

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 is 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

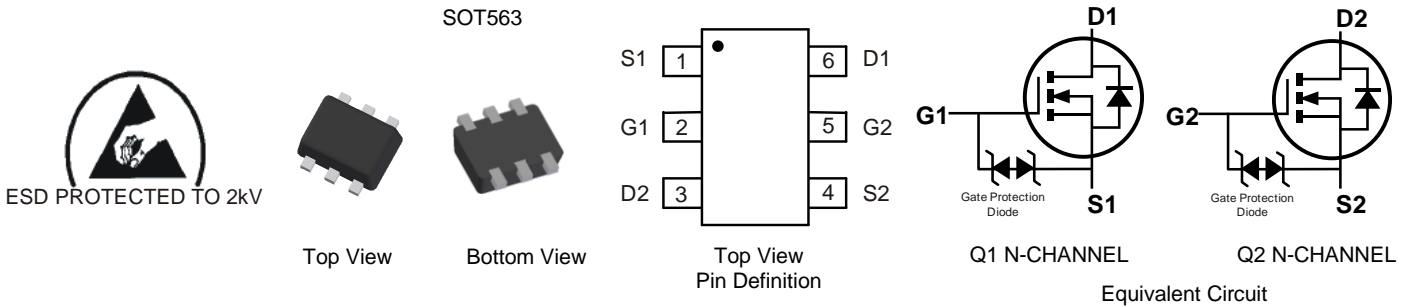
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- DC-DC Converters
- Power Management Functions

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
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Terminal Connections: See Diagram Below
- Weight: 0.006 grams (Approximate)

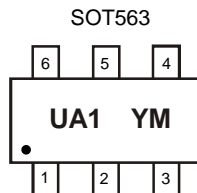


Ordering Information (Note 4)

Part Number	Case	Packaging
DMG1026UV-7	SOT563	3,000 / 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 (Note 5)



UA1 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: D = 2016)
 M = Month (ex: 9 = September)

Date Code Key

Year	2009	~	2016	2017	2018	2019	2020	2021	2022	2023
Code	W	~	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

- Note: 5. Product manufactured with Date Code D9 (September, 2016) and newer are built with additional Pin 1 dot in marking information. Product manufactured prior to Date Code D9 are built without Pin 1 dot.

Maximum Ratings (@T_A = +25°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 6) V _{GS} = 10V	Steady State	T _A = +25°C	I _D	410	mA
		T _A = +85°C		300	
Continuous Drain Current (Note 7) V _{GS} = 10V	t ≤ 10s	T _A = +25°C	I _D	440	mA
		T _A = +85°C		320	
Continuous Drain Current (Note 6) V _{GS} = 4.5V	Steady State	T _A = +25°C	I _D	380	mA
		T _A = +85°C		270	
Continuous Drain Current (Note 7) V _{GS} = 4.5V	t ≤ 10s	T _A = +25°C	I _D	410	mA
		T _A = +85°C		295	
Pulsed Drain Current (Note 8)			I _{DM}	1.0	A

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 6)	P _D	0.58	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 6)	R _{θJA}	213	°C/W
Power Dissipation (Note 7) t ≤ 10s	P _D	0.65	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 7) t ≤ 10s	R _{θJA}	192	°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 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	1.0	μA	V _{DS} = 50V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±50	nA	V _{GS} = ±5V, V _{DS} = 0V
		—	—	±150	nA	V _{GS} = ±10V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(th)}	0.5	—	1.8	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(on)}	—	1.2	1.8	Ω	V _{GS} = 10V, I _D = 500mA
		—	1.4	2.1		V _{GS} = 4.5V, I _D = 200mA
Forward Transfer Admittance	Y _{fs}	80	580	—	mS	V _{DS} = 10V, I _D = 200mA
Continuous Source Current (Note 9)	I _S	—	—	200	mA	—
Diode Forward Voltage	V _{SD}	—	0.8	1.3	V	V _{GS} = 0V, I _S = 200mA
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iSS}	—	32	—	pF	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	4.4	—		
Reverse Transfer Capacitance	C _{rss}	—	2.9	—		
Gate Resistance	R _g	—	126	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	—	0.45	—	pC	V _{GS} = 4.5V, V _{DS} = 10V, I _D = 250mA
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} = 10V, V _{DS} = 30V, R _L = 150Ω, R _G = 25Ω, I _D = 200mA
Turn-On Rise Time	t _r	—	3.4	—		
Turn-Off Delay Time	t _{D(off)}	—	26.4	—		
Turn-Off Fall Time	t _f	—	16.3	—		

- Notes:
6. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
 7. Device mounted on FR-4 PCB with minimum recommended pad layout, measured in t ≤ 10s.
 8. Repetitive rating, pulse width limited by junction temperature, 10μs pulse, duty cycle = 1%.
 9. Short duration pulse test used to minimize self-heating effect.
 10. Guaranteed by design. Not subject to production testing.

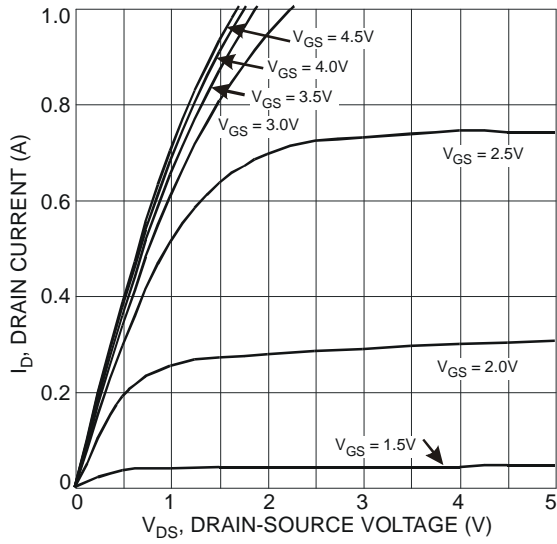


Figure 1 Typical Output Characteristic

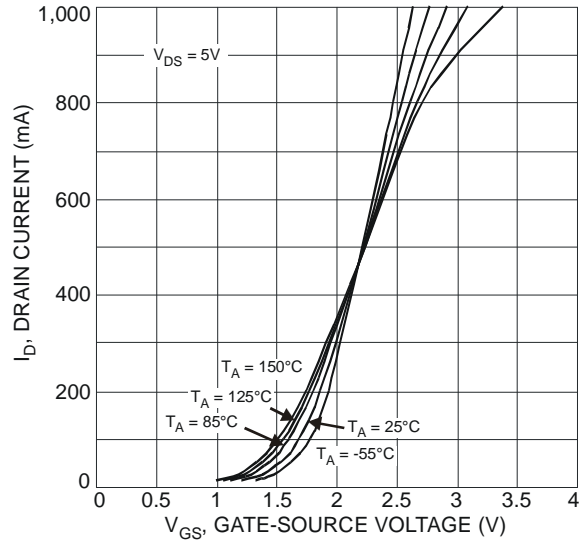


Figure 2 Typical Transfer Characteristic

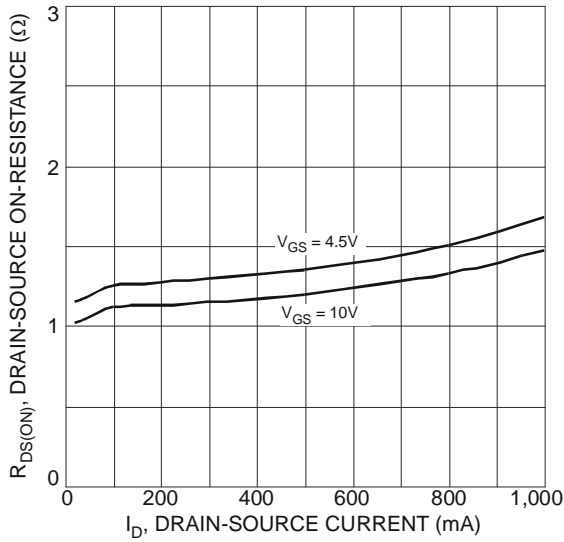


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

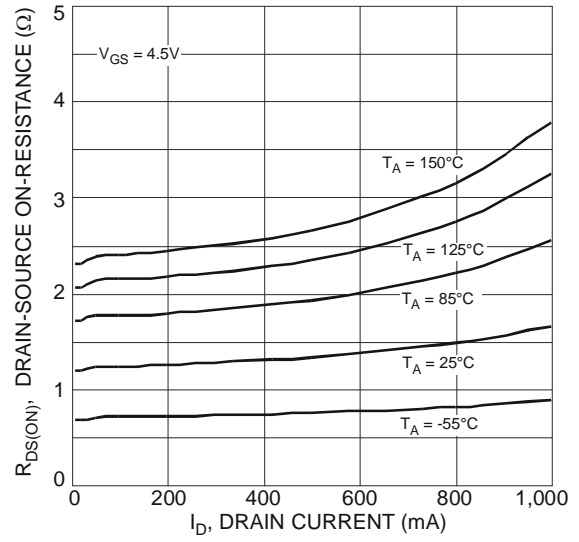


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

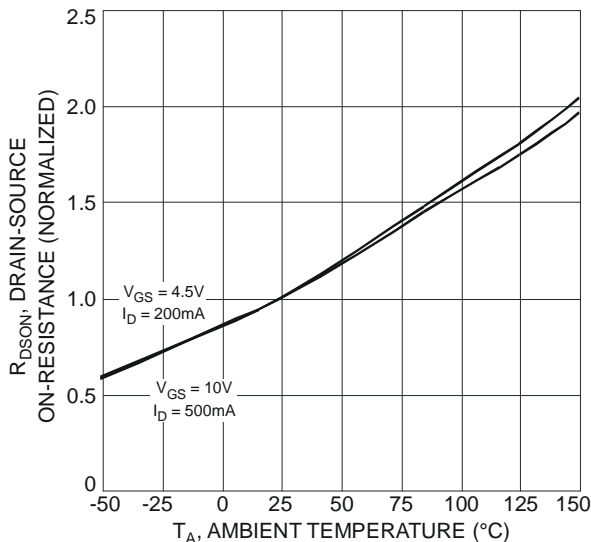


Figure 5 On-Resistance Variation with Temperature

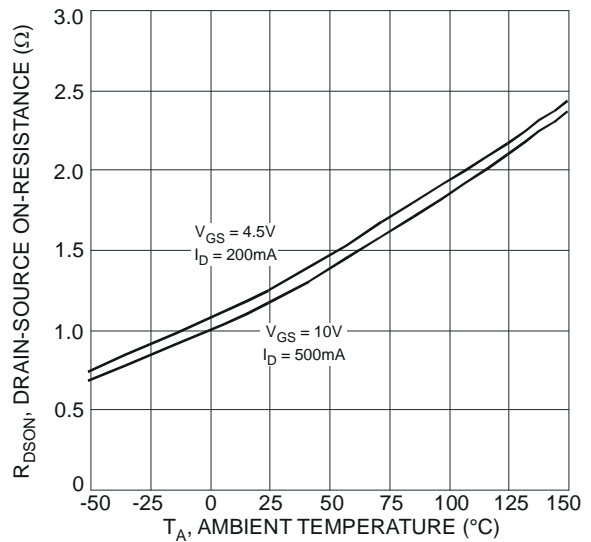


Figure 6 On-Resistance Variation with Temperature

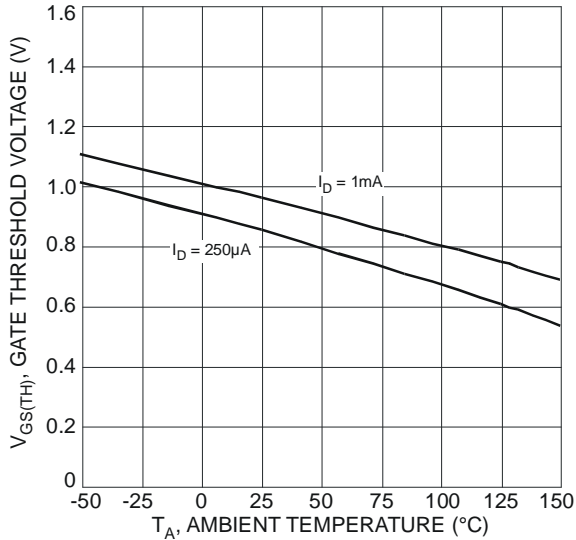


Figure 7 Gate Threshold Variation vs. Ambient Temperature

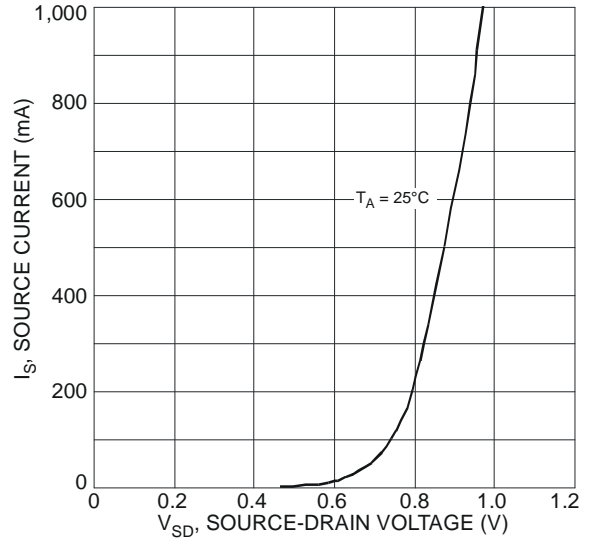


Figure 8 Diode Forward Voltage vs. Current

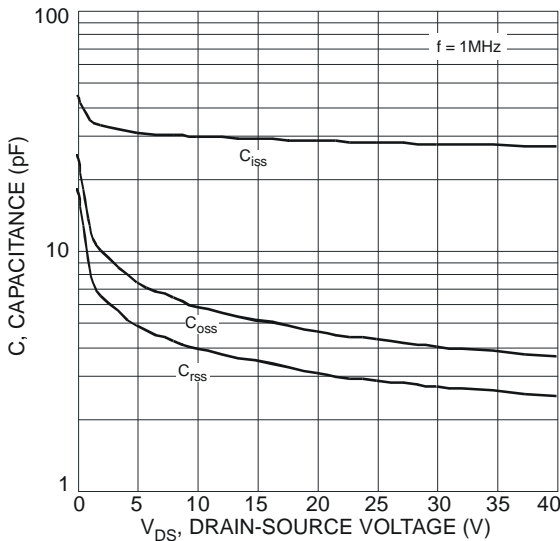


Figure 9 Typical Total Capacitance

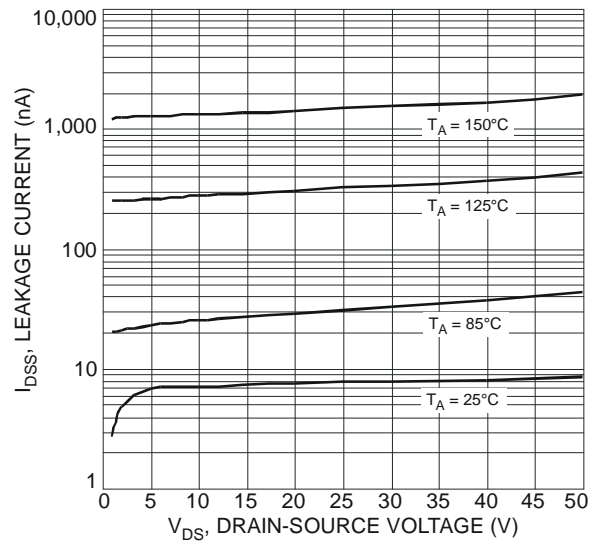


Figure 10 Typical Leakage Current vs. Drain-Source Voltage

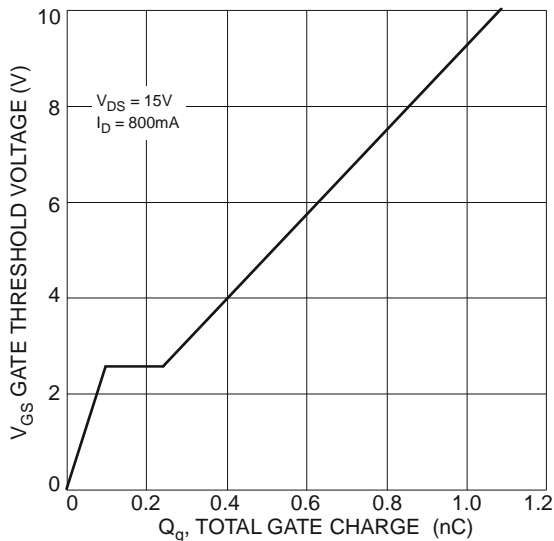


Figure 11 Gate Charge

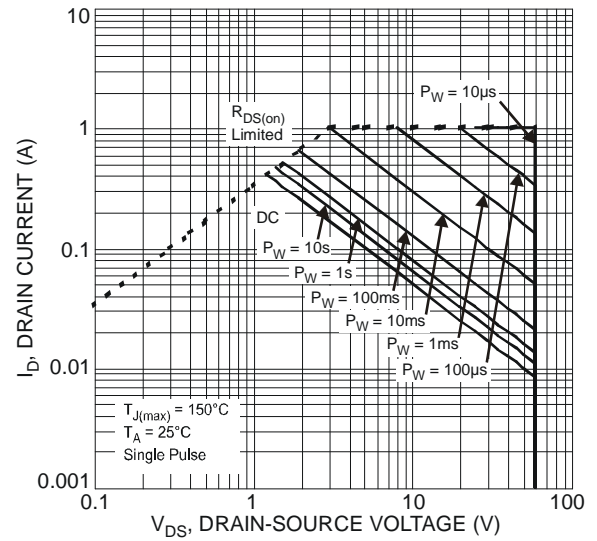


Figure 12 SOA, Safe Operation Area

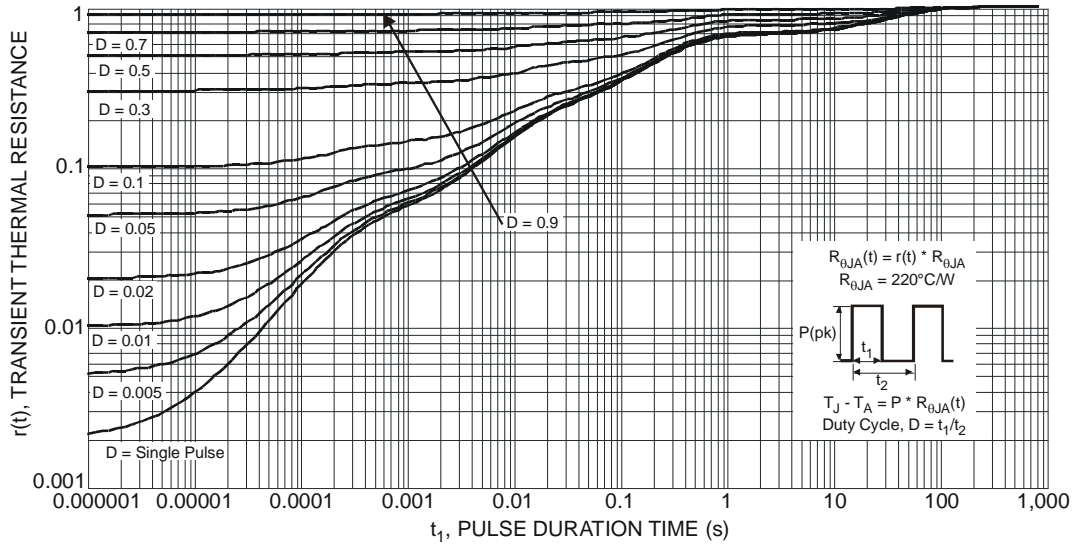
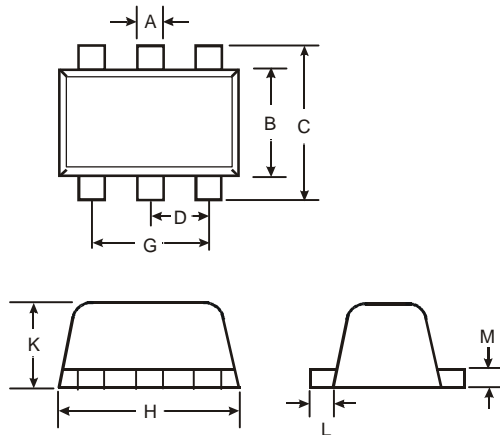


Figure 13 Transient Thermal Response

Package Outline Dimensions

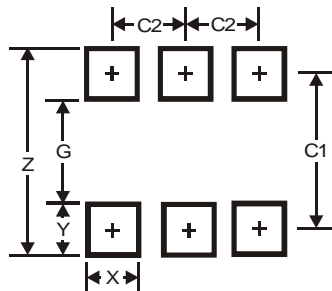
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



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 <http://www.diodes.com/package-outlines.html> 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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