

EMD5DXV6T1, EMD5DXV6T5

Preferred Devices

Product Preview Dual Bias Resistor Transistors

NPN and PNP Silicon Surface Mount Transistors with Monolithic Bias Resistor Network

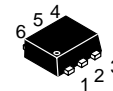
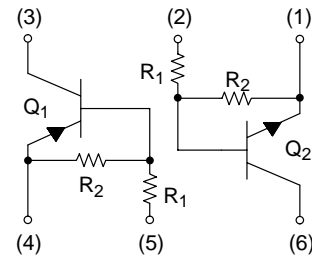
The BRT (Bias Resistor Transistor) contains a single transistor with a monolithic bias network consisting of two resistors; a series base resistor and a base-emitter resistor. These digital transistors are designed to replace a single device and its external resistor bias network. The BRT eliminates these individual components by integrating them into a single device. In the EMD5DXV6T1 series, two complementary BRT devices are housed in the SOT-563 package which is ideal for low power surface mount applications where board space is at a premium.

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- Available in 8 mm, 7 inch Tape and Reel
- Lead Free Solder Plating



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SOT-563
CASE 463A
PLASTIC

MARKING DIAGRAM



U5 = Specific Device Code
D = Date Code

ORDERING INFORMATION

Device	Package	Shipping
EMD5DXV6T1	SOT-563	4 mm pitch 4000/Tape & Reel
EMD5DXV6T5	SOT-563	2 mm pitch 8000/Tape & Reel

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

Preferred devices are recommended choices for future use and best overall value.

EMD5DXV6T1, EMD5DXV6T5

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted, common for Q₁ and Q₂, – minus sign for Q₁ (PNP) omitted)

Rating	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	50	Vdc
Collector-Emitter Voltage	V_{CEO}	50	Vdc
Collector Current	I_C	100	mA _{dc}

THERMAL CHARACTERISTICS

Characteristic (One Junction Heated)	Symbol	Max	Unit
Total Device Dissipation Derate above 25°C	P_D	357 (Note 1) 2.9 (Note 1)	mW mW/°C
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	350 (Note 1)	°C/W
Characteristic (Both Junctions Heated)	Symbol	Max	Unit
Total Device Dissipation Derate above 25°C	P_D	500 (Note 1) 4.0 (Note 1)	mW mW/°C
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	250 (Note 1)	°C/W
Junction and Storage Temperature	T_J, T_{stg}	-55 to +150	°C

1. FR-4 @ Minimum Pad

EMD5DXV6T1, EMD5DXV6T5

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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Q1 TRANSISTOR: PNP

OFF CHARACTERISTICS

Collector-Base Cutoff Current (V _{CB} = 50 V, I _E = 0)	I _{CBO}	-	-	100	nAdc
Collector-Emitter Cutoff Current (V _{CB} = 50 V, I _B = 0)	I _{CEO}	-	-	500	nAdc
Emitter-Base Cutoff Current (V _{EB} = 6.0, I _C = 5.0 mA)	I _{EBO}	-	-	1.0	mAdc

ON CHARACTERISTICS

Collector-Base Breakdown Voltage (I _C = 10 μA, I _E = 0)	V _{(BR)CBO}	50	-	-	Vdc
Collector-Emitter Breakdown Voltage (I _C = 2.0 mA, I _B = 0)	V _{(BR)CEO}	50	-	-	Vdc
DC Current Gain (V _{CE} = 10 V, I _C = 5.0 mA)	h _{FE}	20	35	-	
Collector-Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.3 mA)	V _{CE(SAT)}	-	-	0.25	Vdc
Output Voltage (on) (V _{CC} = 5.0 V, V _B = 2.5 V, R _L = 1.0 kΩ)	V _{OL}	-	-	0.2	Vdc
Output Voltage (off) (V _{CC} = 5.0 V, V _B = 0.5 V, R _L = 1.0 kΩ)	V _{OH}	4.9	-	-	Vdc
Input Resistor	R1	3.3	4.7	6.1	kΩ
Resistor Ratio	R1/R2	0.38	0.47	0.56	

Q2 TRANSISTOR: NPN

OFF CHARACTERISTICS

Collector-Base Cutoff Current (V _{CB} = 50 V, I _E = 0)	I _{CBO}	-	-	100	nAdc
Collector-Emitter Cutoff Current (V _{CB} = 50 V, I _B = 0)	I _{CEO}	-	-	500	nAdc
Emitter-Base Cutoff Current (V _{EB} = 6.0, I _C = 5.0 mA)	I _{EBO}	-	-	0.1	mAdc

ON CHARACTERISTICS

Collector-Base Breakdown Voltage (I _C = 10 μA, I _E = 0)	V _{(BR)CBO}	50	-	-	Vdc
Collector-Emitter Breakdown Voltage (I _C = 2.0 mA, I _B = 0)	V _{(BR)CEO}	50	-	-	Vdc
DC Current Gain (V _{CE} = 10 V, I _C = 5.0 mA)	h _{FE}	80	140	-	
Collector-Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.3 mA)	V _{CE(SAT)}	-	-	0.25	Vdc
Output Voltage (on) (V _{CC} = 5.0 V, V _B = 2.5 V, R _L = 1.0 kΩ)	V _{OL}	-	-	0.2	Vdc
Output Voltage (off) (V _{CC} = 5.0 V, V _B = 0.5 V, R _L = 1.0 kΩ)	V _{OH}	4.9	-	-	Vdc
Input Resistor	R1	33	47	61	kΩ
Resistor Ratio	R1/R2	0.8	1.0	1.2	

EMD5DXV6T1, EMD5DXV6T5

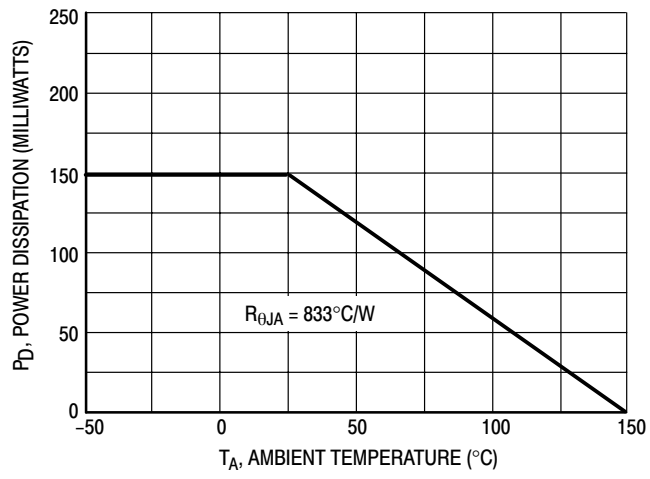


Figure 1. Derating Curve

EMD5DXV6T1, EMD5DXV6T5

TYPICAL ELECTRICAL CHARACTERISTICS — EMD5DXV6T1 PNP TRANSISTOR

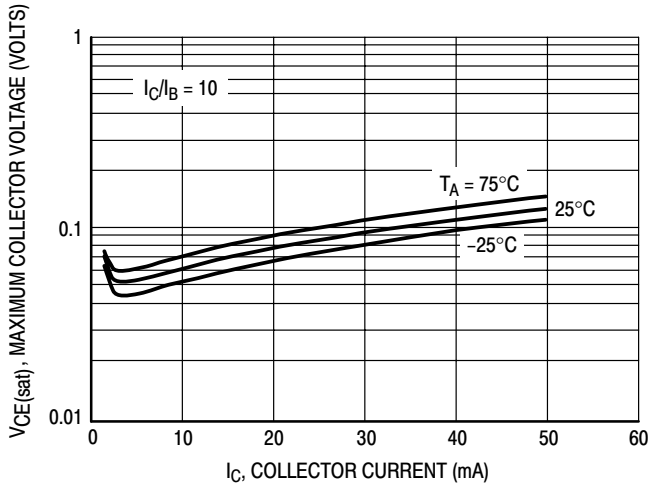


Figure 2. $V_{CE(sat)}$ versus I_C

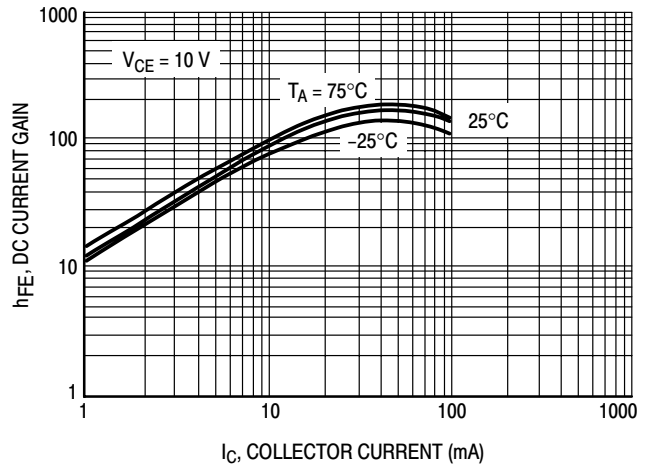


Figure 3. DC Current Gain

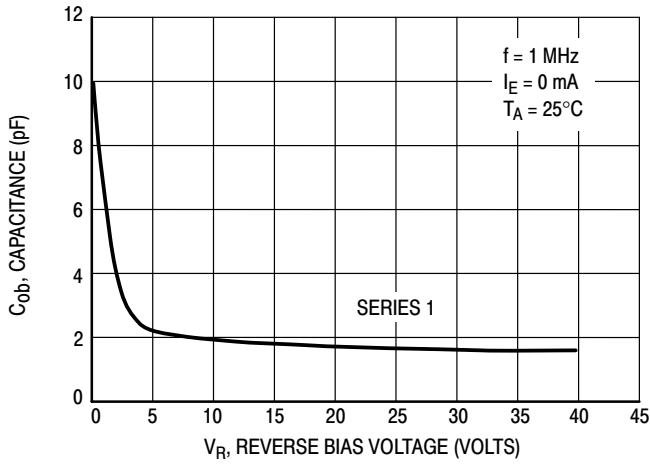


Figure 4. Output Capacitance

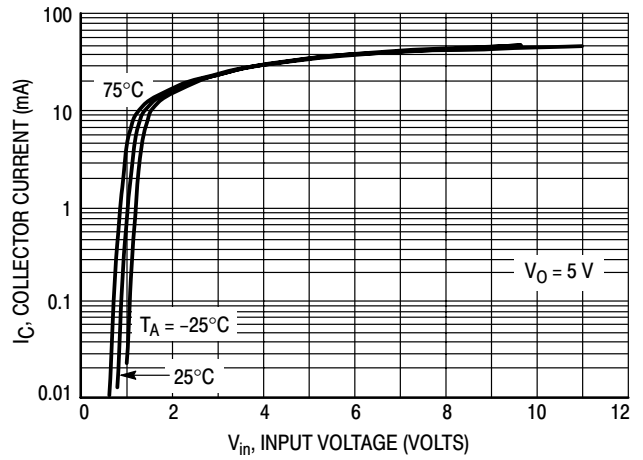


Figure 5. Output Current versus Input Voltage

EMD5DXV6T1, EMD5DXV6T5

TYPICAL ELECTRICAL CHARACTERISTICS — EMD5DXV6T1 NPN TRANSISTOR

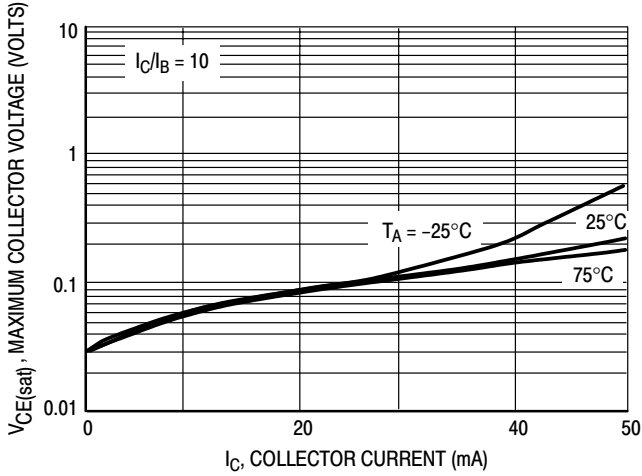


Figure 6. $V_{CE(sat)}$ versus I_C

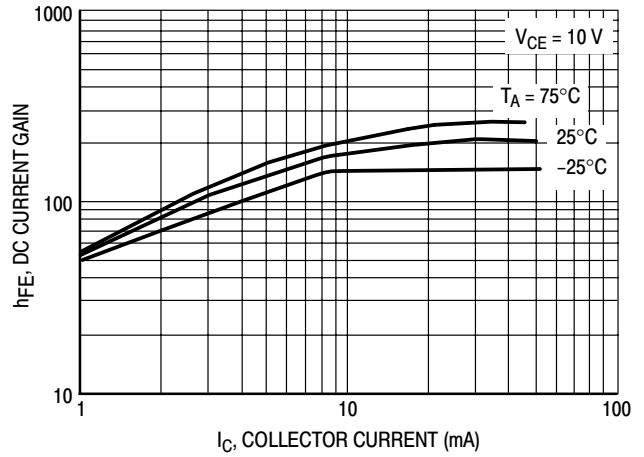


Figure 7. DC Current Gain

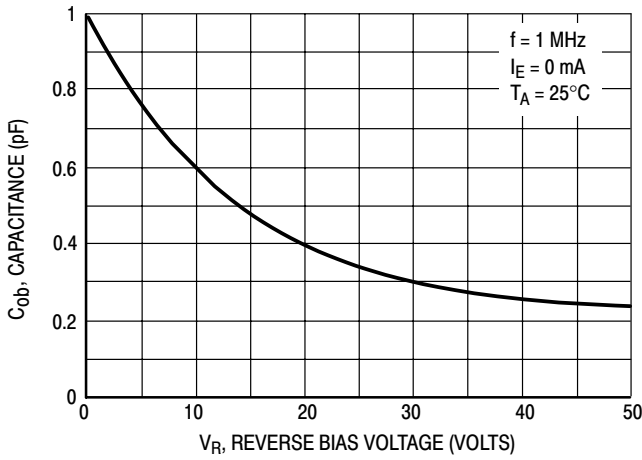


Figure 8. Output Capacitance

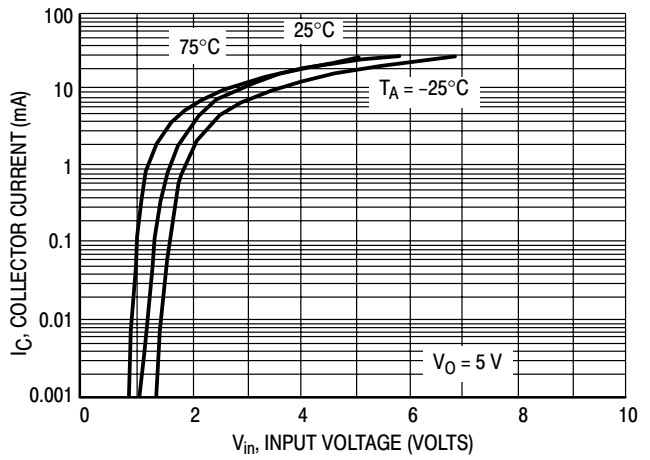


Figure 9. Output Current versus Input Voltage

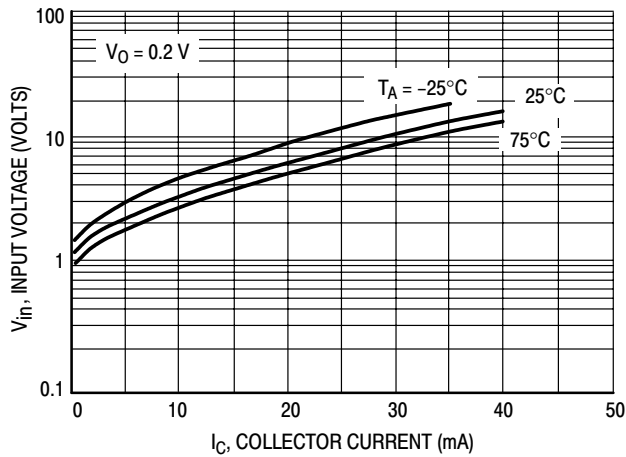
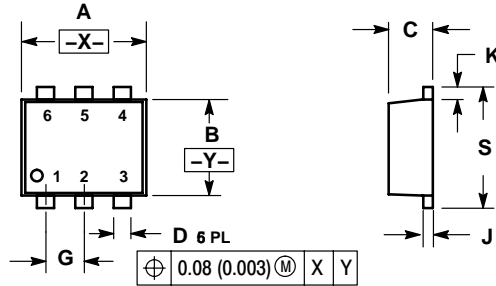


Figure 10. Input Voltage versus Output Current

EMD5DXV6T1, EMD5DXV6T5

PACKAGE DIMENSIONS

SOT-563, 6 LEAD CASE 463A-01 ISSUE O



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.50	1.70	0.059	0.067
B	1.10	1.30	0.043	0.051
C	0.50	0.60	0.020	0.024
D	0.17	0.27	0.007	0.011
G	0.50 BSC		0.020 BSC	
J	0.08	0.18	0.003	0.007
K	0.10	0.30	0.004	0.012
S	1.50	1.70	0.059	0.067

STYLE 1:

- PIN 1. EMITTER 1
- 2. BASE 1
- 3. COLLECTOR 2
- 4. EMITTER 2
- 5. BASE 2
- 6. COLLECTOR 1

STYLE 2:

- PIN 1. EMITTER 1
- 2. EMITTER 2
- 3. BASE 2
- 4. COLLECTOR 2
- 5. BASE 1
- 6. COLLECTOR 1


STYLE 3:

- PIN 1. CATHODE 1
- 2. CATHODE 1
- 3. ANODE/ANODE 2
- 4. CATHODE 2
- 5. CATHODE 2
- 6. ANODE/ANODE 1

STYLE 4:

- PIN 1. COLLECTOR
- 2. COLLECTOR
- 3. BASE
- 4. EMITTER
- 5. COLLECTOR
- 6. COLLECTOR

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