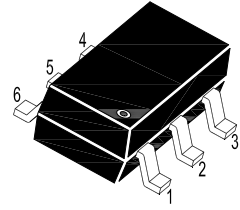
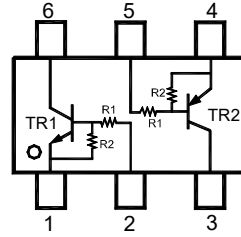


MMDTX4137DW

Complementary NPN/PNP Silicon Epitaxial Planar Digital Transistor

Features

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count



TR1: 1. Emitter 2. Base 6. Collector
TR2: 4. Emitter 5. Base 3. Collector
SOT-363 Plastic Package

Resistor Values

Type	R1(K Ω)	R2(K Ω)
NPN	47	47
PNP	2.2	47

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

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

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

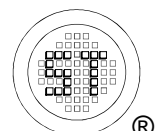
Parameter	Symbol	Value	Unit
Collector Base Voltage	$-V_{CBO}$	50	V
Collector Emitter Voltage	$-V_{CEO}$	50	V
Collector Current	$-I_c$	100	mA

Thermal Characteristics ($T_a = 25^\circ\text{C}$ unless otherwise specified) (Common)

Parameter	Symbol	Value	Unit
Total Power Dissipation ¹⁾	P_D	250	mW
Total Power Dissipation ²⁾	P_D	385	mW
Thermal Resistance from Junction to Ambient ¹⁾	$R_{\theta JA}$	500	$^\circ\text{C/W}$
Thermal Resistance from Junction to Ambient ²⁾	$R_{\theta JA}$	325	$^\circ\text{C/W}$
Operating Junction and Storage Temperature Range	T_j, T_{stg}	- 55 to + 150	$^\circ\text{C}$

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

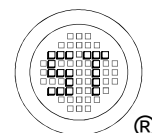
²⁾ Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.



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Characteristics at $T_a = 25^\circ\text{C}$ unless otherwise specified (TR1)

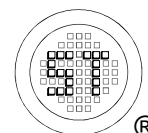
Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at $V_{CE} = 10\text{ V}$, $I_C = 5\text{ mA}$	h_{FE}	80	140	-	-
Collector Base Cutoff Current at $V_{CB} = 50\text{ V}$	I_{CBO}	-	-	100	nA
Collector Emitter Cutoff Current at $V_{CE} = 50\text{ V}$	I_{CEO}	-	-	500	nA
Emitter Base Cutoff Current at $V_{EB} = 6\text{ V}$	I_{EBO}	-	-	100	μA
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 Emitter Saturation Voltage at $I_C = 10\text{ mA}$, $I_B = 0.3\text{ mA}$	$V_{CE(sat)}$	-	-	250	mV
Input Voltage (on) at $V_{CE} = 0.2\text{ V}$, $I_C = 3\text{ mA}$	$V_{I(on)}$	-	1.9	-	V
Input Voltage (off) at $V_{CE} = 5\text{ V}$, $I_C = 100\text{ }\mu\text{A}$	$V_{I(off)}$	-	1.2	-	V
Output Voltage (on) at $V_{CC} = 5\text{ V}$, $V_B = 3.5\text{ V}$, $R_L = 1\text{ K}\Omega$	V_{OL}	-	-	0.2	V
Output Voltage (off) at $V_{CC} = 5\text{ V}$, $V_B = 0.5\text{ V}$, $R_L = 1\text{ K}\Omega$	V_{OH}	4.9	-	-	V
Input Resistance	R_1	32.9	47	61.1	$\text{K}\Omega$
Resistance Ratio	R_1 / R_2	0.8	1	1.2	-



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Characteristics at $T_a = 25^\circ\text{C}$ unless otherwise specified (TR2)

Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at $-V_{CE} = 10\text{ V}$, $-I_C = 5\text{ mA}$	h_{FE}	80	140	-	-
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 $-V_{EB} = 6\text{ V}$	$-I_{EBO}$	-	-	200	μA
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 Emitter Saturation Voltage at $-I_C = 10\text{ mA}$, $-I_B = 0.3\text{ mA}$	$-V_{CE(sat)}$	-	-	250	mV
Input Voltage (on) at $-V_{CE} = 0.2\text{ V}$, $-I_C = 5\text{ mA}$	$-V_{I(on)}$	-	0.8	-	V
Input Voltage (off) at $-V_{CE} = 5\text{ V}$, $-I_C = 100\text{ }\mu\text{A}$	$-V_{I(off)}$	-	0.6	-	V
Output Voltage (on) at $-V_{CC} = 5\text{ V}$, $-V_B = 2.5\text{ V}$, $R_L = 1\text{ K}\Omega$	$-V_{OL}$	-	-	0.2	V
Output Voltage (off) at $-V_{CC} = 5\text{ V}$, $-V_B = 0.5\text{ V}$, $R_L = 1\text{ K}\Omega$	$-V_{OH}$	4.9	-	-	V
Input Resistance	R_1	1.5	2.2	2.9	$\text{K}\Omega$
Resistance Ratio	R_1 / R_2	0.038	0.047	0.056	-



MMDTX4137DW

Electrical Characteristics Curves: TR1

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

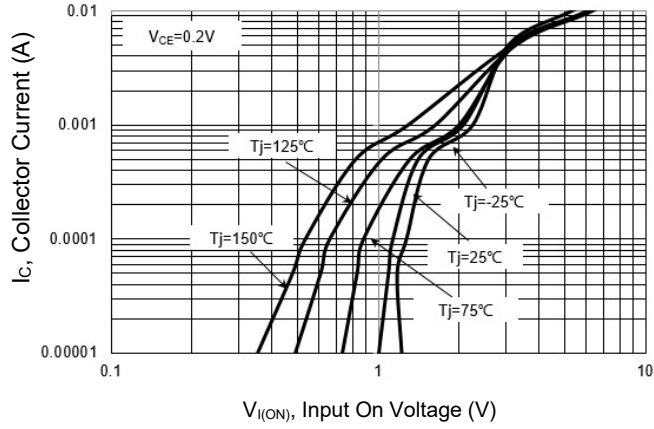


Fig 2. Collector Current vs. $V_{I(off)}$

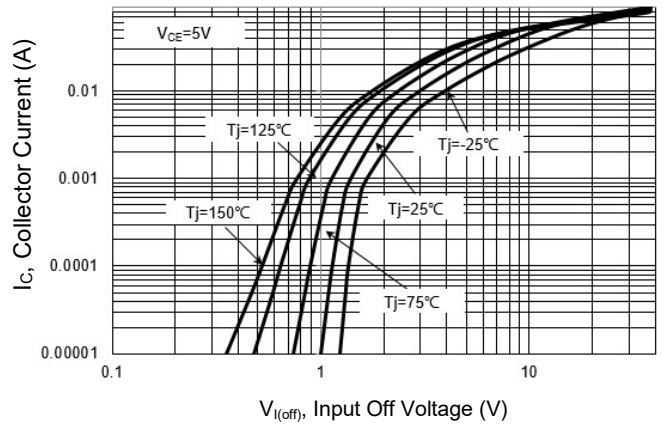


Fig 3. DC Current Gain vs. Collector Current

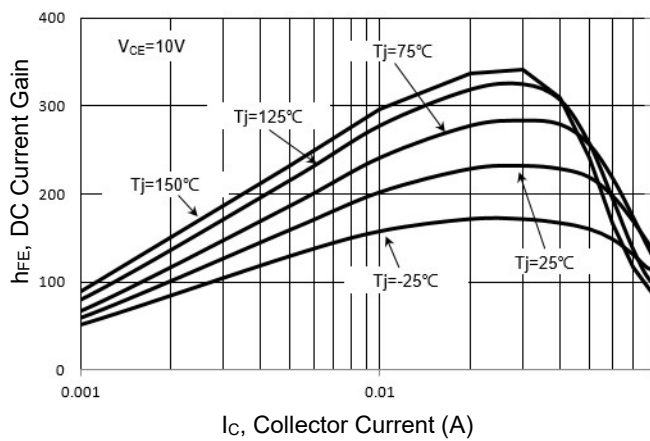
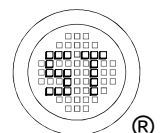
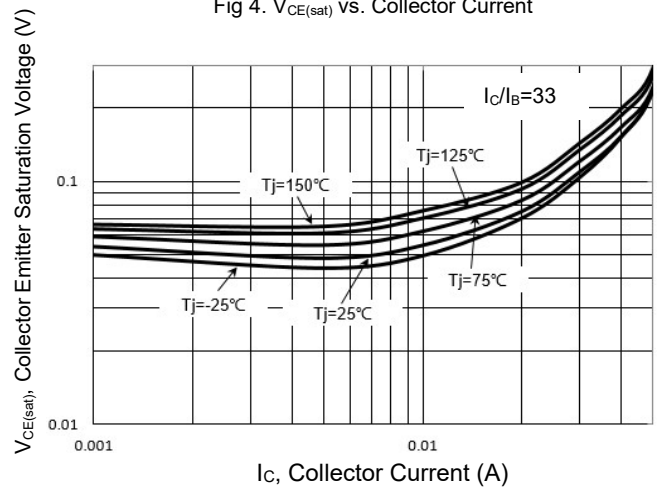


Fig 4. $V_{CE(sat)}$ vs. Collector Current



MMDTX4137DW

Electrical Characteristics Curves: TR2

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

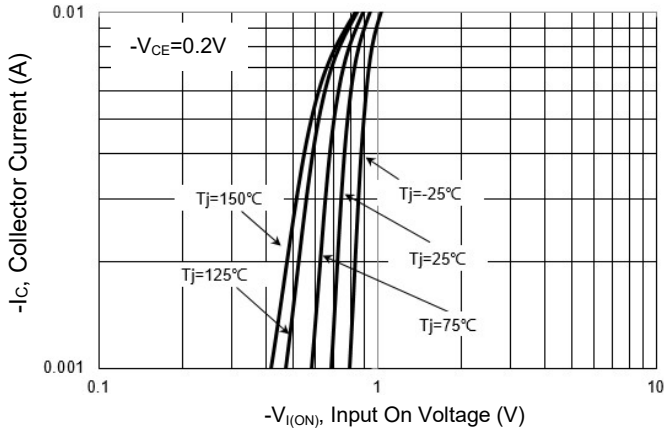


Fig 2. $V_{I(off)}$ vs. Collector Current

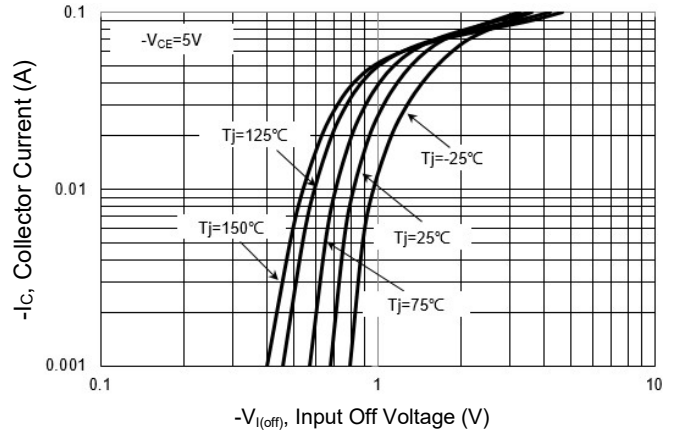


Fig 3. DC Current Gain vs. Collector Current

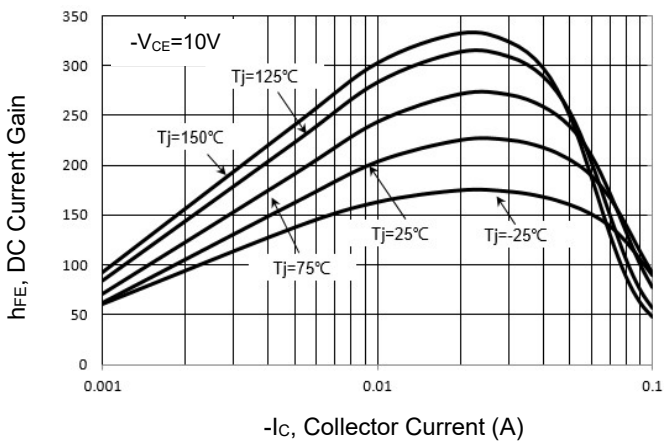
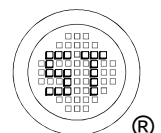
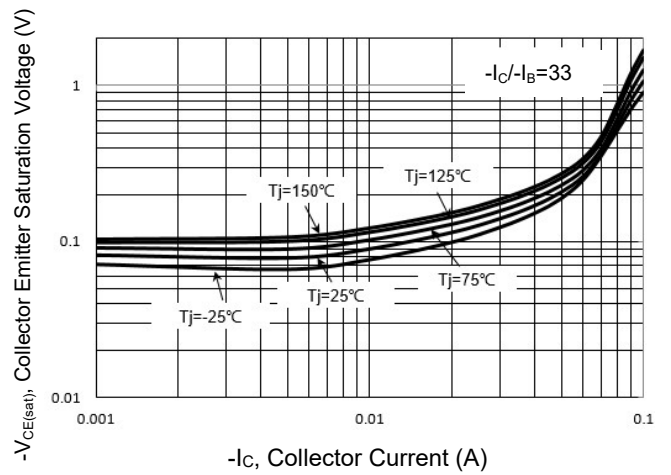


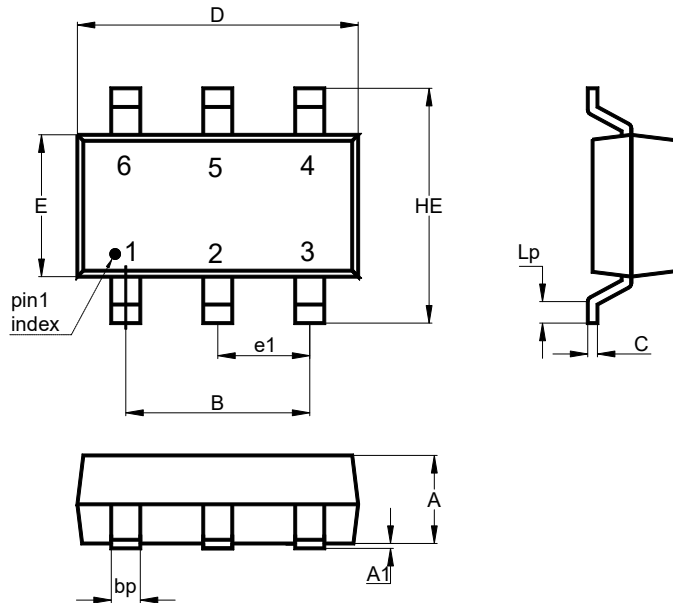
Fig 4. $V_{CE(sat)}$ vs. Collector Current



MMDTX4137DW

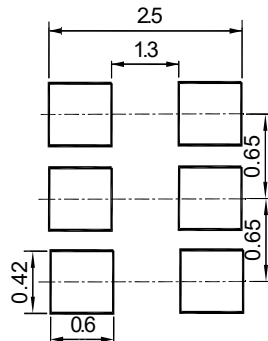
Package Outline (Dimensions in mm)

SOT-363



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

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

