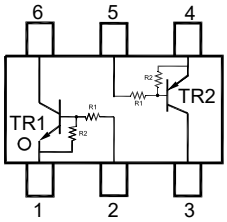
MMDTX241DW

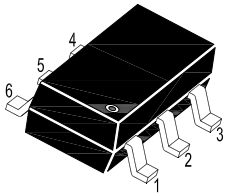
Complementary NPN/PNP Silicon Epitaxial Planar Digital Transistor

For switching and interface circuit and drivecircuit applications

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-363 Plastic Package

Absolute Maximum Ratings at (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
Collector Current	I_C	100	mA

Absolute Maximum Ratings at (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
Collector Current	$-I_C$	100	mA

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

Parameter	Symbol	Value	Unit
Total Power Dissipation	P_{tot}	200	mW
Junction Temperature	T_j	150	℃
Storage Temperature Range	T_{stg}	- 55 to + 150	℃
Thermal Resistance Junction to Ambient [1)]	$R_{\theta JA}$	625	℃/W

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

Dated: 03/07/2023 Rev: 03

Characteristics at T_a = 25℃:TR1

Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at V_{CE} = 5 V, I_C = 10 mA	h_{FE}	70	-	-	-
Collector Base Cutoff Current at V_{CB} = 50 V	I_{CBO}	-	-	100	nA
Collector Emitter Cutoff Current at V_{CE} = 50 V	I_{CEO}	-	-	500	nA
Emitter Base Cutoff Current at V_{EB} = 10 V	I_{EBO}	0.17	-	0.33	mA
Collector Emitter Saturation Voltage at I_C = 5 mA, I_B = 0.25 mA	$V_{CE(sat)}$	-	-	0.3	V
Input Voltage (OFF) at V_{CE} = 5 V, I_C = 100 μA	$V_{I(OFF)}$	1	-	1.5	V
Input Voltage (ON) at V_{CE} = 0.2 V, I_C = 5 mA	$V_{I(ON)}$	1.3	-	3	V
Gain Bandwidth Product at V_{CE} = 10 V, I_C = 5 mA, f = 100 MHz	f_T	-	250	-	MHz
Collector Output Capacitance at V_{CB} = 10 V, f = 1 MHz	C_{ob}	-	-	6	pF
Input Resistance	R_1	15.4	22	28.6	KΩ
Resistance Ratio	R_1/R_2	0.9	1	1.1	-

Characteristics at T_a = 25℃:TR2

Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at $-V_{CE}$ = 5 V, $-I_C$ = 10 mA	h_{FE}	70	-	-	-
Collector Base Cutoff Current at $-V_{CB}$ = 50 V	$-I_{CBO}$	-	-	100	nA
Collector Emitter Cutoff Current at $-V_{CE}$ = 50 V	$-I_{CEO}$	-	-	500	nA
Emitter Base Cutoff Current at $-V_{EB}$ = 10 V	$-I_{EBO}$	0.17	-	0.33	mA
Collector Emitter Saturation Voltage at $-I_C$ = 5 mA, $-I_B$ = 0.25 mA	$-V_{CE(sat)}$	-	-	0.3	V
Input Voltage (OFF) at $-V_{CE}$ = 5 V, $-I_C$ = 100 μA	$-V_{I(OFF)}$	1	-	1.5	V
Input Voltage (ON) at $-V_{CE}$ = 0.2 V, $-I_C$ = 5 mA	$-V_{I(ON)}$	1.3	-	3	V
Gain Bandwidth Product at $-V_{CE}$ = 10 V, $-I_C$ = 5 mA, f = 100 MHz	f_T	-	200	-	MHz
Collector Output Capacitance at $-V_{CB}$ = 10 V, f = 1 MHz	C_{ob}	-	-	6	pF
Input Resistance	R_1	15.4	22	28.6	KΩ
Resistance Ratio	R_1/R_2	0.9	1	1.1	-

Electrical Characteristics Curves :TR1

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

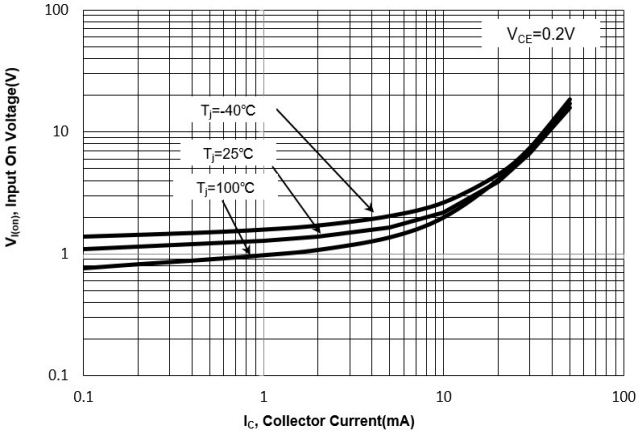


Fig 2. $V_{I(off)}$ vs. Collector Current

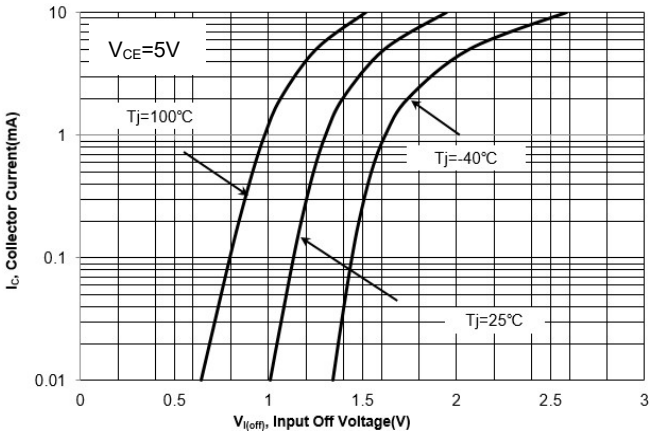


Fig 3. DC Current Gain vs. Collector Current

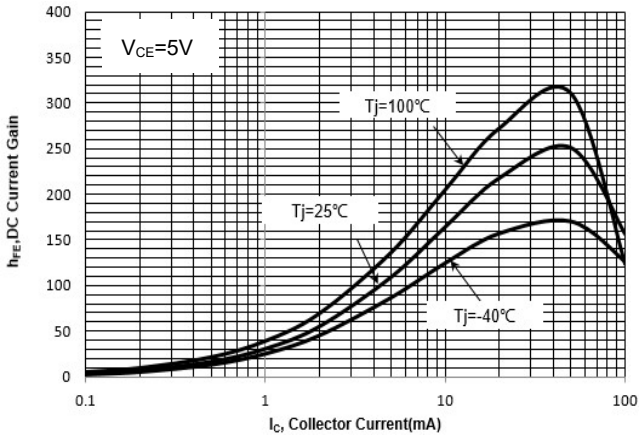
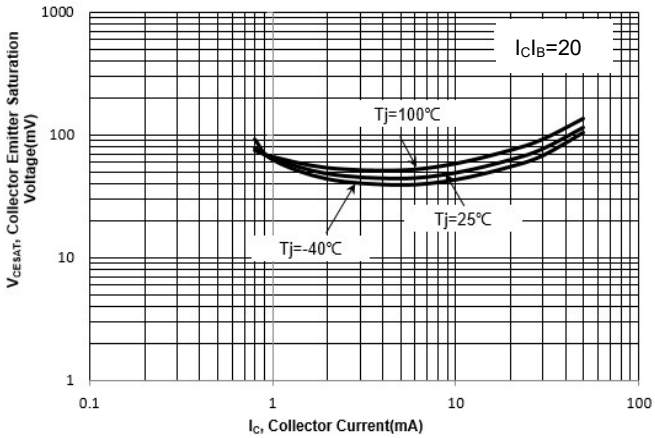


Fig 4. $V_{CE(sat)}$ vs. Collector Current



Electrical Characteristics Curves :TR2

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

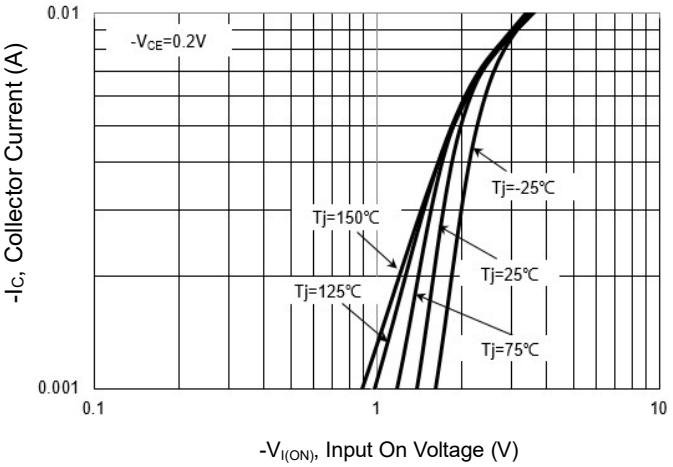


Fig 2. $V_{I(off)}$ vs. Collector Current

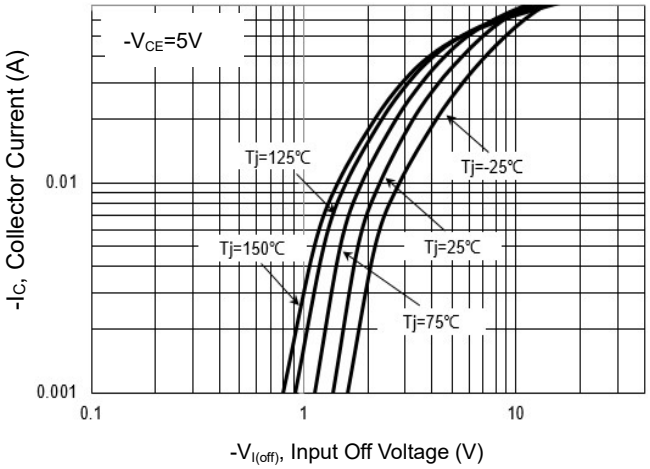


Fig 3. DC Current Gain vs. Collector Current

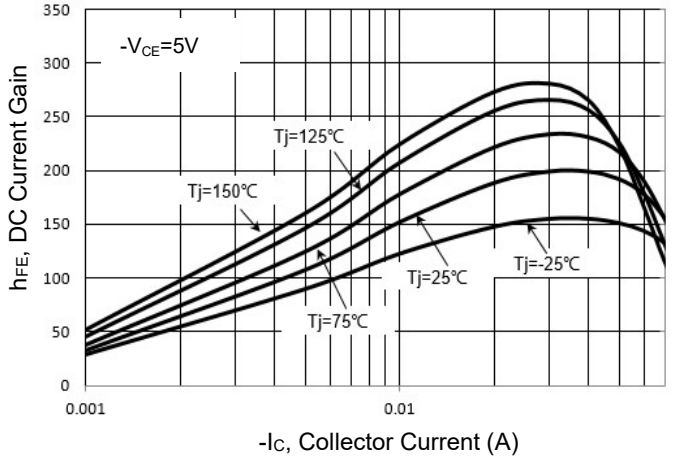
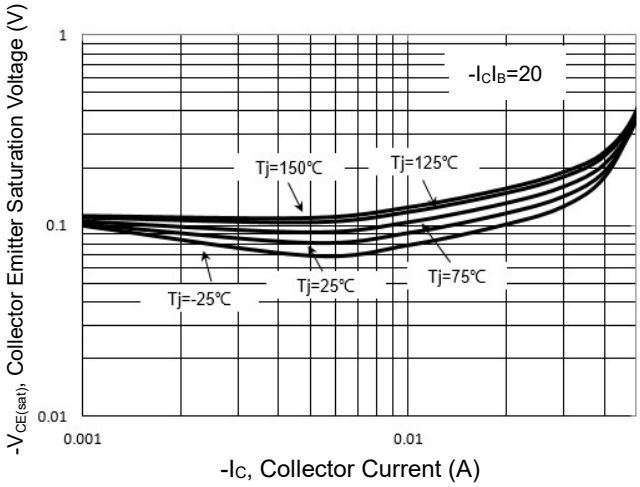
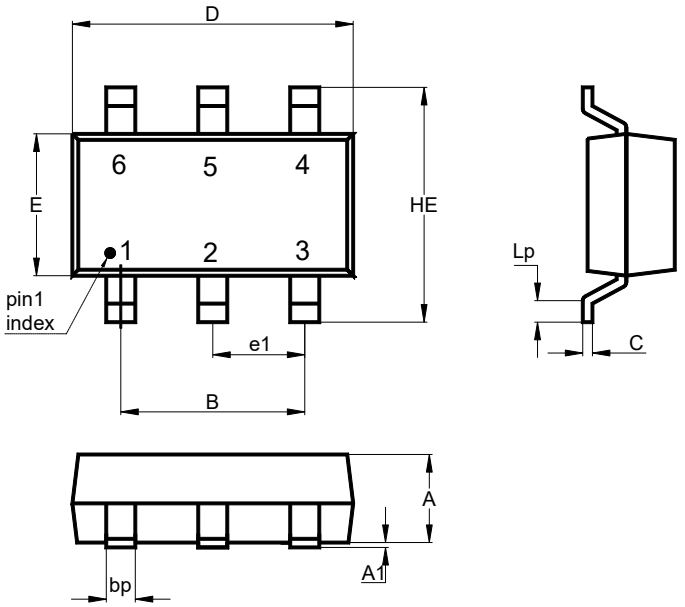


Fig 4. $V_{CE(sat)}$ vs. Collector Current

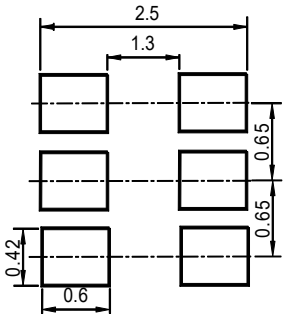


Package Outline (Dimensions in mm) SOT-363



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

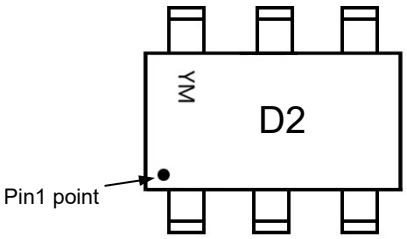


Packing information

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

" D2 " = Part No.
"YM" = Date Code Marking
"Y" = Year
"M" = Month
Font type: Arial



Dated: 03/07/2023 Rev: 03