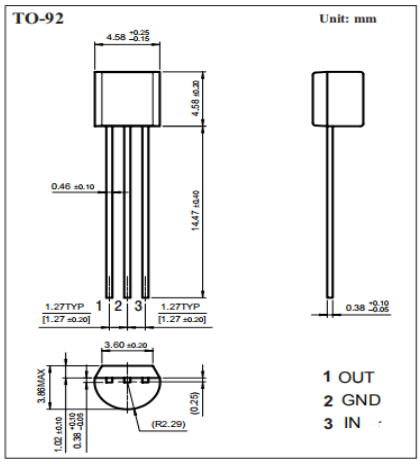
NPN Transistors

MMBT4401



■ Features

- Ideal for Medium Power Amplification and Switching
- Complementary PNP Type Available (MMBT4403)

■ Absolute Maximum Ratings Ta = 25℃

Parameter	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	60	V
Collector-emitter voltage	V_{CEO}	40	V
Emitter-base voltage	V_{EBO}	6.0	V
Collector current	I_C	600	mA
Total Device Dissipation Alumina Substrate	P_D	300	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	℃/W
Junction and Storage Temperature	T_J, T_{stg}	-55 to150	℃

■ Electrical Characteristics Ta = 25℃

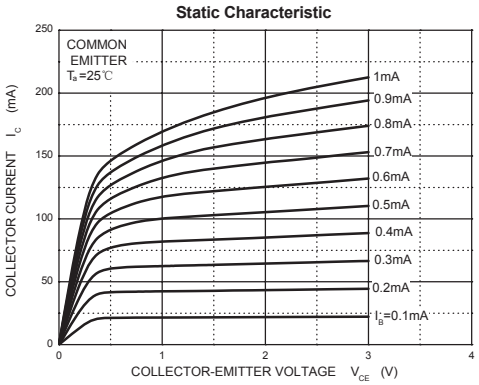
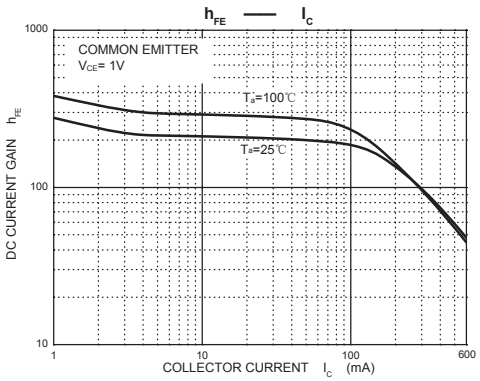
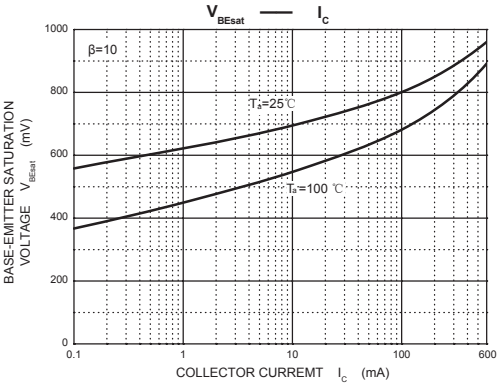
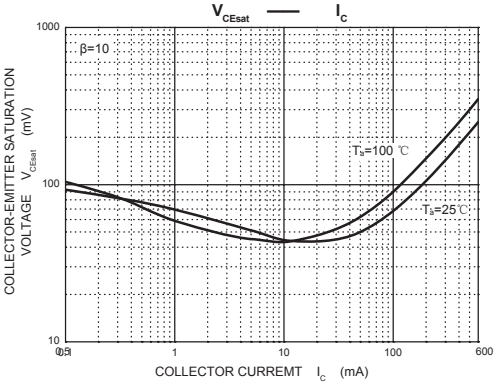
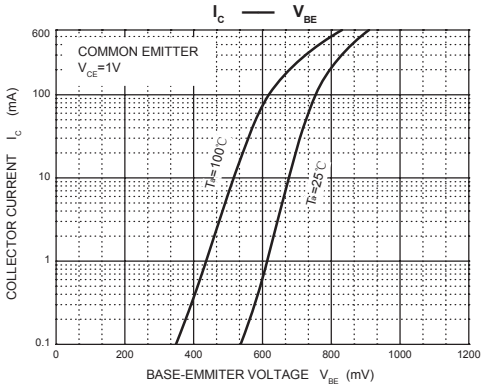
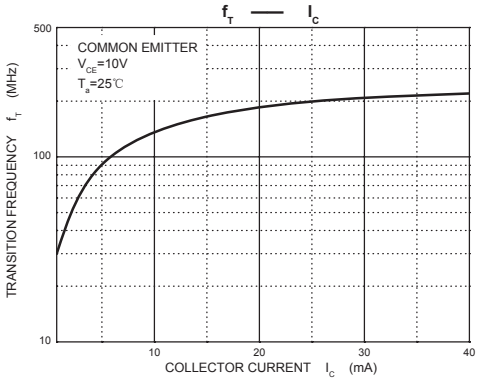
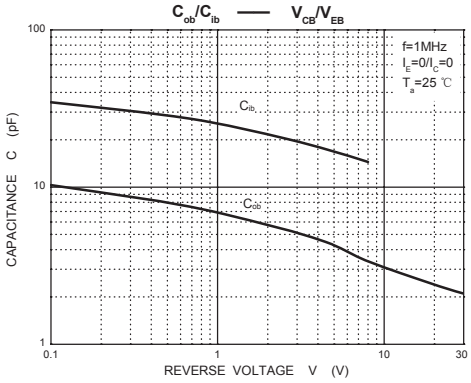
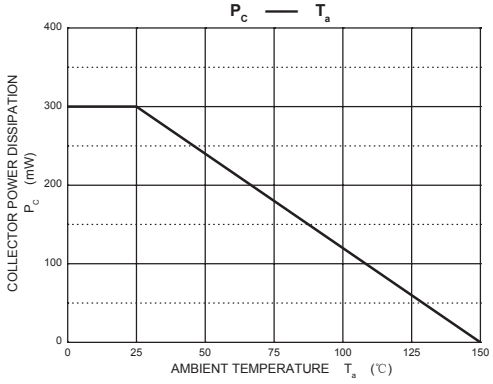
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	I_C = 100μA, I_E = 0	60			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C = 1.0 mA, I_B = 0	40			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E =100μA, I_C = 0	6.0			V
Collector cut-off current	I_{CBO}	V_{CB}=50 V, I_E=0			0.1	μA
Emitter cut-off current	I_{EBO}	V_{EB}=5V, I_C=0			0.1	μA
DC current gain *	h_{FE}	I_C = 0.1 mA, V_{CE} = 1.0 V I_C = 1.0 mA, V_{CE} = 1.0 V I_C = 10 mA, V_{CE} = 1.0 V I_C = 150 mA, V_{CE} = 1.0 V I_C = 500 mA, V_{CE} = 2.0 V	20 40 80 100 40		300	
Collector-emitter saturation voltage *	$V_{CE(sat)}$	I_C = 150 mA, I_B = 15 mA			0.4	V
		I_C = 500 mA, I_B = 50 mA			0.75	
Base-emitter saturation voltage *	$V_{BE(sat)}$	I_C = 150 mA, I_B = 15 mA	0.75		0.95	V
		I_C = 500 mA, I_B = 50 mA			1.2	
Transition frequency	f_T	I_C = 20 mA, V_{CE} = 10 V, f = 100 MHz	250			MHz
Delay time	t_d	V_{CC} = 30 V, V_{EB} = 2.0 V,			15	ns
Rise time	t_r	I_C = 150 mA, I_{B1} = 15 mA			20	ns
Storage time	t_s	V_{CC} = 30 V, I_C = 150 mA,			225	ns
Fall time	t_f	I_{B1} = I_{B2} = 15 mA			30	ns

* Pulse test: pulse width ≤ 300 μs, duty cycle ≤ 2.0%.

■ Marking

Marking	2X

NPN Transistors

MMBT4401

■ Typical Characterisitics