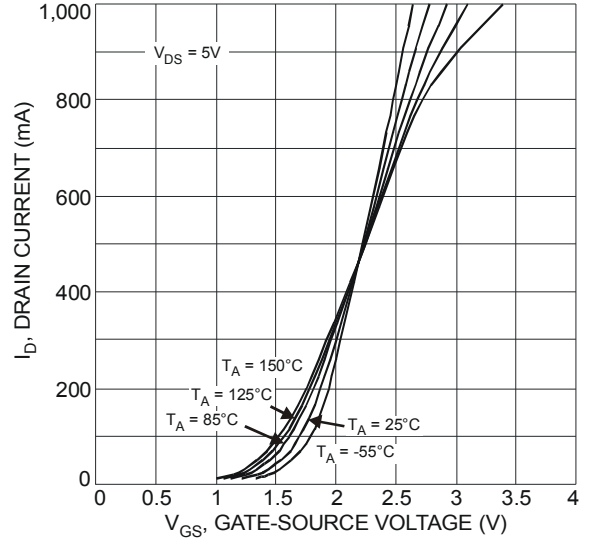


Figure 2 Typical Transfer Characteristic

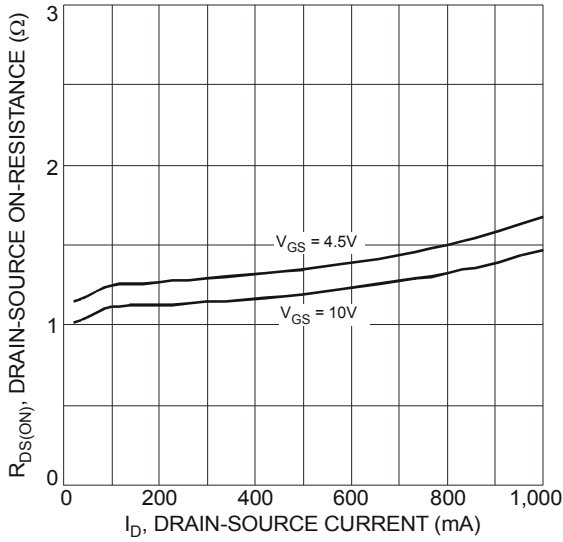


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

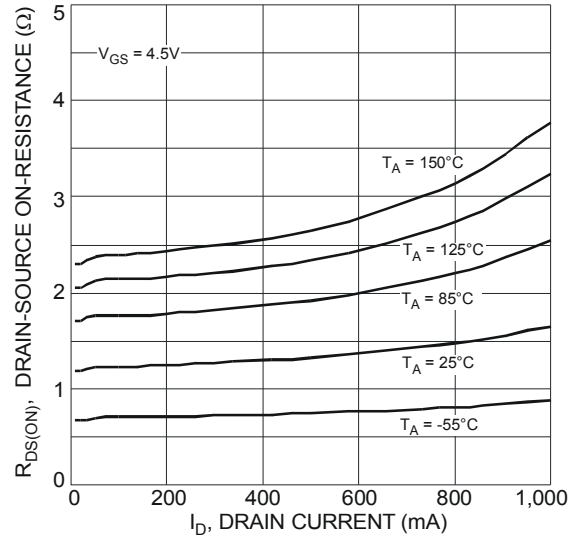


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

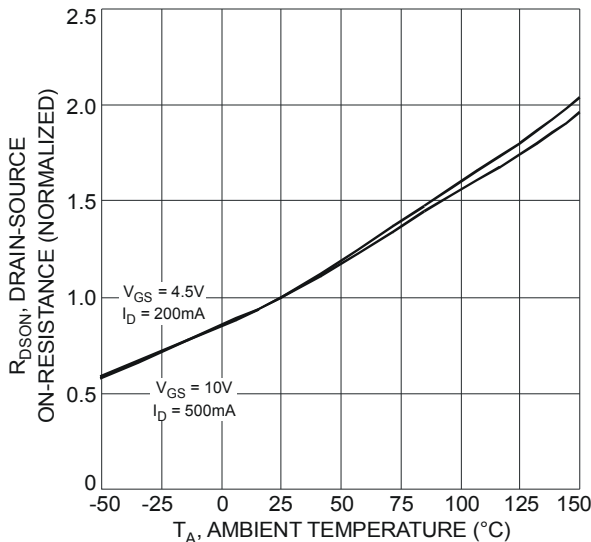


Figure 5 On-Resistance Variation with Temperature

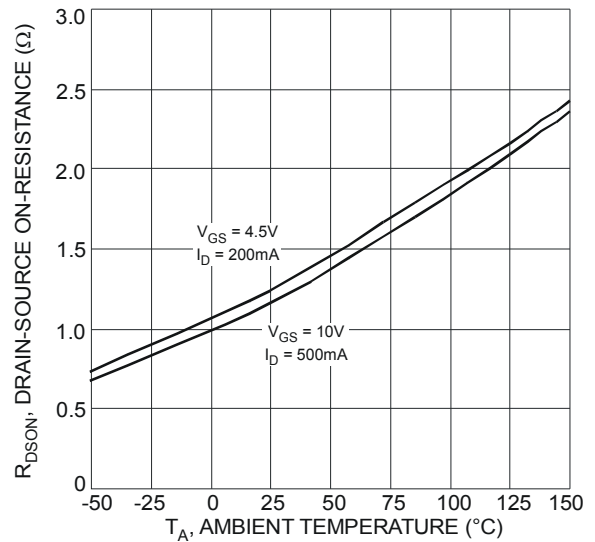


Figure 6 On-Resistance Variation with Temperature

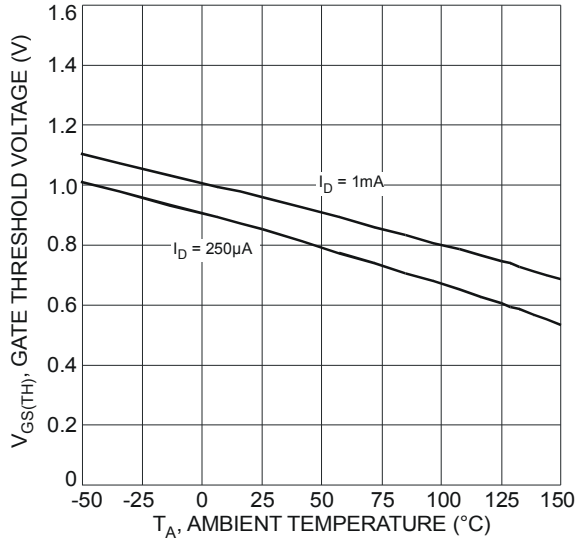


Figure 7 Gate Threshold Variation vs. Ambient Temperature

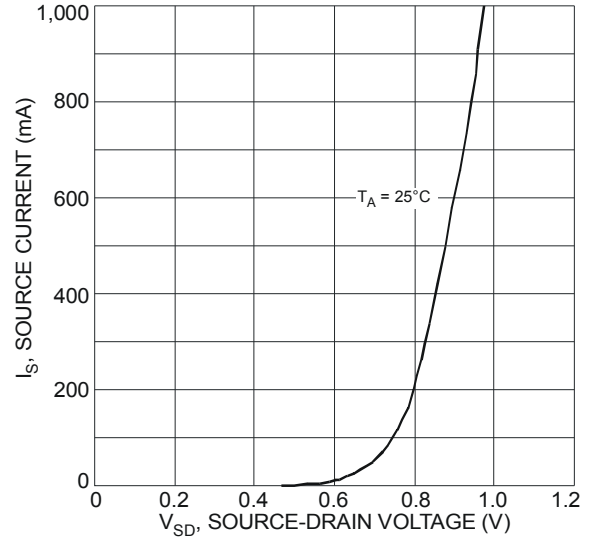


Figure 8 Diode Forward Voltage vs. Current

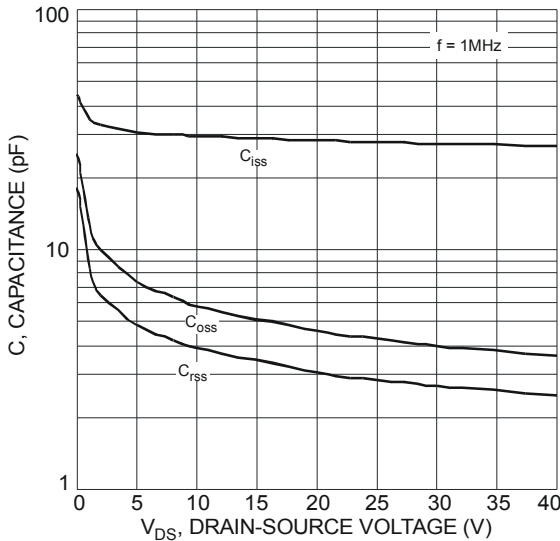


Figure 9 Typical Total Capacitance

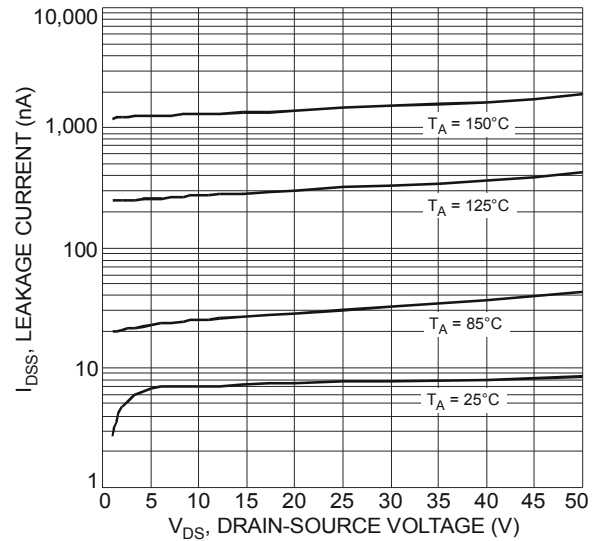


Figure 10 Typical Leakage Current vs. Drain-Source Voltage

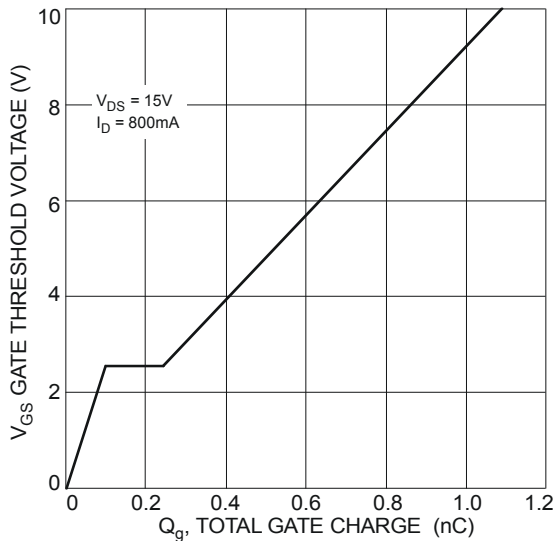


Figure 11 Gate Charge

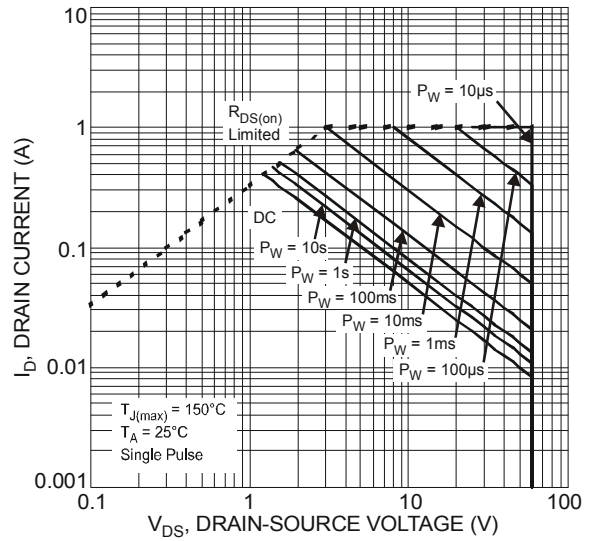


Figure 12 SOA, Safe Operation Area

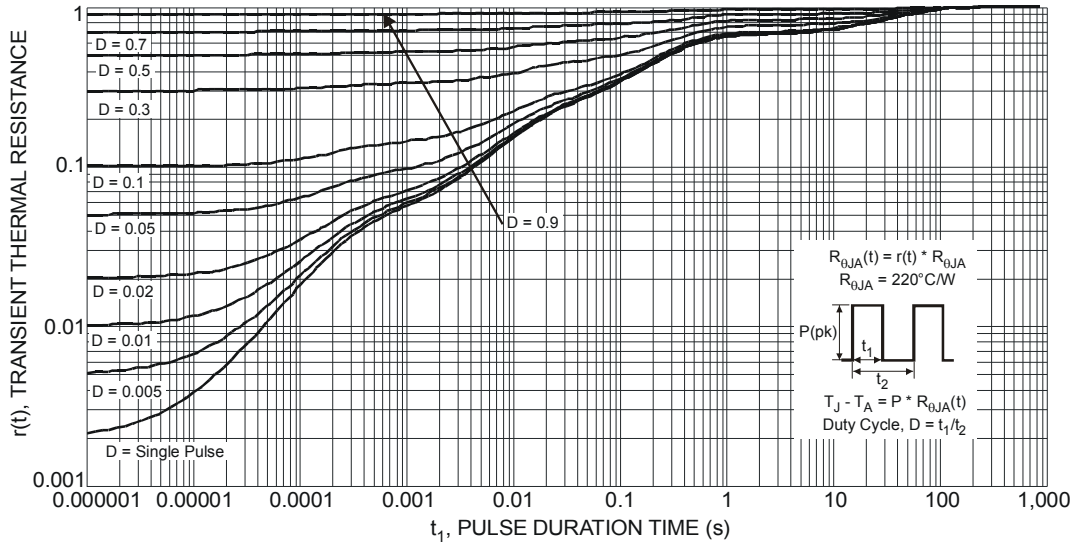
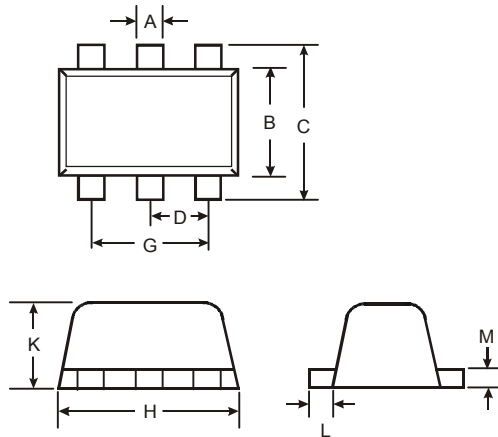


Figure 13 Transient Thermal Response

Package Outline Dimensions

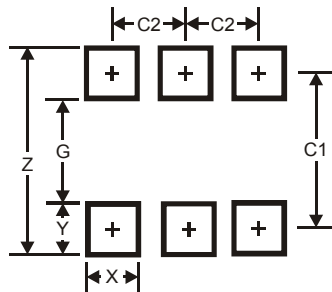
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT563			
Dim	Min	Max	Typ
A	0.15	0.30	0.20
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	-	-	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.55	0.60	0.60
L	0.10	0.30	0.20
M	0.10	0.18	0.11
All Dimensions in mm			

Suggested Pad Layout

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



Dimensions	Value (in mm)
Z	2.2
G	1.2
X	0.375
Y	0.5
C1	1.7
C2	0.5

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