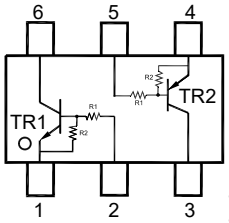
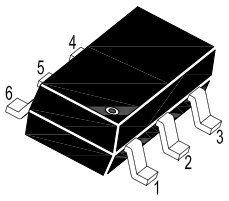
MMDTX441DW

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-363 Plastic Package

Applications

- For switching and interface circuit and drivecircuit applications

Absolute Maximum Ratings (T_a = 25℃) (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℃) (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℃) (TR1 and TR2)

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

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

Dated: 03/03/2023 Rev: 04

Characteristics at T_a = 25℃ (TR1:NPN)

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

Characteristics at T_a = 25℃ (TR2:PNP)

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

Electrical Characteristics Curves:TR1

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

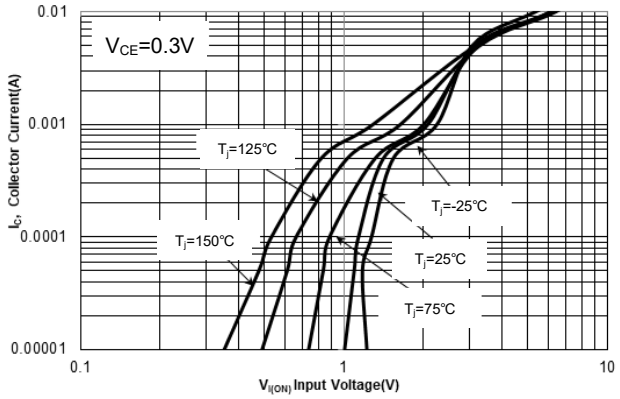


Fig 2. Collector Current vs. $V_{I(off)}$

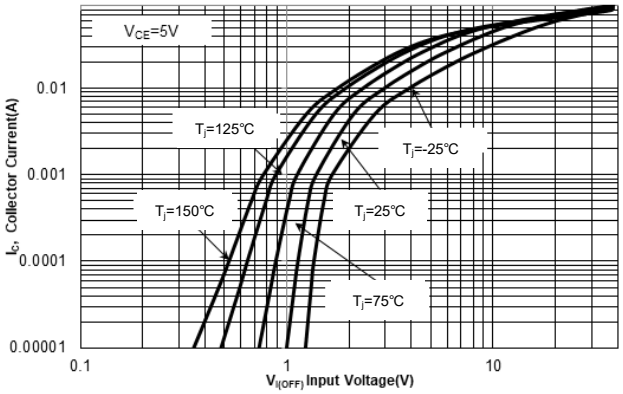


Fig 3. DC Current Gain vs. Collector Current

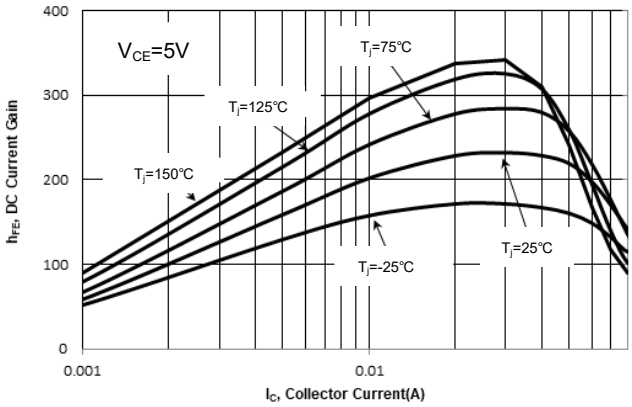
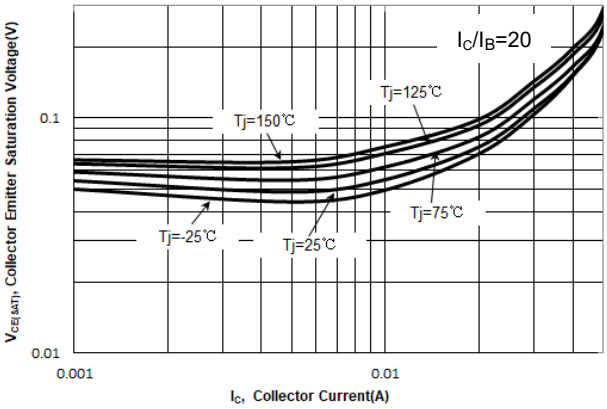


Fig 4. $V_{CE(sat)}$ vs. Collector Current



Electrical Characteristics Curves:TR2

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

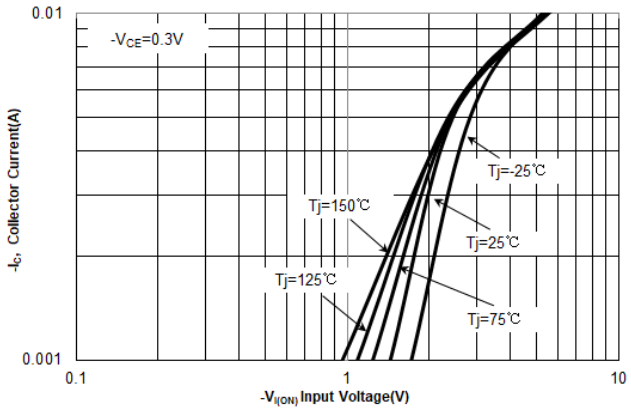


Fig 2. Collector Current vs. $V_{I(off)}$

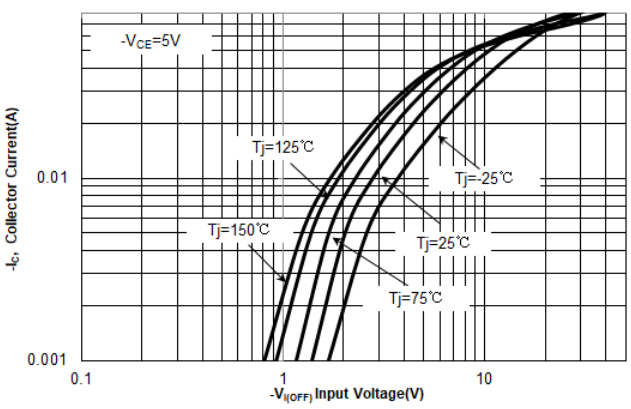


Fig 3. DC Current Gain vs. Collector Current

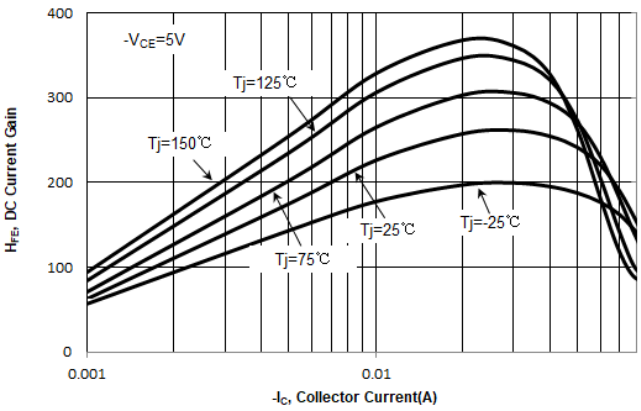
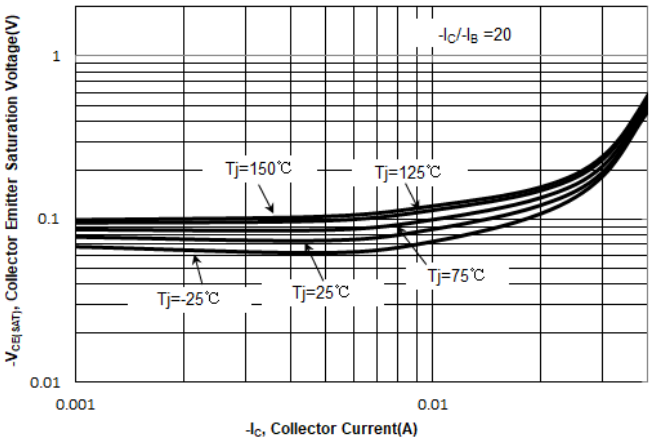
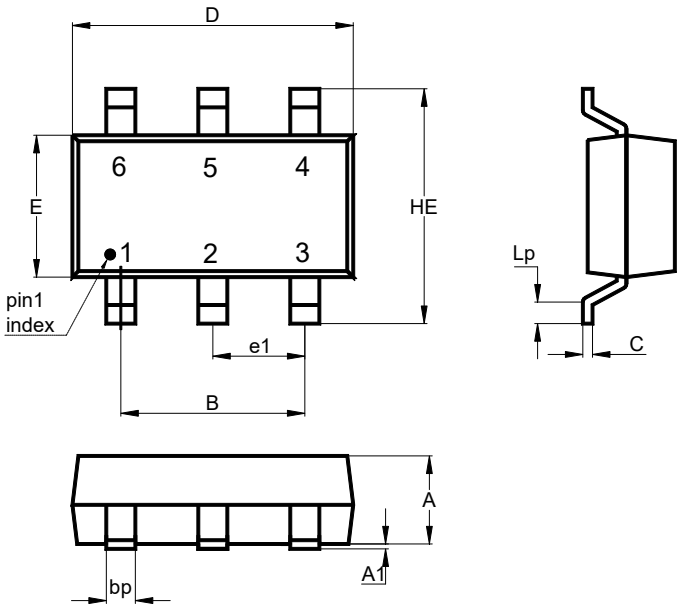


Fig 4. $V_{CE(sat)}$ vs. Collector Current

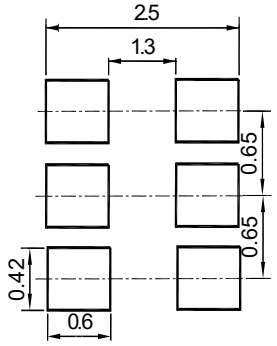


Package Outline (Dimensions in mm) SOT-363



Unit	A	A1	B	C	D	E	e1	HE	Lp	bp
mm	1.0 0.9	0.1 0	1.3 typ.	0.25 0.1	2.2 1.8	1.35 1.15	0.65 typ.	2.2 2.0	0.4 0.15	0.3 0.1

Recommended Soldering Footprint



Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
SOT-363	8	4 ± 0.1	0.157 ± 0.004	178	7	3,000

Marking information

" D1 " = Part No.
"YM" = Date Code Marking
"Y" = Year
"M" = Month
Font type: Arial