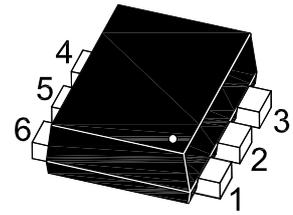
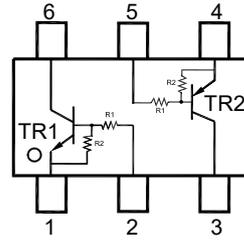


MMDTX441DE

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



TR1: 1. Emitter 2. Base 6. Collector
TR2: 4. Emitter 5. Base 3. Collector
SOT-563 Plastic package

Applications

- Switching and interface
- Circuit and drive circuit

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

Parameter	Symbol	Value	Unit
Collector Base Voltage	V_{CB0}	50	V
Collector Emitter Voltage	V_{CEO}	50	V
Emitter Base Voltage	V_{EBO}	- 10 to 40	V
Collector Current	I_c	30	mA
Peak Collector Current	I_{CM}	100	mA

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

Parameter	Symbol	Value	Unit
Collector Base Voltage	$-V_{CB0}$	50	V
Collector Emitter Voltage	$-V_{CEO}$	50	V
Emitter Base Voltage	V_{EBO}	- 40 to 10	V
Collector Current	$-I_c$	30	mA
Peak Collector Current	$-I_{CM}$	100	mA

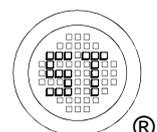
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$) (TR1 and TR2)

Parameter	Symbol	Value	Unit
Total Power Dissipation	P_D	150	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Operating ambient and Storage Temperature Range	T_{stg}	- 55 to + 150	$^\circ\text{C}$

Thermal Characteristics(TR1 and TR2)

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient ¹⁾	$R_{\theta JA}$	833	$^\circ\text{C/W}$

¹⁾ Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.



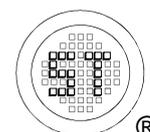
MMDTX441DE

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

Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at $V_{CE} = 10\text{ V}$, $I_C = 5\text{ mA}$	h_{FE}	80	-	-	-
Collector Emitter Cutoff Current at $V_{CE} = 50\text{ V}$	I_{CEO}	-	-	500	nA
Emitter Base Cutoff Current at $V_{EB} = 5\text{ V}$	I_{EBO}	-	-	180	μA
Collector Emitter Saturation Voltage at $I_C = 5\text{ mA}$, $I_B = 0.5\text{ mA}$	$V_{CE(sat)}$	-	-	150	mV
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
Transition Frequency at $V_{CE} = 10\text{ V}$, $-I_E = 5\text{ mA}$, $f = 100\text{ MHz}$	f_T	-	250	-	MHz
Input Resistance	R_1	32.9	47	61.1	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 $-V_{CE} = 10\text{ V}$, $-I_C = 5\text{ mA}$	h_{FE}	80	-	-	-
Collector Emitter Cutoff Current at $-V_{CE} = 50\text{ V}$	$-I_{CEO}$	-	-	500	nA
Emitter Base Cutoff Current at $-V_{EB} = 5\text{ V}$	$-I_{EBO}$	-	-	180	μA
Collector Emitter Saturation Voltage at $-I_C = 5\text{ mA}$, $-I_B = 0.5\text{ mA}$	$-V_{CE(sat)}$	-	-	150	mV
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
Transition Frequency at $-V_{CE} = 10\text{ V}$, $I_E = 5\text{ mA}$, $f = 100\text{ MHz}$	f_T	-	250	-	MHz
Input Resistance	R_1	32.9	47	61.1	K Ω
Resistance Ratio	R_1/R_2	0.8	1	1.2	-



MMDTX441DE

Electrical Characteristics Curves(TR1)

Fig. 1 Output Current vs. $V_{I(OFF)}$, Input Voltage

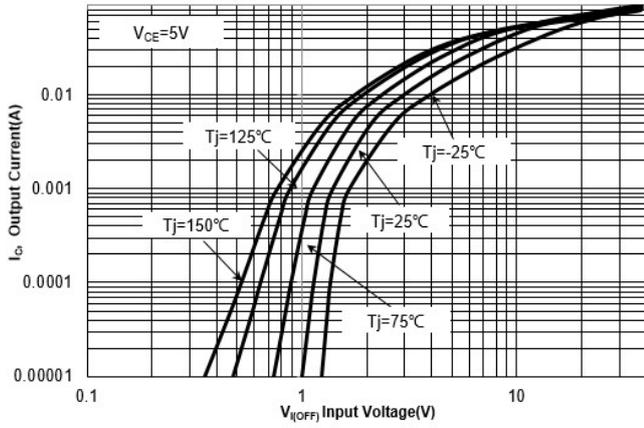


Fig. 2 V_{CESAT} vs. Output Current

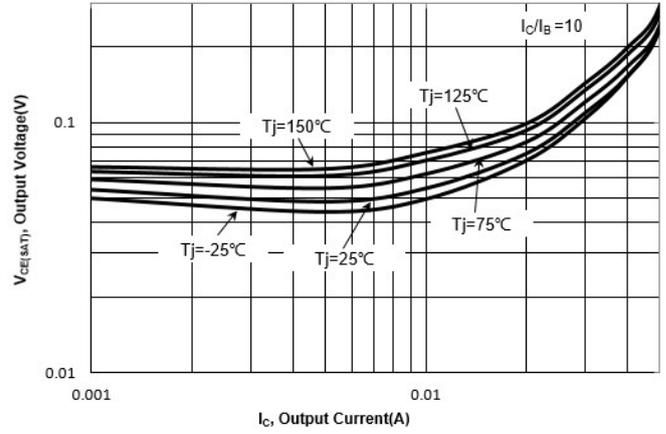


Fig. 3 Output Current vs. $V_{I(ON)}$, Input Voltage

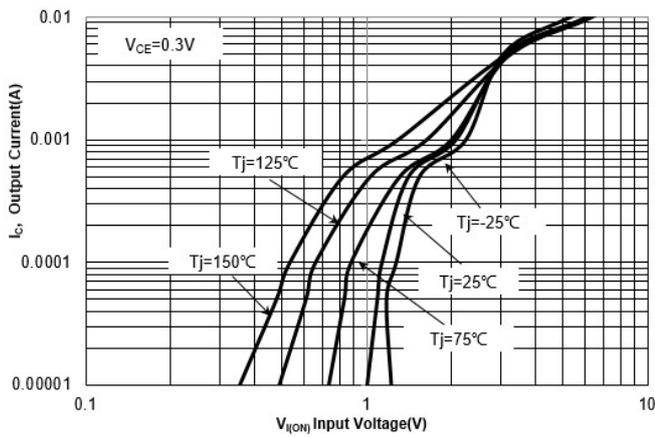
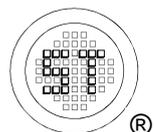
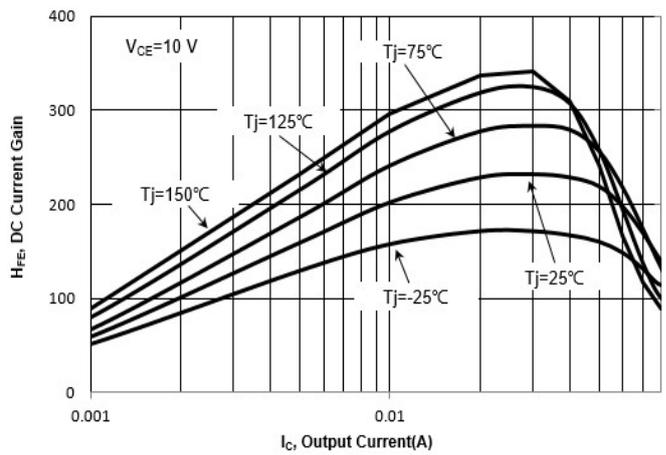


Fig. 4 DC Current Gain vs. Output Current



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Electrical Characteristics Curves(TR2)

Fig. 1 Output Current vs. $V_{I(OFF)}$, Input Voltage

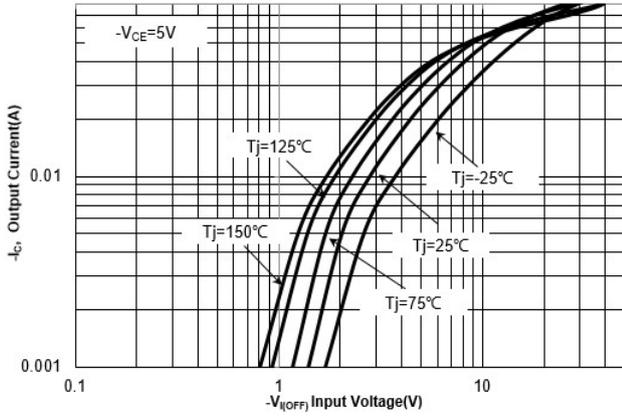


Fig. 2 V_{CESAT} vs. Output Current

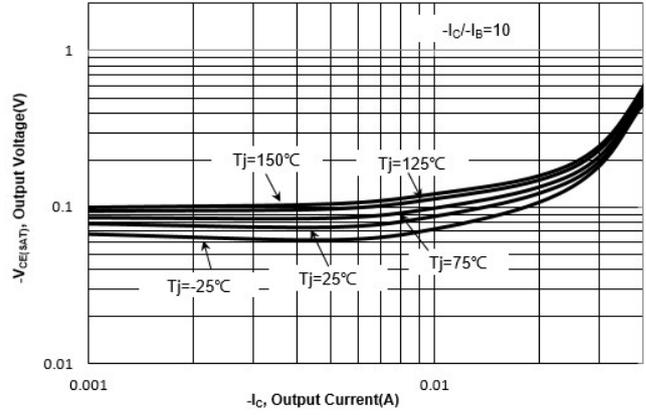


Fig. 3 Output Current vs. $V_{I(ON)}$, Input Voltage

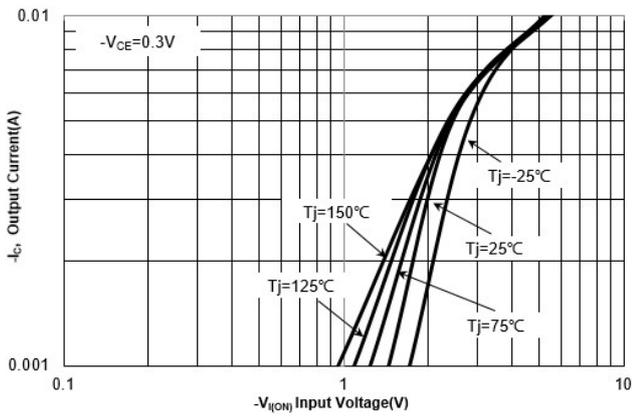
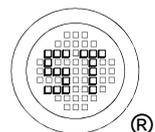
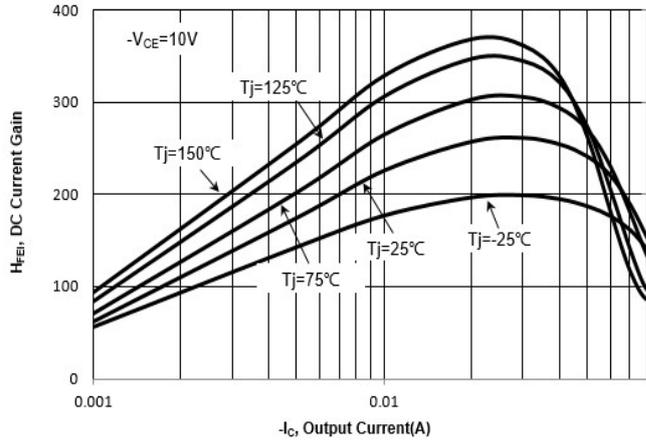


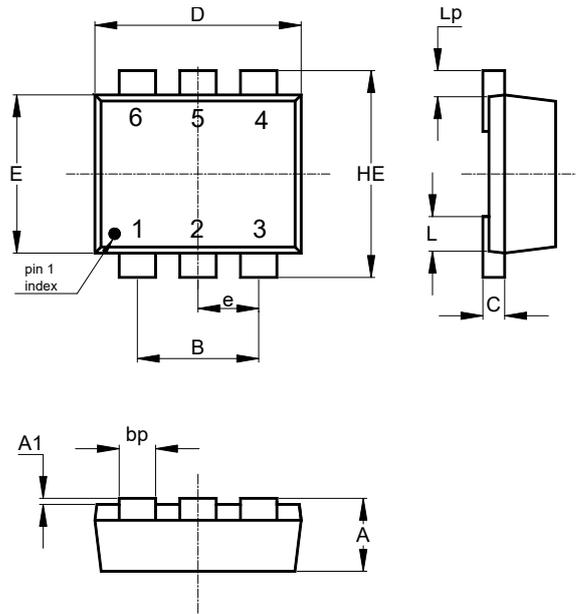
Fig. 4 DC Current Gain vs. Output Current



MMDTX441DE

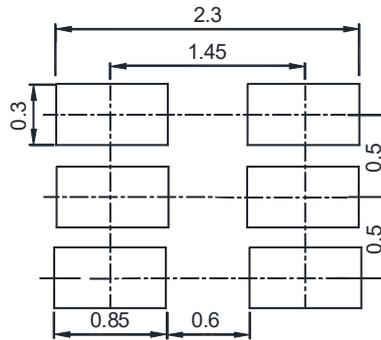
Package Outline (Dimensions in mm)

SOT-563



Unit	A	A1	B	C	D	E	HE	e	L	Lp	bp
mm	0.6 0.5	0.05 0	1.0 typ.	0.18 0.1	1.7 1.5	1.25 1.1	1.7 1.55	0.5 Typ.	0.15 0.02	0.3 0.1	0.3 0.15

Recommended Soldering Footprint



Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
SOT-563	8	4 ± 0.1	0.157 ± 0.004	178	7	4,000

Marking information

- " DE " = Part No.
 - " YM " = Date Code Marking
 - " Y " = Year
 - " M " = Month
- Font type: Arial

