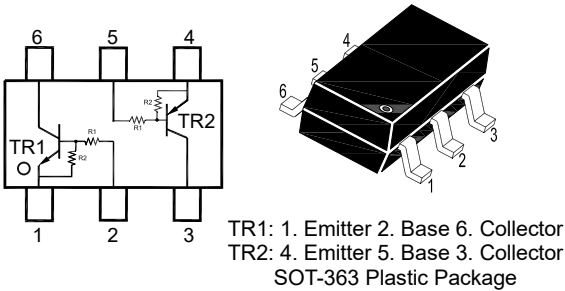


MMDTX441DW-HAF

Complementary NPN/PNP Silicon Epitaxial Planar Digital Transistor

Features

- Transistors with different polarity and built-in bias resistors R1(47 KΩ) and R2(47 KΩ)
- Simplification of circuit design
- Reduces number of components and board space
- Halogen and Antimony Free(HAF), RoHS compliant



Applications

- For switching and interface circuit and drivecircuit applications

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$) (TR1)

Parameter	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_I	+ 40 / - 10	V
Collector Current	I_C	100	mA

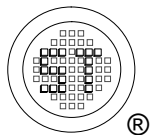
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$) (TR2)

Parameter	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	$-V_I$	+ 10 / - 40	V
Collector Current	$-I_C$	100	mA

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$) (TR1 and TR2)

Parameter	Symbol	Value	Unit
Total Power Dissipation	P_{tot}	200	mW
Thermal Resistance Junction to Ambient ¹⁾	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Operating Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	- 65 to + 150	$^\circ\text{C}$

¹⁾ Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.



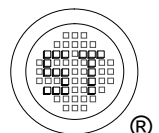
MMDTX441DW-HAF

Characteristics at $T_a = 25^\circ\text{C}$ (TR1:NPN)

Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at $V_{CE} = 5\text{ V}$, $I_C = 5\text{ mA}$	h_{FE}	80	-	-	-
Collector Base Cutoff Current at $V_{CB} = 50\text{ V}$	I_{CBO}	-	-	100	nA
Collector Emitter Cutoff Current at $V_{CE} = 30\text{ V}$	I_{CEO}	-	-	1	μA
Emitter Base Cutoff Current at $V_{EB} = 5\text{ V}$	I_{EBO}	-	-	90	μA
Collector Emitter Saturation Voltage at $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$	$V_{CE(sat)}$	-	-	0.15	V
Input Voltage (OFF) at $V_{CE} = 5\text{ V}$, $I_C = 100\text{ }\mu\text{A}$	$V_{I(OFF)}$	0.8	-	-	V
Input Voltage (ON) at $V_{CE} = 0.3\text{ V}$, $I_C = 2\text{ mA}$	$V_{I(ON)}$	-	-	3	V
Collector Output capacitance at $V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$	C_{ob}	-	-	2.5	pF
Input Resistance	R_1	33	47	61	K Ω
Resistance Ratio	R_1/R_2	0.8	1	1.2	-

Characteristics at $T_a = 25^\circ\text{C}$ (TR2:PNP)

Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at $-V_{CE} = 5\text{ V}$, $-I_C = 5\text{ mA}$	h_{FE}	80	-	-	-
Collector Base Cutoff Current at $-V_{CB} = 50\text{ V}$	$-I_{CBO}$	-	-	100	nA
Collector Emitter Cutoff Current at $-V_{CE} = 30\text{ V}$	$-I_{CEO}$	-	-	1	μA
Emitter Base Cutoff Current at $-V_{EB} = 5\text{ V}$	$-I_{EBO}$	-	-	90	μA
Collector Emitter Saturation Voltage at $-I_C = 10\text{ mA}$, $-I_B = 0.5\text{ mA}$	$-V_{CE(sat)}$	-	-	0.15	V
Input Voltage (OFF) at $-V_{CE} = 5\text{ V}$, $-I_C = 100\text{ }\mu\text{A}$	$-V_{I(OFF)}$	0.8	-	-	V
Input Voltage (ON) at $-V_{CE} = 0.3\text{ V}$, $-I_C = 2\text{ mA}$	$-V_{I(ON)}$	-	-	3	V
Collector Output capacitance at $-V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$	C_{ob}	-	-	3	pF
Input Resistance	R_1	33	47	61	K Ω
Resistance Ratio	R_1/R_2	0.8	1	1.2	-



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Electrical Characteristics Curves:TR1

Fig 1. Collector Current vs. $V_{I(ON)}$

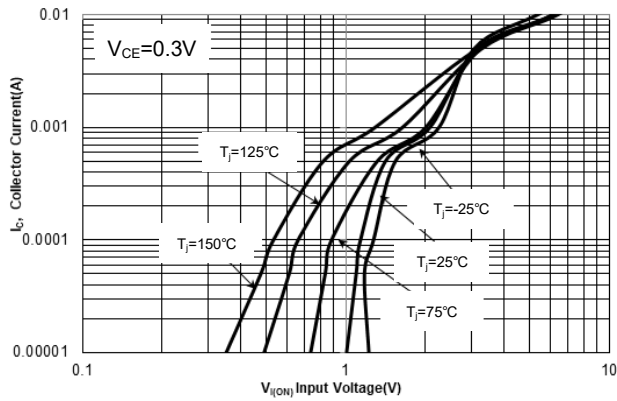


Fig 2. Collector Current vs. $V_{I(off)}$

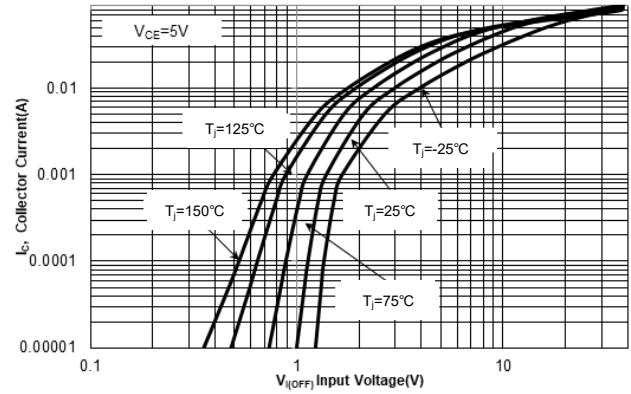


Fig 3. DC Current Gain vs. Collector Current

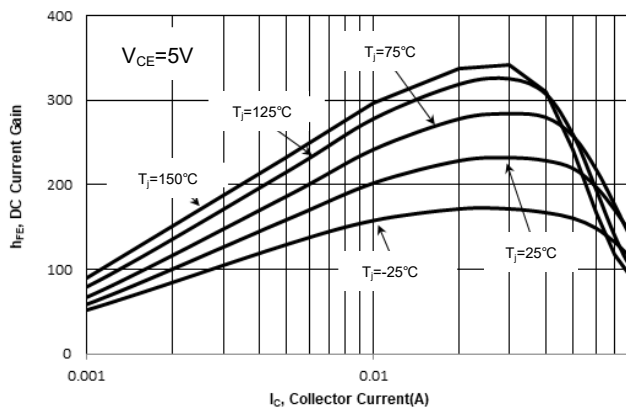
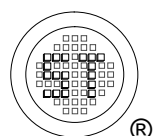
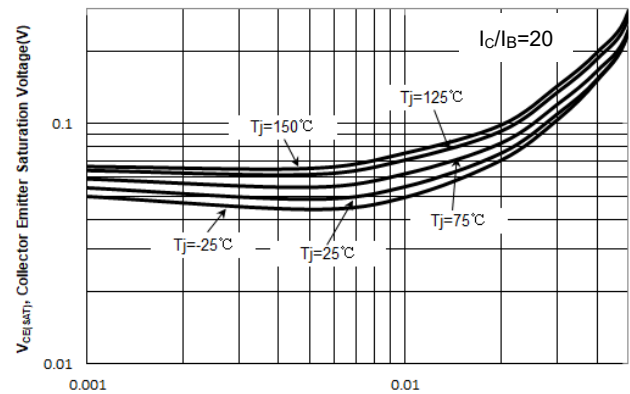


Fig 4. $V_{CE(sat)}$ vs. Collector Current



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Electrical Characteristics Curves:TR2

Fig 1. Collector Current vs. $V_{I(ON)}$

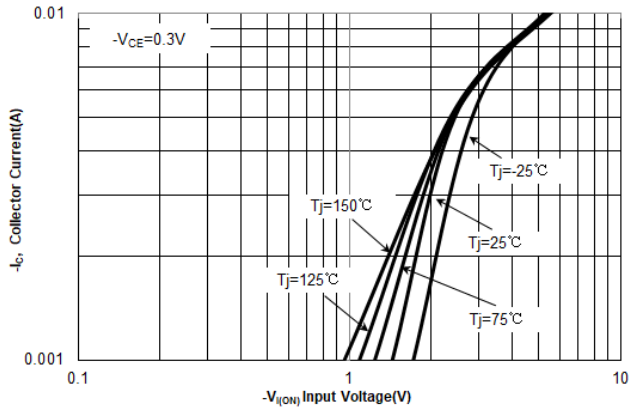


Fig 2. Collector Current vs. $V_{I(off)}$

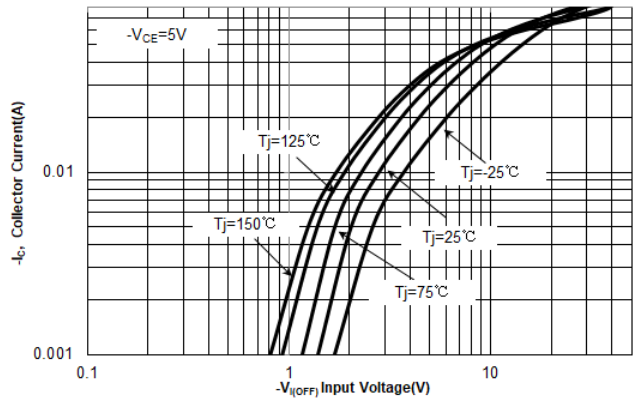


Fig 3. DC Current Gain vs. Collector Current

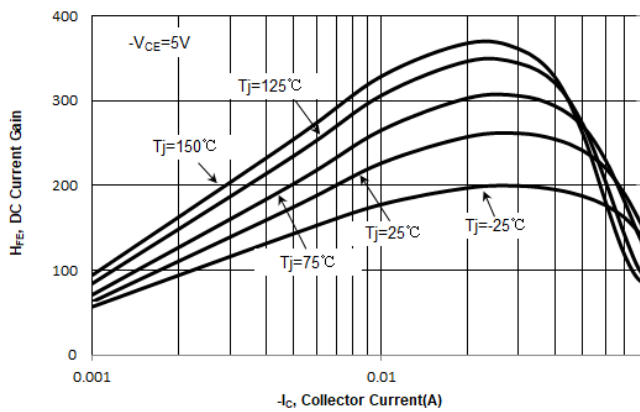


Fig 4. $V_{CE(sat)}$ vs. Collector Current

