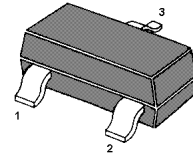


# MMBT4401

## NPN Silicon General Purpose Transistor

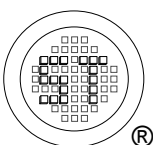


1. Base 2. Emitter 3. Collector  
TO-236 Plastic Package

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

Parameter	Symbol	Value	Unit
Collector Base Voltage	$V_{CBO}$	60	V
Collector Emitter Voltage	$V_{CEO}$	40	V
Emitter Base Voltage	$V_{EBO}$	6	V
Collector Current Continuous	$I_C$	600	mA
Total Device Dissipation FR-5 Board <sup>1)</sup>	$P_{tot}$	300	mW
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	- 55 to + 150	$^\circ\text{C}$

<sup>1)</sup> FR-5 = 1 X 0.75 X 0.062 in.



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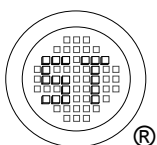


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# MMBT4401

## Characteristics at $T_a = 25\text{ }^\circ\text{C}$

Parameter	Symbol	Min.	Max.	Unit
DC Current Gain at $V_{CE} = 1\text{ V}$ , $I_C = 0.1\text{ mA}$ at $V_{CE} = 1\text{ V}$ , $I_C = 1\text{ mA}$ at $V_{CE} = 1\text{ V}$ , $I_C = 10\text{ mA}$ at $V_{CE} = 1\text{ V}$ , $I_C = 150\text{ mA}$ at $V_{CE} = 2\text{ V}$ , $I_C = 500\text{ mA}$	$h_{FE}$ $h_{FE}$ $h_{FE}$ $h_{FE}$ $h_{FE}$	20 40 80 100 40	- - - 300 -	- - - - -
Collector Base Cutoff Current at $V_{CB} = 35\text{ V}$	$I_{CBO}$	-	0.1	$\mu\text{A}$
Emitter Base Cutoff Current at $V_{EB} = 5\text{ V}$	$I_{EBO}$	-	0.1	$\mu\text{A}$
Collector Base Breakdown Voltage at $I_C = 0.1\text{ mA}$	$V_{(BR)CBO}$	60	-	V
Collector Emitter Breakdown Voltage at $I_C = 1\text{ mA}$	$V_{(BR)CEO}$	40	-	V
Emitter Base Breakdown Voltage at $I_E = 0.1\text{ mA}$	$V_{(BR)EBO}$	6	-	V
Collector Emitter Saturation Voltage at $I_C = 150\text{ mA}$ , $I_B = 15\text{ mA}$ at $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$	$V_{CE(sat)}$ $V_{CE(sat)}$	- -	0.4 0.75	V V
Base Emitter Saturation Voltage at $I_C = 150\text{ mA}$ , $I_B = 15\text{ mA}$ at $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$	$V_{BE(sat)}$ $V_{BE(sat)}$	0.75 -	0.95 1.2	V V
Current Gain Bandwidth Product at $V_{CE} = 10\text{ V}$ , $I_C = 20\text{ mA}$ , $f = 100\text{ MHz}$	$f_T$	250	-	MHz
Collector Base Capacitance at $V_{CB} = 5\text{ V}$ , $f = 1\text{ MHz}$	$C_{ob}$	-	6.5	pF
Delay Time $V_{CC} = 30\text{ V}$ , $V_{EB} = 2\text{ V}$ , $I_C = 150\text{ mA}$ , $I_{B1} = 15\text{ mA}$	$t_d$	-	15	ns
Rise Time $V_{CC} = 30\text{ V}$ , $V_{EB} = 2\text{ V}$ , $I_C = 150\text{ mA}$ , $I_{B1} = 15\text{ mA}$	$t_r$	-	20	ns
Storage Time $V_{CC} = 30\text{ V}$ , $I_C = 150\text{ mA}$ , $I_{B1} = I_{B2} = 15\text{ mA}$	$t_s$	-	225	ns
Fall Time $V_{CC} = 30\text{ V}$ , $I_C = 150\text{ mA}$ , $I_{B1} = I_{B2} = 15\text{ mA}$	$t_f$	-	30	ns



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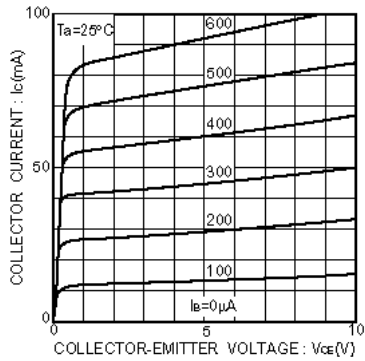


Fig.1 Grounded emitter output characteristics

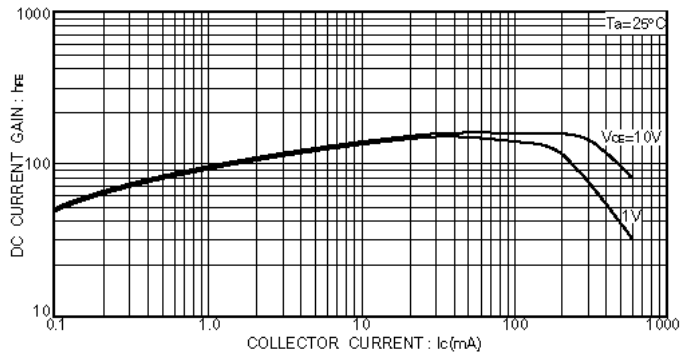


Fig.3 DC current gain vs. collector current(I)

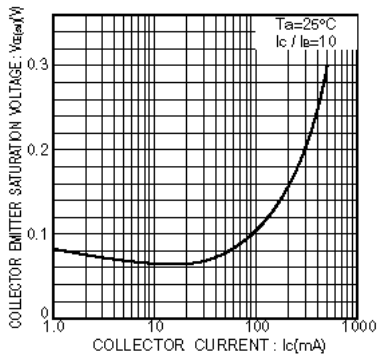


Fig.2 Collector-emitter saturation voltage vs. collector current

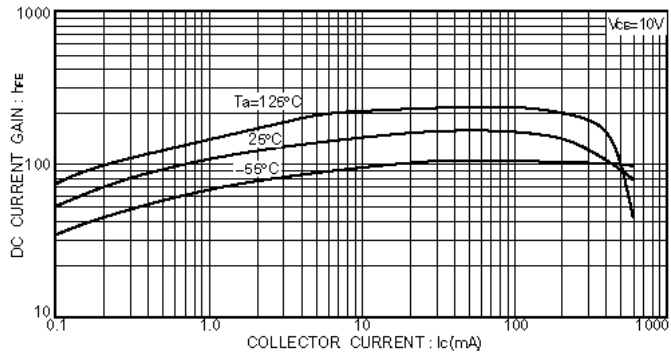


Fig.4 DC current gain vs. collector current(II)

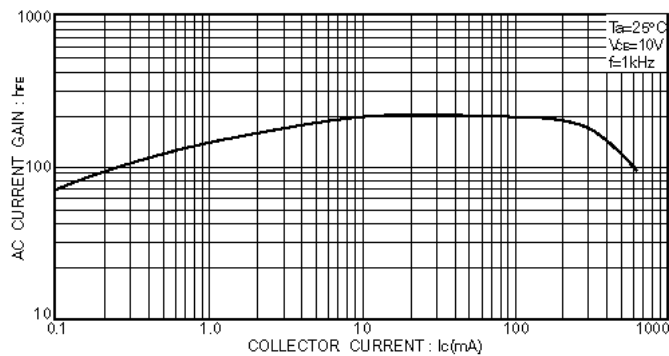


Fig.5 AC current gain vs. collector current

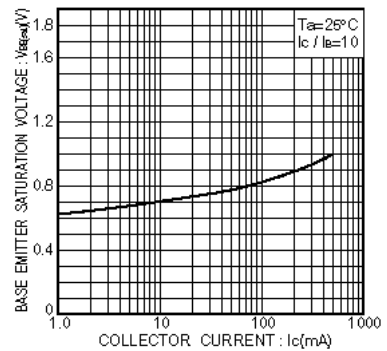
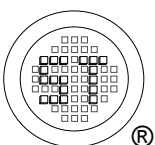


Fig.6 Base-emitter saturation voltage vs. collector current



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