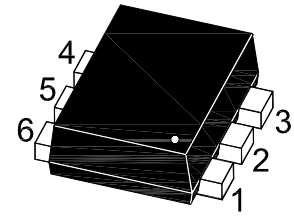
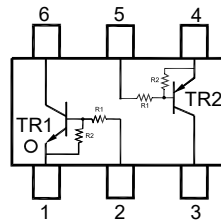


MMDTX1441DE

Complementary NPN/PNP Silicon Epitaxial Planar Digital Transistor

Features

- Transistors with different polarity and built-in bias resistors R1 and R2
- 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

- For switching and interface circuit and drivecircuit applications

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

Parameter	Symbol	Value	Unit
Collector Base Voltage	V_{CB0}	50	V
Collector Emitter Voltage	V_{CE0}	50	V
Collector Current	I_c	100	mA

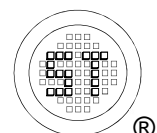
Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$ (TR2)

Parameter	Symbol	Value	Unit
Collector Base Voltage	$-V_{CB0}$	50	V
Collector Emitter Voltage	$-V_{CE0}$	50	V
Collector Current	$-I_c$	100	mA

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

Parameter	Symbol	Value	Unit
Total Power Dissipation	P_{tot}	357	mW
Thermal Resistance from Junction to Ambient ¹⁾	$R_{\theta JA}$	350	$^\circ\text{C/W}$
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	- 55 to + 150	$^\circ\text{C}$

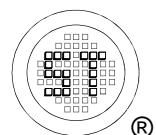
¹⁾ Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.



MMDTX1441DE

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

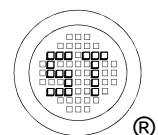
Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at $V_{CE} = 10\text{ V}$, $I_C = 5\text{ mA}$	h_{FE}	80	-	-	-
Collector-Base Breakdown Voltage at $I_C = 10\text{ }\mu\text{A}$	$V_{(BR)CBO}$	50	-	-	V
Collector-Emitter Breakdown Voltage at $I_C = 2\text{ mA}$	$V_{(BR)CEO}$	50	-	-	V
Collector Base Cutoff Current at $V_{CB} = 50\text{ V}$	I_{CBO}	-	-	100	nA
Collector Emitter Cutoff Current at $V_{CE} = 50\text{ V}$	I_{CEO}	-	-	500	nA
Emitter Base Cutoff Current at $V_{EB} = 6\text{ V}$	I_{EBO}	-	-	0.1	mA
Collector Emitter Saturation Voltage at $I_C = 10\text{ mA}$, $I_B = 0.3\text{ mA}$	V_{CEsat}	-	-	0.25	V
Input Voltage (OFF) at $V_{CE} = 5\text{ V}$, $I_C = 100\text{ }\mu\text{A}$	$V_{I(OFF)}$	0.5	-	-	V
Input Voltage (ON) at $V_{CE} = 0.3\text{ V}$, $I_C = 2\text{ mA}$	$V_{I(ON)}$	-	-	3	V
Input Resistance	R_1	32.9	47	61.1	K Ω
Resistance Ratio	R_2/R_1	0.8	1	1.2	-



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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-Base Breakdown Voltage at $-I_C = 10\text{ }\mu\text{A}$	$-V_{(BR)CBO}$	50	-	-	V
Collector-Emitter Breakdown Voltage at $-I_C = 2\text{ mA}$	$-V_{(BR)CEO}$	50	-	-	V
Collector Base Cutoff Current at $-V_{CB} = 50\text{ V}$	$-I_{CBO}$	-	-	100	nA
Collector Emitter Cutoff Current at $-V_{CE} = 50\text{ V}$	$-I_{CEO}$	-	-	500	nA
Emitter Base Cutoff Current at $-V_{EB} = 6\text{ V}$	$-I_{EBO}$	-	-	0.2	mA
Collector Emitter Saturation Voltage at $-I_C = 10\text{ mA}$, $-I_B = 0.3\text{ mA}$	$-V_{CEsat}$	-	-	0.25	V
Input Voltage (OFF) at $-V_{CE} = 5\text{ V}$, $-I_C = 100\text{ }\mu\text{A}$	$-V_{I(OFF)}$	0.3	-	-	V
Input Voltage (ON) at $-V_{CE} = 0.3\text{ V}$, $-I_C = 1\text{ mA}$	$-V_{I(ON)}$	-	-	1.4	V
Input Resistance	R_1	7	10	13	K Ω
Resistance Ratio	R_2/R_1	3.7	4.7	5.7	-



Electrical Characteristics Curves(TR1)

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

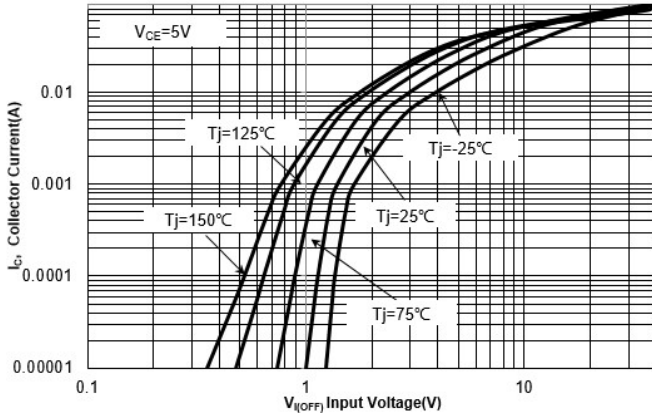


Fig. 2 V_{CESAT} vs. Collector Current

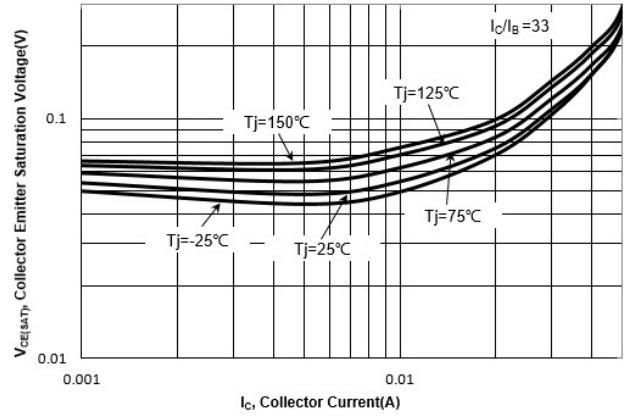


Fig. 3 Collector Current vs. $V_{I(ON)}$, Input Voltage

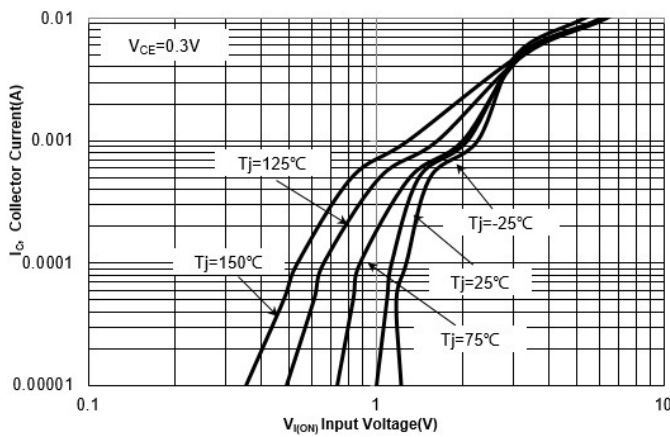
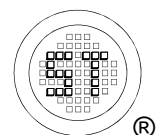
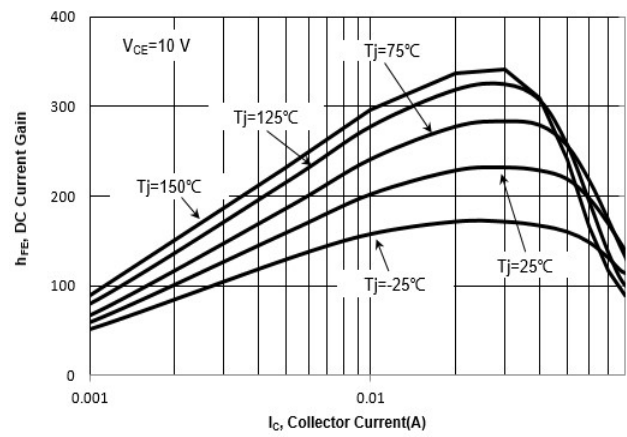


Fig. 4 DC Current Gain vs. Collector Current



Electrical Characteristics Curves:TR2

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

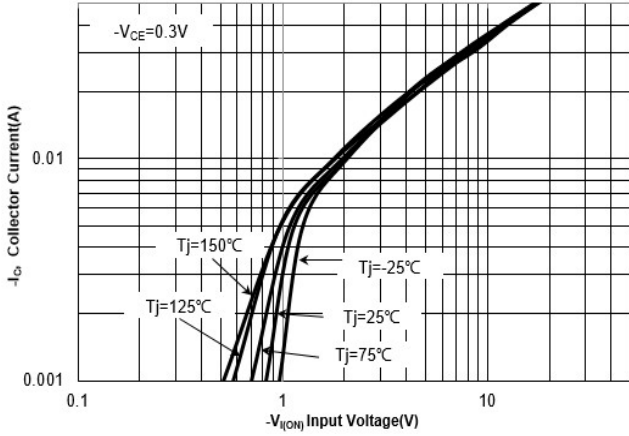


Fig 2. $V_{I(OFF)}$ vs. Collector Current

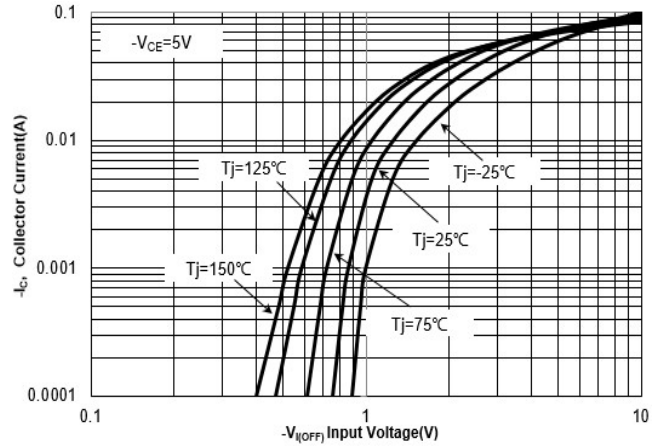


Fig 3. DC Current Gain vs. Collector Current

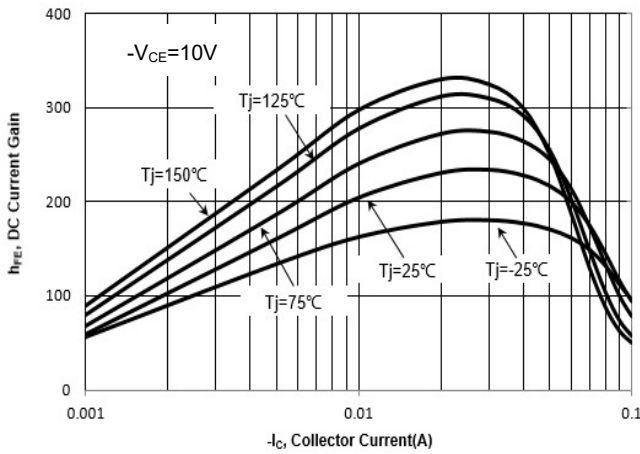
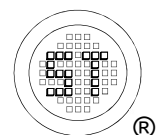
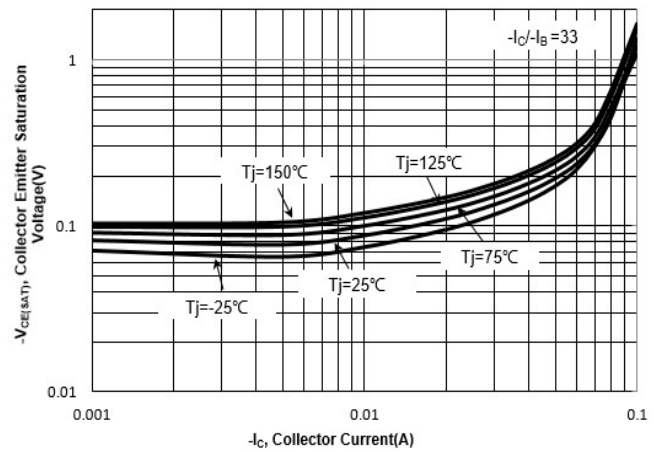


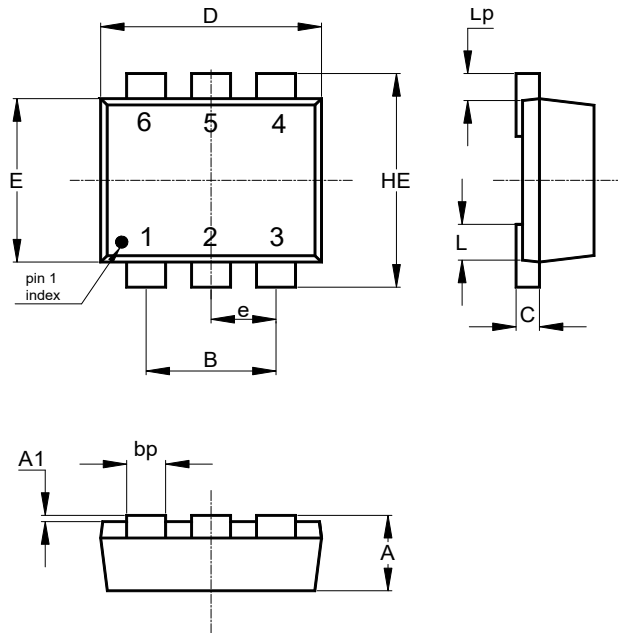
Fig 4. $V_{CE(sat)}$ vs. Collector Current



MMDTX1441DE

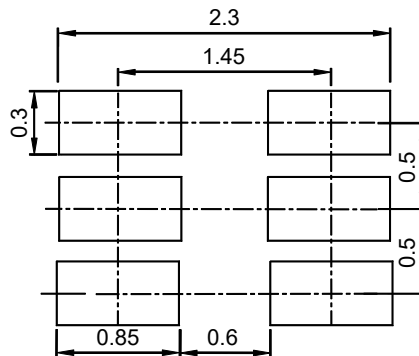
Package Outline (Dimensions in mm)

SOT-563



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

- " DD " = Part No.
- " YM " = Date Code Marking
- " Y " = Year
- " M " = Month

Font type: Arial

