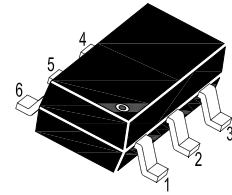
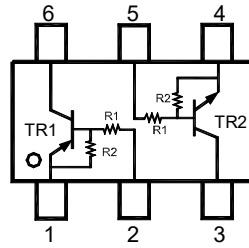


# MMDTX141FDW

## Complementary PNP/NPN 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-363 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	$-V_{CEO}$	50	V
Emitter Base Voltage	$-V_{EBO}$	10	V
Collector Current	$-I_C$	100	mA

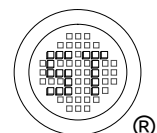
### Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$ (TR2)

Parameter	Symbol	Value	Unit
Collector Base Voltage	$V_{CB0}$	50	V
Collector Emitter Voltage	$V_{CEO}$	50	V
Emitter Base Voltage	$V_{EBO}$	10	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	$P_{tot}$	200	mW
Maximum Thermal Resistance from Junction to Ambient <sup>1)</sup>	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	- 55 to + 150	$^\circ\text{C}$

<sup>1)</sup> Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.



# MMDTX141FDW

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

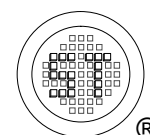
Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at $-V_{CE} = 5\text{ V}$ , $-I_C = 10\text{ mA}$	$h_{FE}$	50	-	-	-
Collector Base Cutoff Current at $-V_{CB} = 50\text{ V}$	$-I_{CBO}$	-	-	100	nA
Collector Emitter Cutoff Current at $-V_{CE} = 50\text{ V}$	$-I_{CEO}$	-	-	500	nA
Emitter Base Cutoff Current at $-V_{EB} = 10\text{ V}$	$-I_{EBO}$	0.38	-	0.71	mA
Collector Emitter Saturation Voltage at $-I_C = 5\text{ mA}$ , $-I_B = 0.25\text{ mA}$	$-V_{CE(sat)}$	-	-	0.3	V
Input Voltage (OFF) at $-V_{CE} = 5\text{ V}$ , $-I_C = 100\text{ }\mu\text{A}$	$-V_{I(OFF)}$	1	-	1.5	V
Input Voltage (ON) at $-V_{CE} = 0.2\text{ V}$ , $-I_C = 5\text{ mA}$	$-V_{I(ON)}$	1.2	-	2.4	V
Gain Bandwidth Product at $-V_{CE} = 10\text{ V}$ , $-I_C = 5\text{ mA}$ , $f = 100\text{ MHz}$	$f_T$	-	200	-	MHz

## Characteristics at $T_a = 25^\circ\text{C}$ (TR2:NPN)

Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at $V_{CE} = 5\text{ V}$ , $I_C = 10\text{ mA}$	$h_{FE}$	50	-	-	-
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 $V_{EB} = 10\text{ V}$	$I_{EBO}$	0.38	-	0.71	mA
Collector Emitter Saturation Voltage at $I_C = 5\text{ mA}$ , $I_B = 0.25\text{ mA}$	$V_{CEsat}$	-	-	0.3	V
Input Voltage (OFF) at $V_{CE} = 5\text{ V}$ , $I_C = 100\text{ }\mu\text{A}$	$V_{I(OFF)}$	1	-	1.5	V
Input Voltage (ON) at $V_{CE} = 0.2\text{ V}$ , $I_C = 5\text{ mA}$	$V_{I(ON)}$	1.2	-	2.4	V
Gain Bandwidth Product at $V_{CE} = 10\text{ V}$ , $I_C = 5\text{ mA}$ , $f = 100\text{ MHz}$	$f_T$	-	250	-	MHz

## Characteristics at $T_a = 25^\circ\text{C}$ (TR1 and TR2)

Input Resistance	$R_1$	7	10	13	$K\Omega$
Resistance Ratio	$R_1/R_2$	0.9	1	1.1	-



# MMDTX141FDW

## Electrical Characteristics Curves:TR1

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

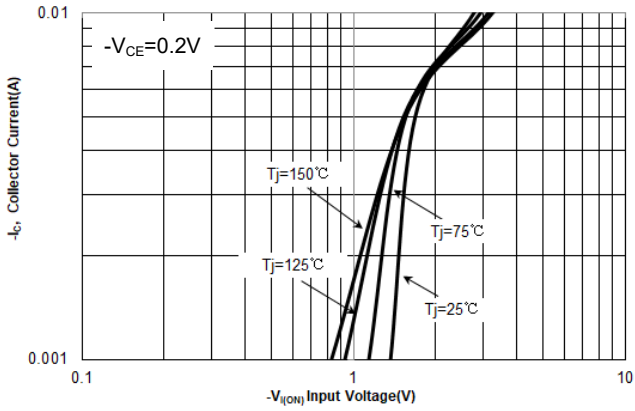


Fig 2. Collector Current vs.  $V_{I(OFF)}$

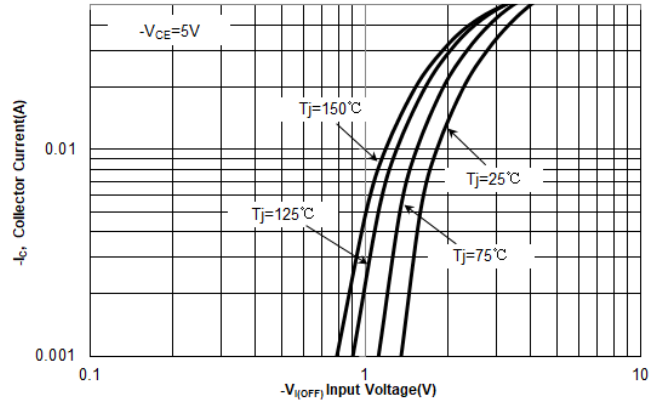


Fig 3. DC Current Gain vs. Collector Current

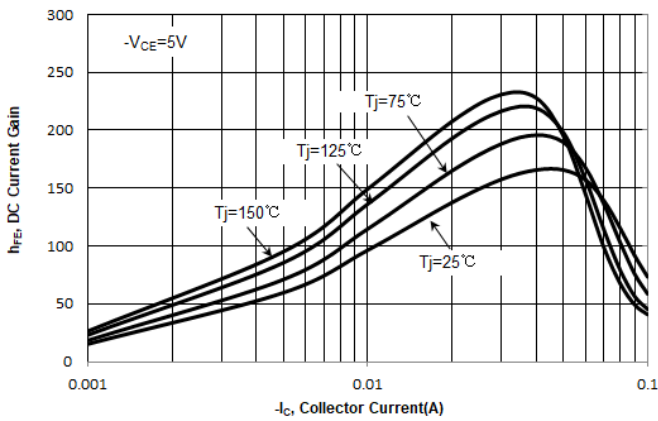
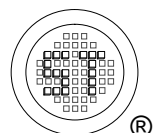
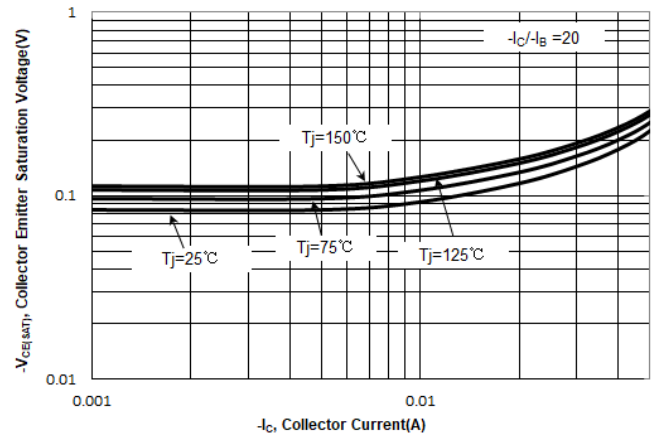


Fig 4.  $V_{CE(sat)}$  vs. Collector Current



# MMDTX141FDW

## Electrical Characteristics Curves:TR2

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

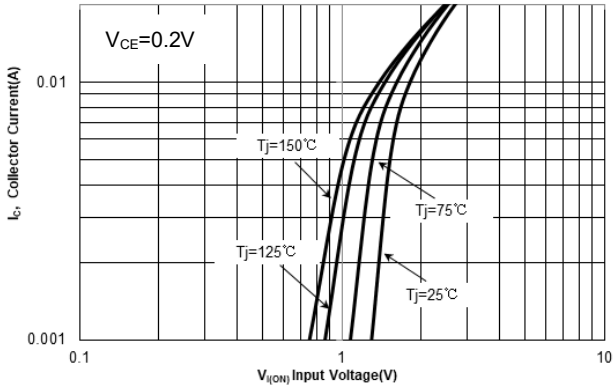


Fig 2. Collector Current vs.  $V_{I(off)}$

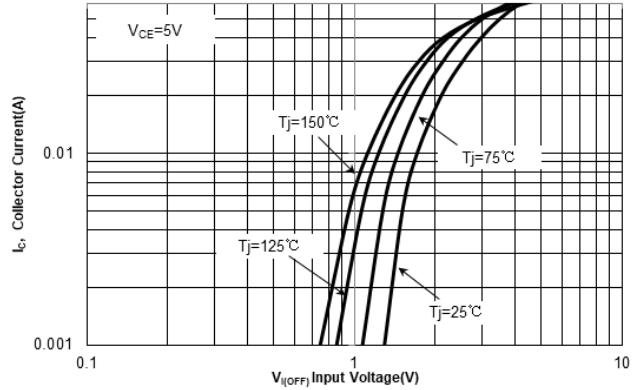


Fig 3. DC Current Gain vs. Collector Current

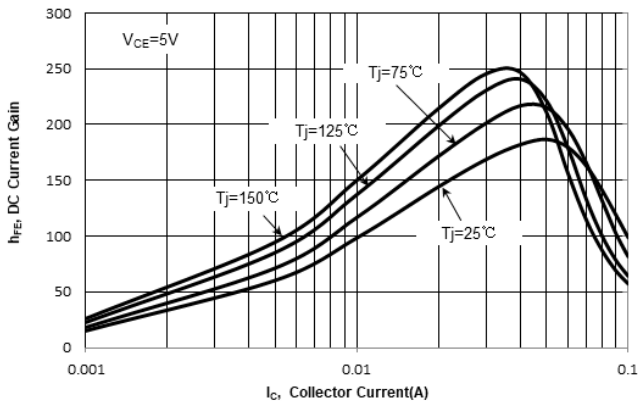
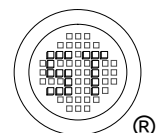
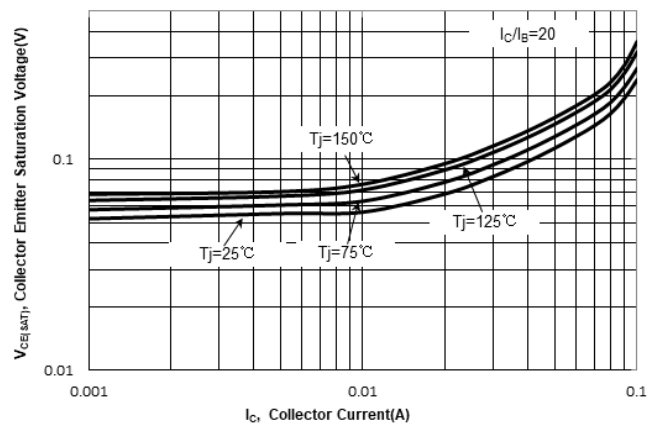


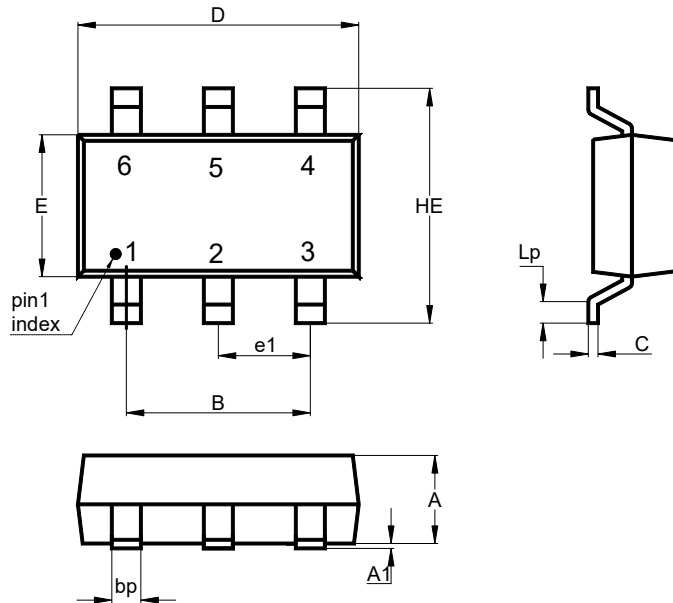
Fig 4.  $V_{CE(sat)}$  vs. Collector Current



# MMDTX141FDW

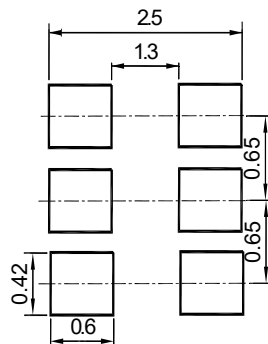
Package Outline (Dimensions in mm)

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

"6F" = Part No.  
 "YM" = Date Code Marking  
 "Y" = Year  
 "M" = Month  
 Font type: Arial

