NEW PRODUCT

DEMD48

DUAL NPN/PNP PRE-BIASED TRANSISTOR

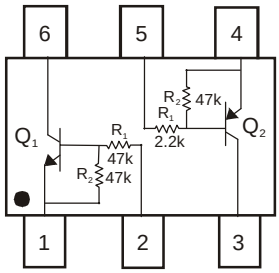
Features

- Epitaxial Planar Die Construction
- Surface Mount Package Suited for Automated Assembly
- Simplifies Circuit Design and Reduces Board Space
- **Lead Free/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**

SOT-563

Mechanical Data

- Case: SOT-563
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Finish — Matte Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.005 grams (approximate)



Reference	Device Type	R1(Nom)	R2(Nom)
Q_1	NPN	47kΩ	47kΩ
Q_2	PNP	2.2 kΩ	47kΩ

Maximum Ratings, Total Device @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3)	P_D	300	mW
Thermal Resistance, Junction to Ambient Air (Note 3)	$R_{\theta JA}$	417	°C/W
Operating and Storage Temperature Range	T_j, T_{STG}	-55 to +150	°C

Maximum Ratings, Pre-Biased NPN Transistor, Q_1 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	50	V
Collector-Emitter Voltage	V_{CEO}	50	V
Emitter-Base Voltage	V_{EBO}	10	V
Input Voltage	V_{IN}	-10 to +40	V
Output Current (DC)	I_O	100	mA
Peak Collector Current	I_{CM}	100	mA

Maximum Ratings, Pre-Biased PNP Transistor, Q_2 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-50	V
Collector-Emitter Voltage	V_{CEO}	-50	V
Emitter-Base Voltage	V_{EBO}	-10	V
Input Voltage	V_{IN}	-12 to +5	V
Output Current (DC)	I_O	-100	mA
Peak Collector Current	I_{CM}	-100	mA

Notes:
1. No purposefully added lead.
2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
3. Device mounted on FR-4 PCB; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.

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Electrical Characteristics, Pre-Biased NPN Transistor, Q_1 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Cut-Off Current	I_{CBO}	-	-	100	nA	V_{CB} = 50V, I_E = 0A
Collector-Emitter Cut-Off Current	I_{CEO}	-	-	1 50	μA	V_{CE} = 30V, I_B = 0A V_{CE} = 30V, I_B = 0A, T_A = 150°C
Emitter-Base Cut-Off Current	I_{EBO}	-	-	90	μA	V_{EB} = 5V, I_C = 0A
Input Voltage	$V_{I(off)}$	-	1.2	0.8	V	V_{CE} = 5V, I_O = 100μA
	$V_{I(on)}$	3	1.6	-	V	V_{CE} = 0.3V, I_O = 2mA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	-	-	0.15	V	I_C/I_B = 10mA/0.5mA
DC Current Gain	h_{FE}	80	-	-	-	V_{CE} = 5V, I_C = 5mA
Input Resistance	R_1	33	47	61	kΩ	-
Resistance Ratio	R_2/R_1	0.8	1	1.2	-	-
Collector Capacitance	C_C	-	-	2.5	pF	V_{CB} = 10V, I_E = 0, f = 1MHz

Electrical Characteristics, Pre-Biased PNP Transistor, Q_2 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Cut-Off Current	I_{CBO}	-	-	-100	nA	V_{CB} = -50V, I_E = 0A
Collector-Emitter Cut-Off Current	I_{CEO}	-	-	-1 -50	μA	V_{CE} = -30V, I_B = 0A V_{CE} = -30V, I_B = 0A, T_A = 150°C
Emitter-Base Cut-Off Current	I_{EBO}	-	-	-180	μA	V_{EB} = -5V, I_C = 0A
Input Voltage	$V_{I(off)}$	-	-0.6	-0.5	V	V_{CC} = -5V, I_O = -100μA
	$V_{I(on)}$	-1.1	-0.75	-	V	V_O = -0.3V, I_O = -5mA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	-	-	-0.1	V	I_C/I_B = -5mA/-0.25mA
DC Current Gain	h_{FE}	100	-	-	-	V_{CE} = -5V, I_C = -10mA
Input Resistance	R_1	1.54	2.2	2.86	kΩ	-
Resistance Ratio	R_2/R_1	17	21	26	-	-
Collector Capacitance	C_C	-	-	3.0	pF	V_{CB} = -10V, I_E = 0, f = 1MHz

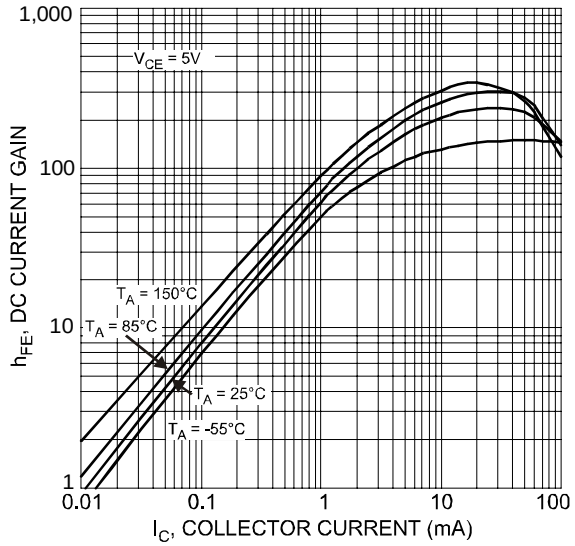


Fig. 1 Typical DC Current Gain vs. Collector Current (Q1, NPN)

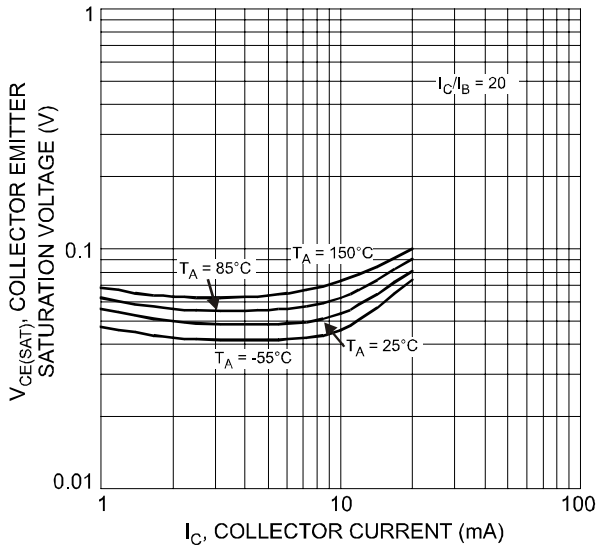


Fig. 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current (Q1, NPN)

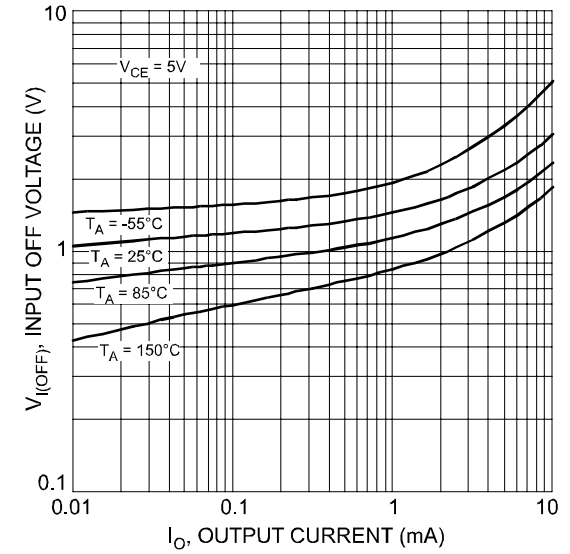


Fig. 3 Typical Input Off Voltage vs. Output Current (Q1, NPN)

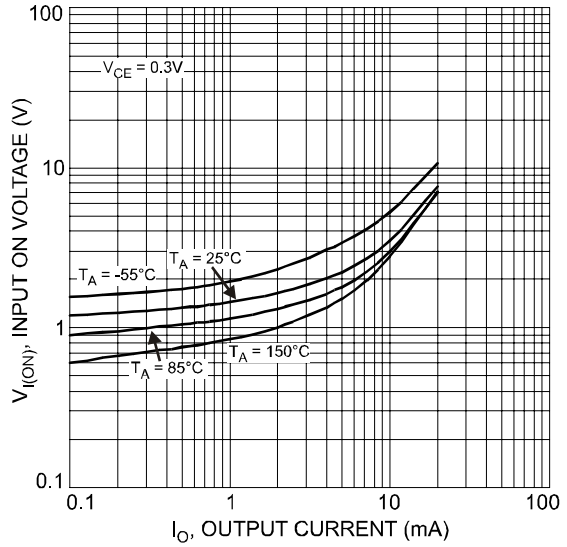


Fig. 4 Typical Input ON Voltage vs. Output Current (Q1, NPN)

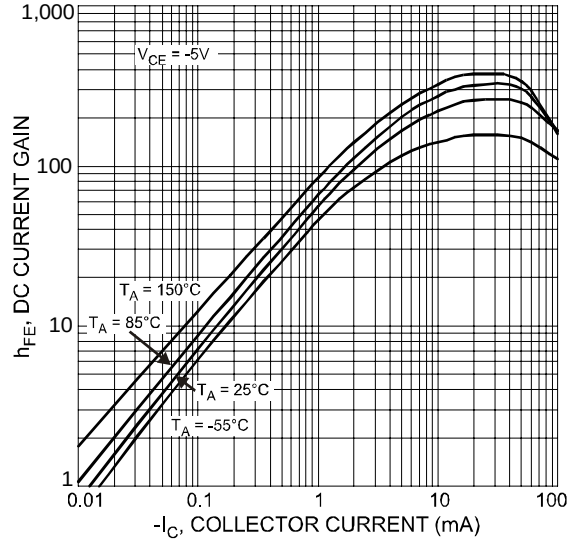


Fig. 5 Typical DC Current Gain vs. Collector Current (Q2, PNP)

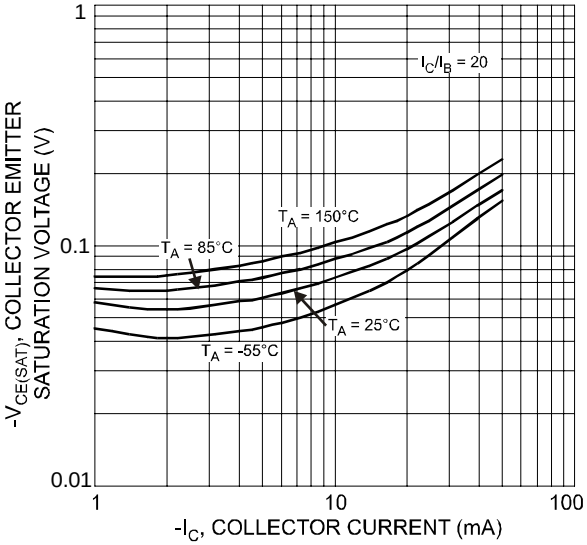


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current (Q2, PNP)

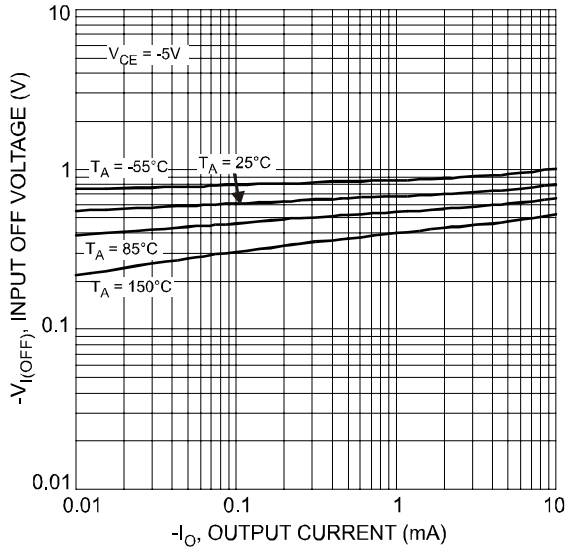


Fig. 7 Typical Input Off Voltage vs. Output Current (Q2, PNP)

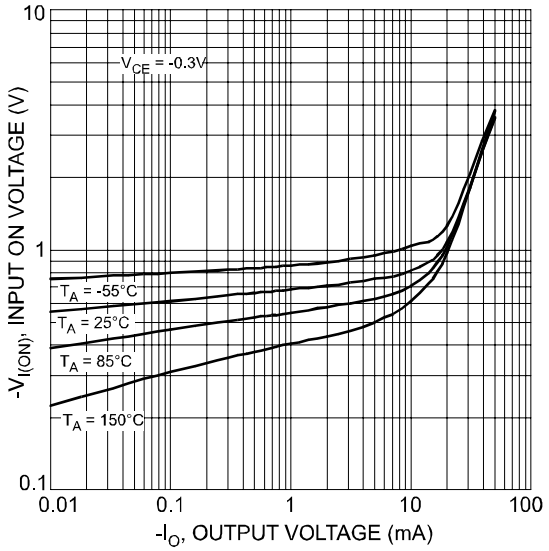


Fig. 8 Typical Input ON Voltage vs. Output Current (Q2, PNP)

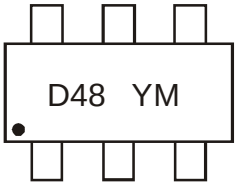
NEW PRODUCT

Ordering Information (Note 4)

Device	Packaging	Shipping
DEMD48-7	SOT-563	3000/Tape & Reel

Note: 4. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information



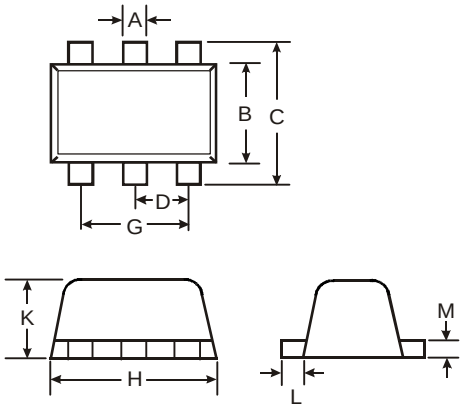
D48 = Product Type Marking Code
YM = Date Code Marking
Y = Year ex: U = 2007
M = Month ex: 9 = September

Date Code Key

Year	2007	2008	2009	2010	2011	2012
Code	U	V	W	X	Y	Z

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

Package Outline Dimensions



SOT-563			
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			