

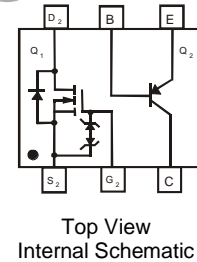
N-CHANNEL ENHANCEMENT MODE MOSFET PLUS PNP TRANSISTOR

Features

- N-Channel MOSFET and PNP Transistor in One Package
- Low On-Resistance
- Very Low Gate Threshold Voltage, 1.0V Max
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- ESD Protected MOSFET Gate up to 2kV
- 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-Q101) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

Mechanical Data

- Package: SOT563
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.006 grams (Approximate)

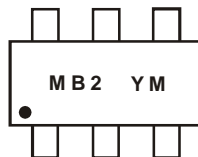


Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMB54D0UV-7	SOT563	3,000	Tape & Reel
DMB54D0UV-13	SOT563	10,000	Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 - 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.
 - 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



MB2 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: J = 2022)
 M = Month (ex: 6 = June)

Date Code Key

Year	2008	...	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	V	...	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 – MOSFET, Q1 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V _{DSS}	50	V
Gate-Source Voltage	V _{GSS}	±12	V
Drain Current (Note 5)	I _D	160	mA
Pulsed Drain Current (Note 5)	I _{DM}	560	mA

Maximum Ratings – PNP Transistor, Q2 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	-50	V
Collector-Emitter Voltage	V _{CEO}	-45	V
Emitter-Base Voltage	V _{EBO}	-5.0	V
Collector Current	I _C	-100	mA

Thermal Characteristics, Total Device (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	250	mW
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	500	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics – MOSFET (@T_A = 25°C unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV _{DSS}	50	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	10	μA	V _{DS} = 50V, V _{GS} = 0V
Gate-Body Leakage	I _{GSS}	—	—	1.0 5.0	μA	V _{GS} = ±8V, V _{DS} = 0V V _{GS} = ±12V, V _{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	V _{GS(TH)}	0.7	0.8	1.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	3.1	4	Ω	V _{GS} = 4V, I _D = 100mA
		—	4	5		V _{GS} = 2.5V, I _D = 80mA
Forward Transconductance	g _{FS}	180	—	—	mS	V _{DS} = 10V, I _D = 100mA, f = 1.0KHz
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C _{ISS}	—	25	—	pF	V _{DS} = 10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{OSS}	—	5	—	pF	
Reverse Transfer Capacitance	C _{RSS}	—	2.1	—	pF	

- Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage (Note 6)	V _{(BR)CBO}	-50	—	—	V	I _C = 10μA, I _B = 0
Collector-Emitter Breakdown Voltage (Note 6)	V _{(BR)CEO}	-45	—	—	V	I _C = 10mA, I _B = 0
Emitter-Base Breakdown Voltage (Note 6)	V _{(BR)EBO}	-5	—	—	V	I _E = 1μA, I _C = 0
DC Current Gain (Note 6)	h _{FE}	220	290	475	—	V _{CE} = -5.0V, I _C = -2.0mA
Collector-Emitter Saturation Voltage (Note 6)	V _{CE(SAT)}	—	—	-100 -400	mV	I _C = -10mA, I _B = -0.5mA I _C = -100mA, I _B = -5.0mA
Base-Emitter Saturation Voltage (Note 6)	V _{BE(SAT)}	—	-700 -900	—	mV	I _C = -10mA, I _B = -0.5mA I _C = -100mA, I _B = -5.0mA
Base-Emitter Voltage (Note 6)	V _{BE(ON)}	-600	—	-750 -820	mV	V _{CE} = -5.0V, I _C = -2.0mA V _{CE} = -5.0V, I _C = -10mA
Collector-Cutoff Current (Note 6)	I _{CBO}	—	—	-15 -4.0	nA μA	V _{CB} = -30V V _{CB} = -30V, T _A = +150°C
Collector-Emitter Cut-Off Current (Note 6)	I _{CES}	—	—	-100	nA	V _{CE} = -45V
Gain Bandwidth Product	f _T	100	—	—	MHz	V _{CE} = -5.0V, I _C = -10mA, f = 100MHz
Output Capacitance	C _{OB}	—	—	4.5	pF	V _{CB} = -10V, f = 1.0MHz
Noise Figure	NF	—	—	10	dB	I _C = -0.2mA, V _{CE} = -5.0Vdc, R _S = 2.0KΩ, f = 1.0KHz, BW = 200Hz

Note: 6. Short duration pulse test used to minimize self-heating effect.

MOSFET

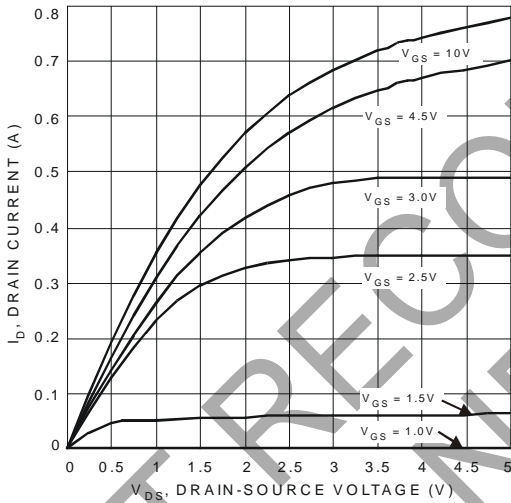


Fig. 1 Typical Output Characteristics

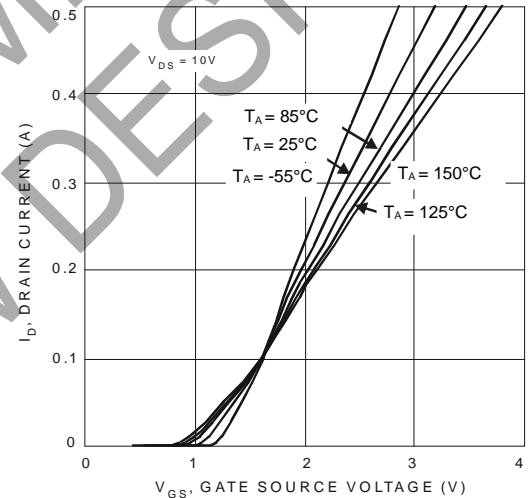


Fig. 2 Typical Transfer Characteristics

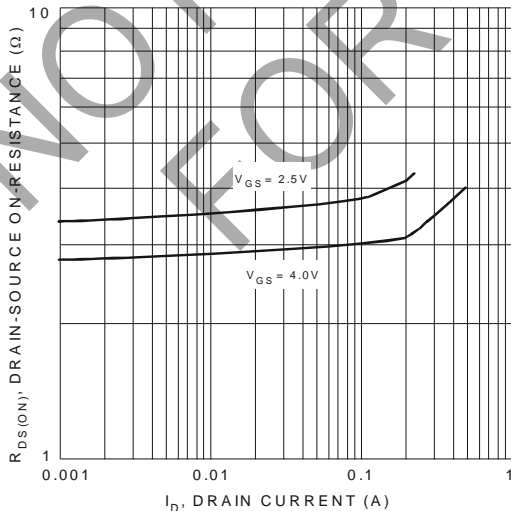


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

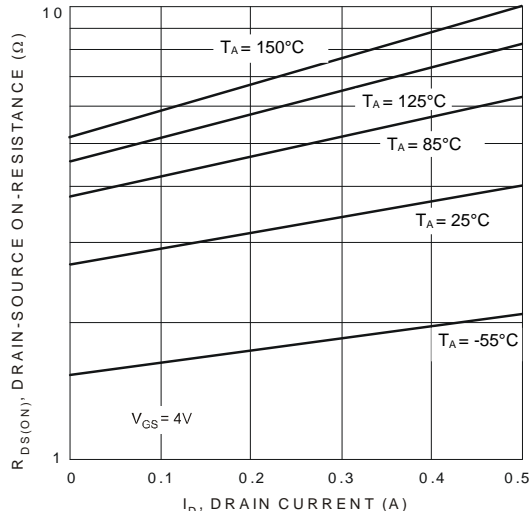


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

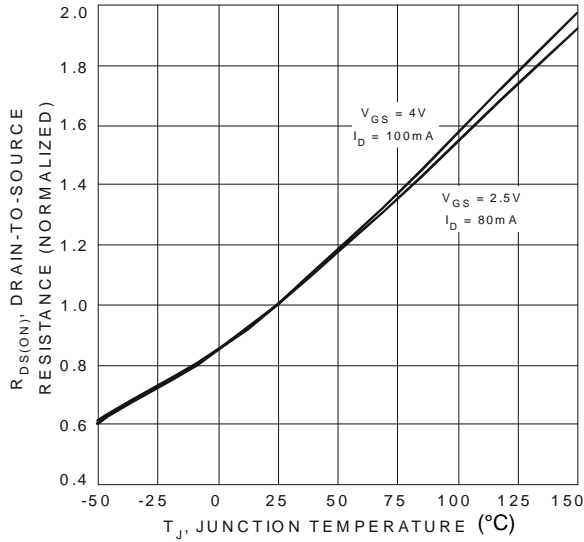


Fig. 5 On-Resistance Variation with Temperature

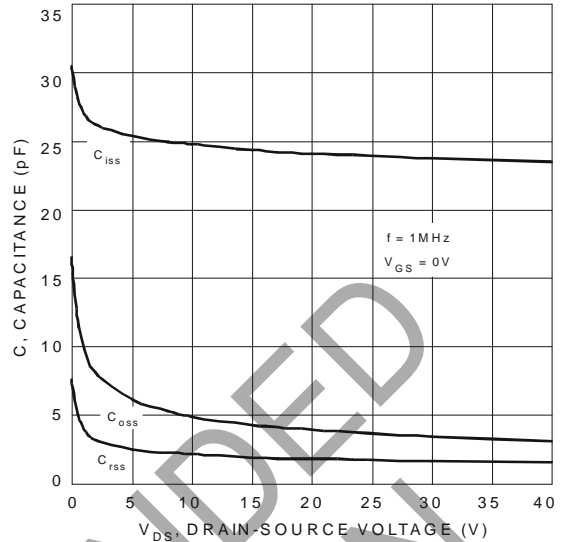


Fig. 6 Typical Capacitance

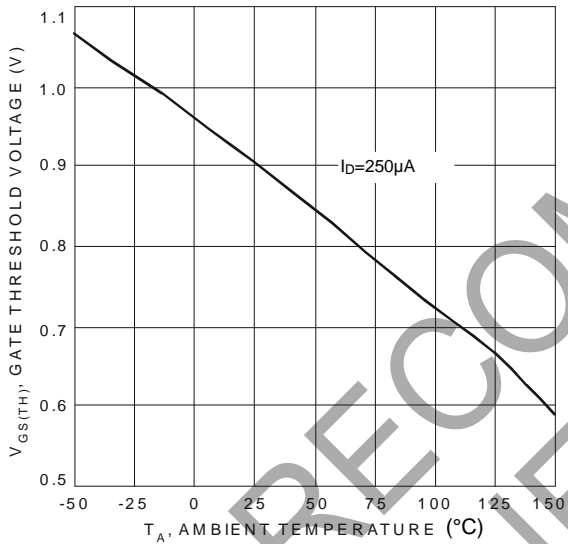


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

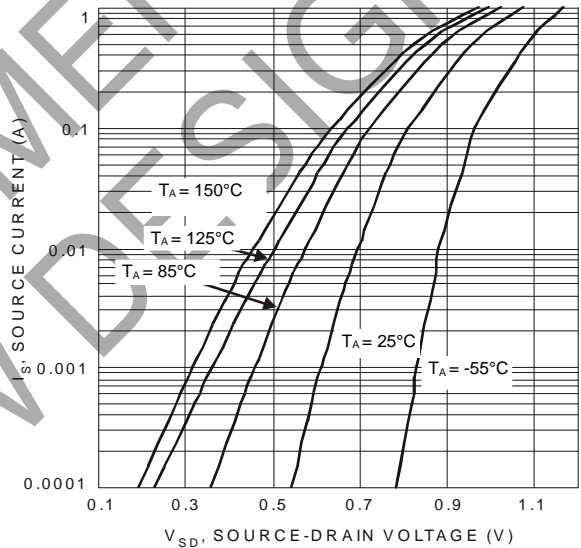


Fig. 8 Diode Forward Voltage vs. Current

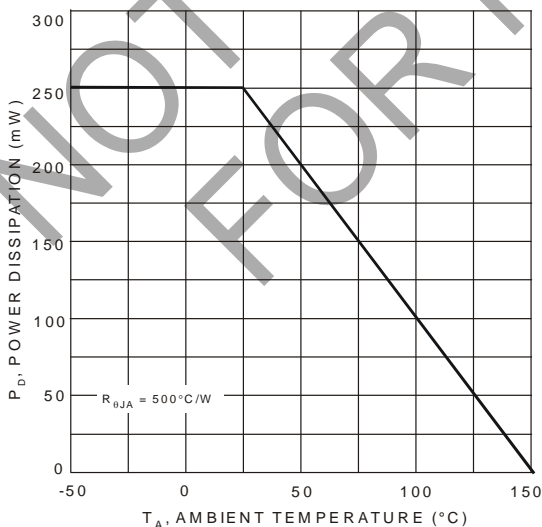


Fig. 9 Derating Curve - Total Package Power Dissipation

PNP Transistor

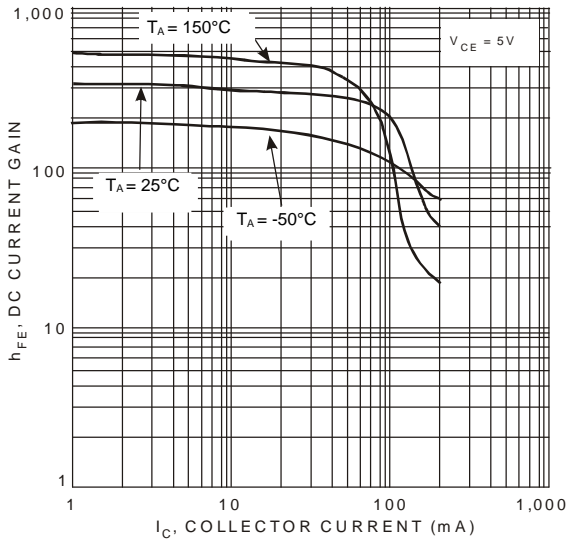


Fig. 10 Typical DC Current Gain vs. Collector Current

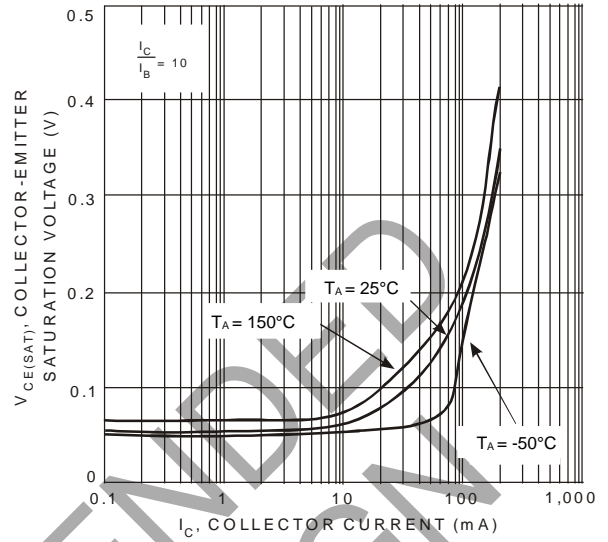


Fig. 11 Collector-Emitter Saturation Voltage vs. Collector Current

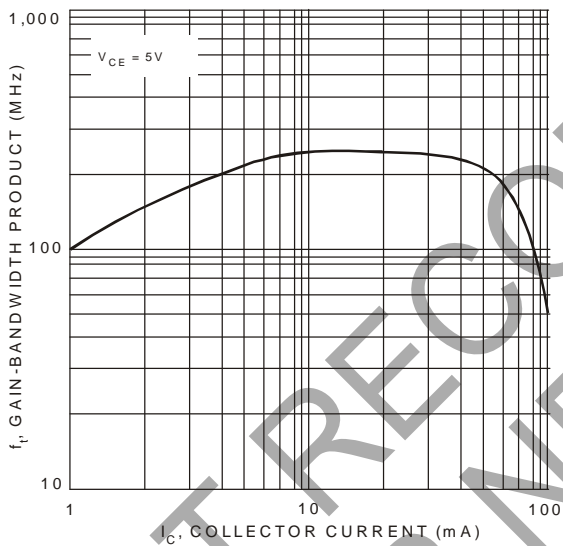


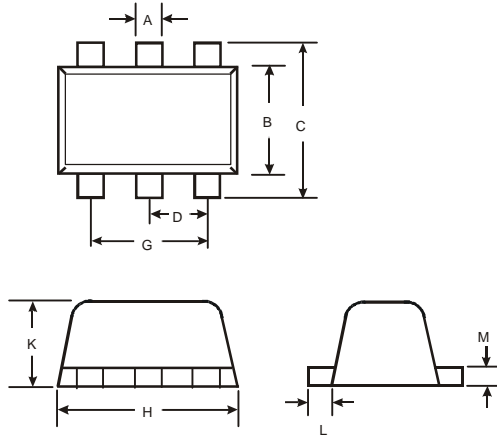
Fig. 12 Typical Gain-Bandwidth Product vs. Collector Current

NOT RECOMMENDED FOR NEW DESIGN

Package Outline Dimensions

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

SOT563

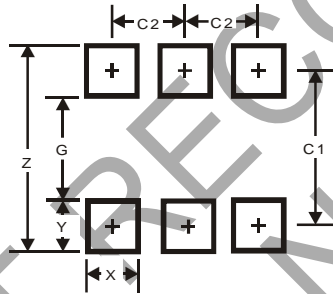


SOT563			
Dim	Min	Max	Typ
A	0.15	0.30	0.20
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	-	-	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.55	0.60	0.60
L	0.10	0.30	0.20
M	0.10	0.18	0.11
All Dimensions in mm			

Suggested Pad Layout

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

SOT563



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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