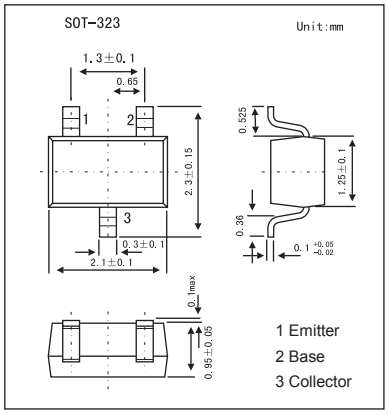
PNP Transistors

MMBT4403W (KMBT4403W)



■ Features

- Switching transistors.
- Collector Current Capability I_C=-600mA
- Collector Emitter Voltage V_{CEO}=-40V

■ Absolute Maximum Ratings Ta = 25℃

Parameter	Symbol	Rating	Unit
Collector-emitter voltage	V_{CEO}	-40	V
Collector-base voltage	V_{CBO}	-40	V
Emitter-base voltage	V_{EBO}	-5	V
Collector current	I_C	-600	mA
Total Device Dissipation FR-5 Board	P_D	150	mW
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	833	℃/W
Junction temperature	T_j	150	℃
Storage temperature	T_{stg}	-55 to +150	℃

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■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-emitter breakdown voltage *	$V_{(BR)CEO}$	I_C = -1.0 mA, I_B = 0	-40			V
Collector-base breakdown voltage	$V_{(BR)CBO}$	I_C = -0.1 mA, I_E = 0	-40			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E = -0.1 mA, I_C = 0	-5			V
Base cutoff current	I_{BEV}	V_{CE} = -35 V, V_{EB} = -0.4 V			-0.1	uA
Collector cutoff current	I_{CEX}	V_{CE} = -35 V, V_{EB} = -0.4 V			-0.1	uA
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} = -2.0 V * I_C = -500 mA, V_{CE} = -2.0 V *	30 60 100 100 20		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	
		I_C = -500 mA, I_B = -50 mA			-1.3	
Current-gain-bandwidth product	f_T	I_C = -20 mA, V_{CE} = -10 V, f = 100 MHz	200			MHz
Collector-base capacitance	C_{cb}	V_{CB} = -10 V, I_E = 0, f = 1.0 MHz			8.5	pF
Emitter-base capacitance	C_{eb}	V_{BE} = -0.5 V, I_C = 0, f = 1.0 MHz			30	pF
Input impedance	h_{ie}	I_C = -1.0 mA, V_{CE} = -10 V, f = 1.0 kHz	1.5		15	kΩ
Voltage feedback ratio	h_{re}	I_C = -1.0 mA, V_{CE} = -10 V, f = 1.0 kHz	0.1		8.0	X 10^{-4}
Small-signal current gain	h_{fe}	I_C = -1.0 mA, V_{CE} = -10 V, f = 1.0 kHz	60		500	
Output admittance	h_{oe}	I_C = -1.0 mA, V_{CE} = -10 V, f = 1.0 kHz	1.0		100	umhos
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 us, duty cycle ⩽ 2.0%.

■ Marking

Marking	2T

MMBT4403W (KMBT4403W)

■ Typical Characterisitics

TRANSIENT CHARACTERISTICS

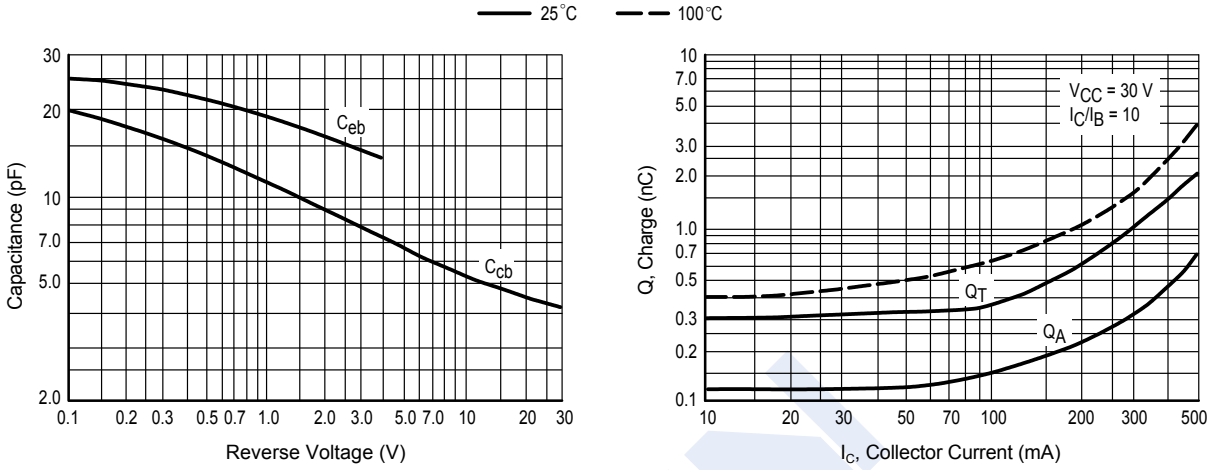

Figure 1. Capacitances

Figure 2. Charge Data

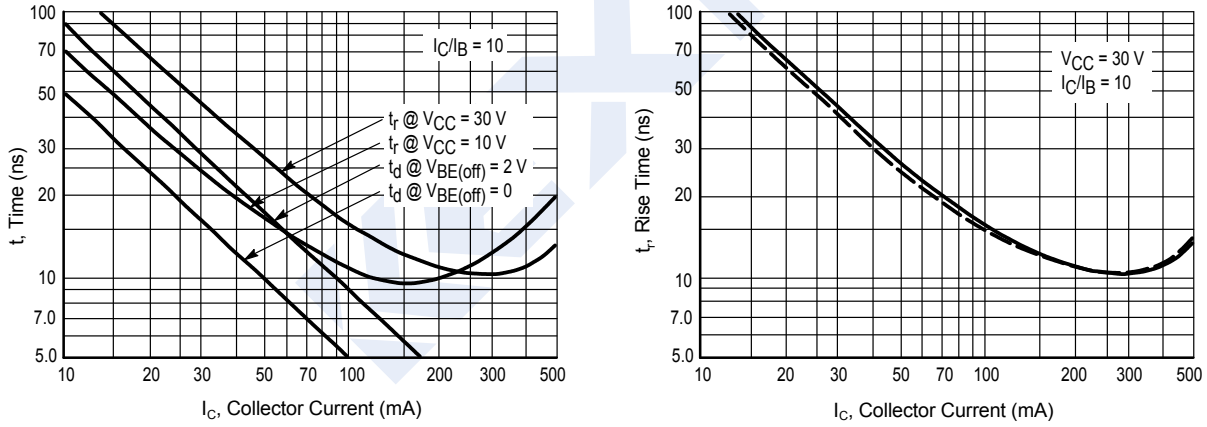

Figure 3. Turn–On Time

Figure 4. Rise Time

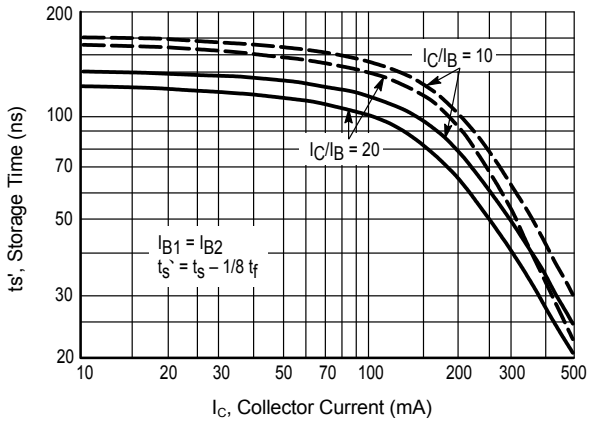

Figure 5. Storage Time

MMBT4403W (KMBT4403W)

■ Typical Characterisitics

SMALL–SIGNAL CHARACTERISTICS

NOISE FIGURE

V_{CE} = –10 Vdc, T_A = 25℃

Bandwidth = 1.0 Hz

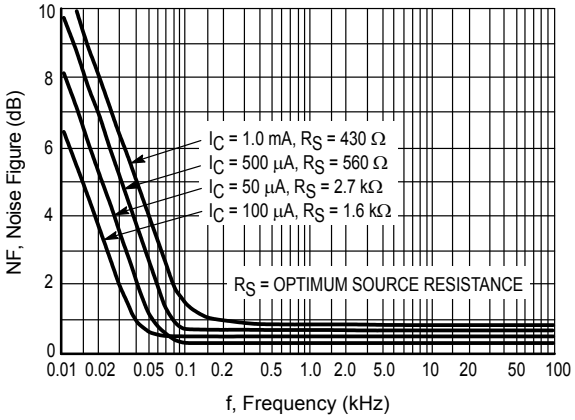

Figure 6. Frequency Effects

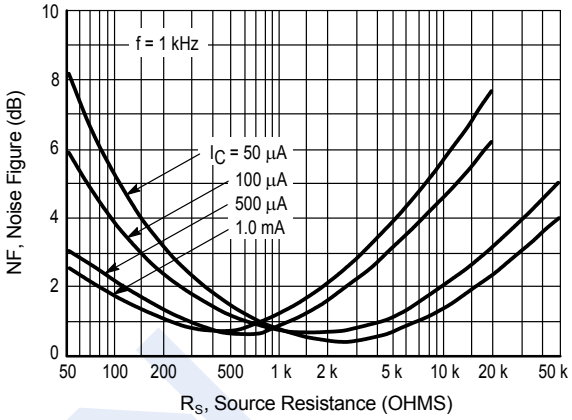

Figure 7. Source Resistance Effects

h PARAMETERS

V_{CE} = –10 Vdc, f = 1.0 kHz, T_A = 25°C

This group of graphs illustrates the relationship between h_{fe} and other "h" parameters for this series of transistors. To obtain these curves, a high–gain and a low–gain unit were selected from the MMBT4403W lines, and the same units were used to develop the correspondingly–numbered curves on each graph.

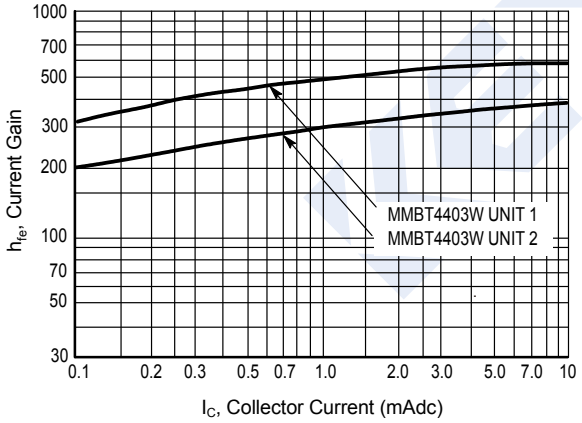

Figure 8. Current Gain

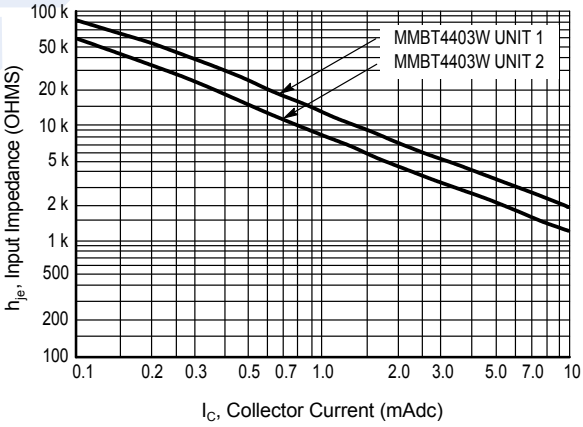

Figure 9. Input Impedance

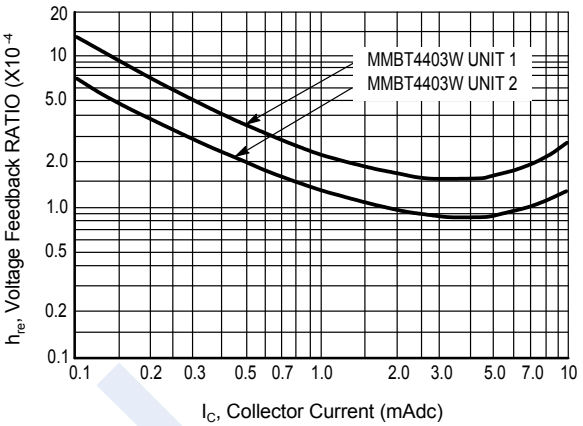

Figure 10. Voltage Feedback Ratio

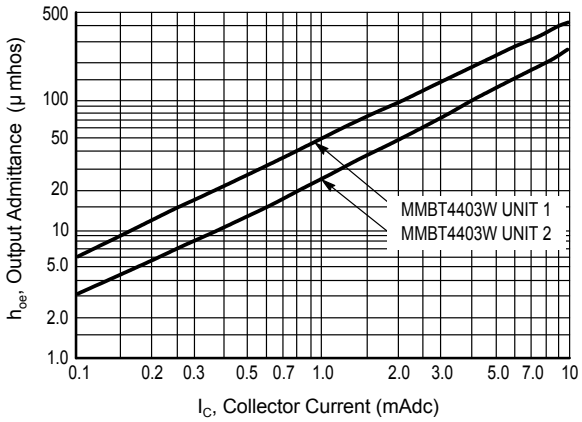

Figure 11. Output Admittance

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■ Typical Characterisitics

STATIC CHARACTERISTICS

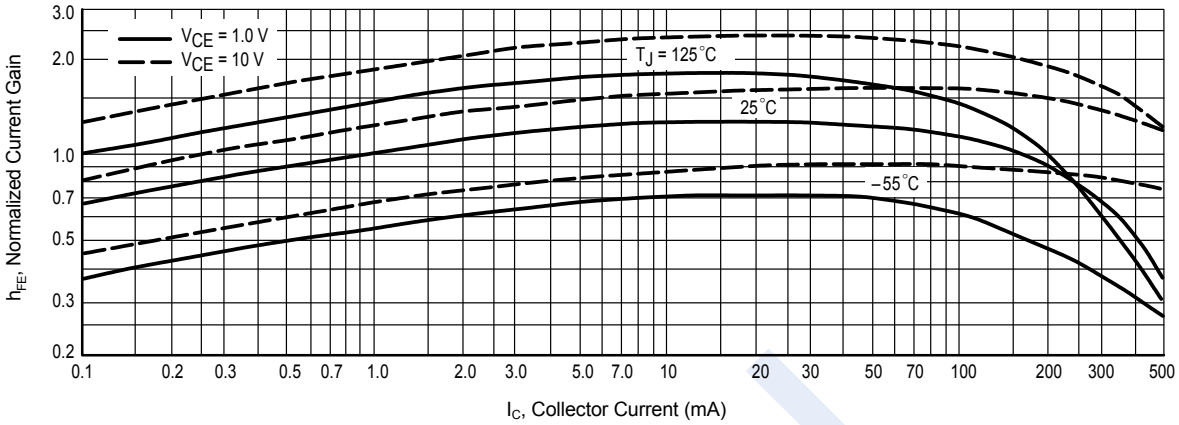

Figure 12. DC Current Gain

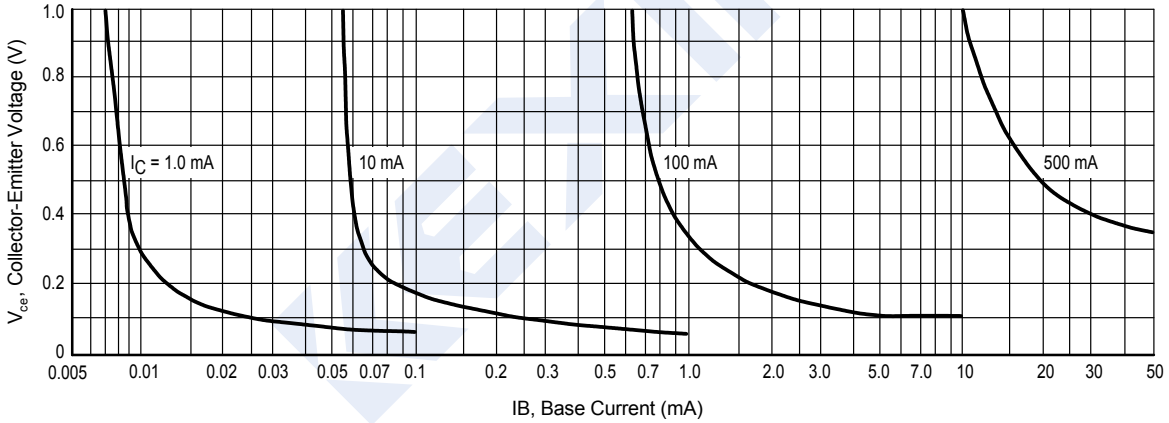

Figure 13. Collector Saturation Region

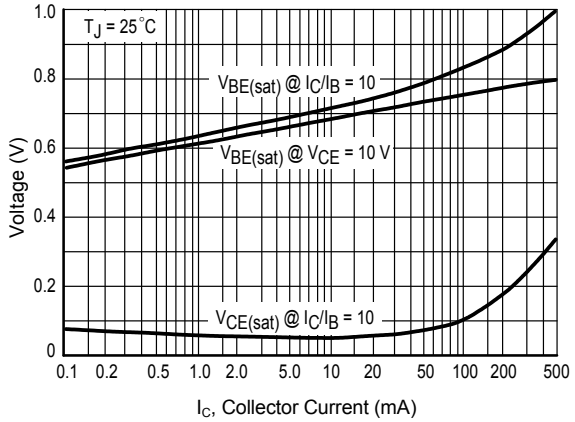

Figure 14. "On" Voltages

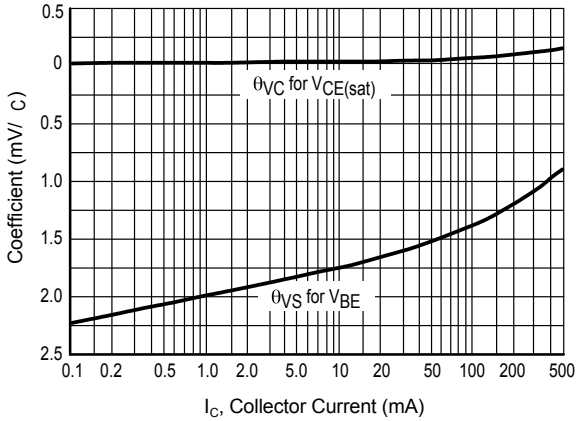

Figure 15. Temperature Coefficients