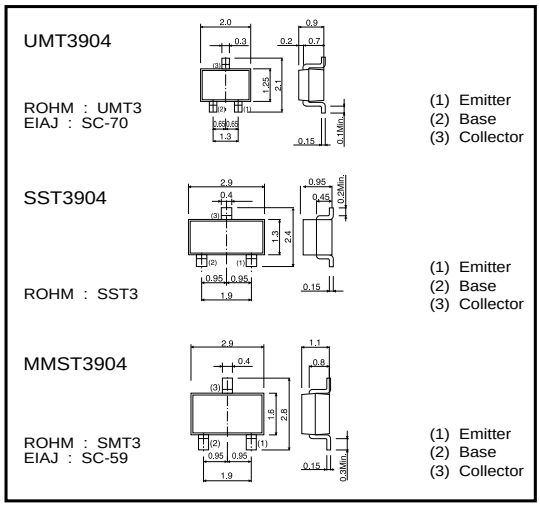
NPN General Purpose Transistor

UMT3904 / SST3904 / MMST3904

●Features

1) BV_{CEO} > 40V (I_C = 1mA)
2) Complements the UMT3906 / SST3906 / MMST3906.

●Dimensions (Unit : mm)



●Package, marking and packaging specifications

Part No.	UMT3904	SST3904	MMST3904
Packaging type	UMT3	SST3	SMT3
Marking	R1A	R1A	R1A
Code	T106	T116	T146
Basic ordering unit (pieces)	3000	3000	3000

●Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	Limits	Unit	
Collector-base voltage		V_{CBO}	60	V	
Collector-emitter voltage		V_{CEO}	40	V	
Emitter-base voltage		V_{EBO}	6	V	
Collector current		I_C	0.2	A	
Collector power dissipation	UMT3904, SST3904, MMST3904	P_C	0.2	W	
	SST3904, MMST3904		0.35	W	*
Junction temperature		Tj	150	°C	
Storage temperature		Tstg	−55 to +150	°C	

* When mounted on a 7 x 5 x 0.6 mm ceramic board.

●Electrical characteristics (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	60	-	-	V	I_C = 10μA
Collector-emitter breakdown voltage	BV_{CEO}	40	-	-	V	I_C = 1mA
Emitter-base breakdown voltage	BV_{EBO}	6	-	-	V	I_E = 10μA
Collector cutoff current	I_{CES}	-	-	50	nA	V_{CB} = 30V
Emitter cutoff current	I_{EBO}	-	-	50	nA	V_{EB} = 3V
Collector-emitter saturation voltage	$V_{CE(sat)}$	-	-	0.2	V	I_C/I_B = 10mA/1mA
		-	-	0.3		I_C/I_B = 50mA/5mA
Base-emitter saturation voltage	$V_{BE(sat)}$	0.65	-	0.85	V	I_C/I_B = 10mA/1mA
		-	-	0.95		I_C/I_B = 50mA/5mA
DC current transfer ratio	h_{FE}	40	-	-	-	V_{CE} = 1V , I_C = 0.1mA
		70	-	-		V_{CE} = 1V , I_C = 1mA
		100	-	300		V_{CE} = 1V , I_C = 10mA
		60	-	-		V_{CE} = 1V , I_C = 50mA
		30	-	-		V_{CE} = 1V , I_C = 100mA
Transition frequency	f_T	300	-	-	MHz	V_{CE} = 20V , I_E = −10mA, f = 100MHz
Collector output capacitance	Cob	-	-	4	pF	V_{CB} = 10V , f = 100kHz
Emitter input capacitance	Cib	-	-	8	pF	V_{EB} = 0.5V , f = 100kHz
Delay time	td	-	-	35	ns	V_{CC} = 3V , $V_{BE(OFF)}$ = 0.5V , I_C = 10mA , I_{B1} = 1mA
Rise time	tr	-	-	35	ns	V_{CC} = 3V , $V_{BE(OFF)}$ = 0.5V , I_C = 10mA , I_{B1} = 1mA
Storage time	tstg	-	-	200	ns	V_{CC} = 3V , I_C = 10mA , I_{B1} = $-I_{B2}$ = 1mA
Fall time	tf	-	-	50	ns	V_{CC} = 3V , I_C = 10mA , I_{B1} = $-I_{B2}$ = 1mA

●**Electrical characteristic curves**

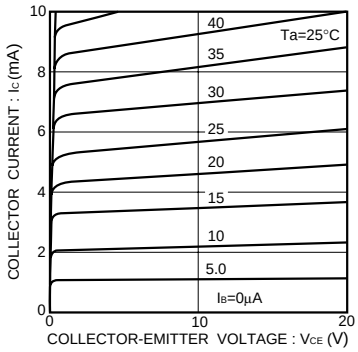


Fig.1 Grounded emitter output characteristics

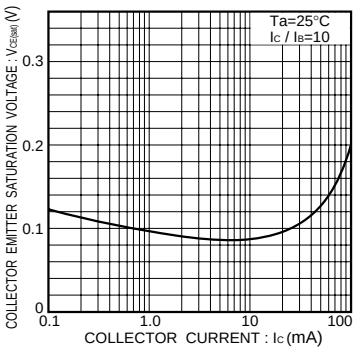


Fig.2 Collector-emitter saturation voltage vs. collector current

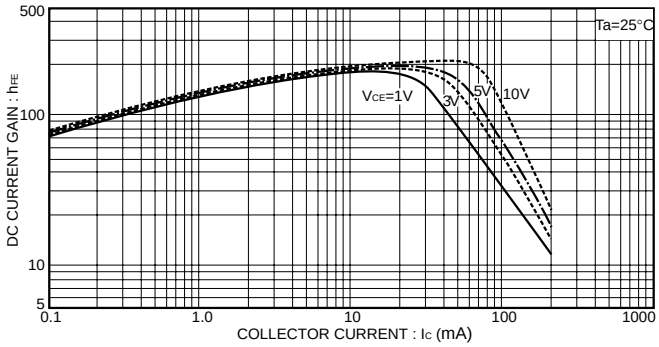


Fig.3 DC current gain vs. collector current (Ⅰ)

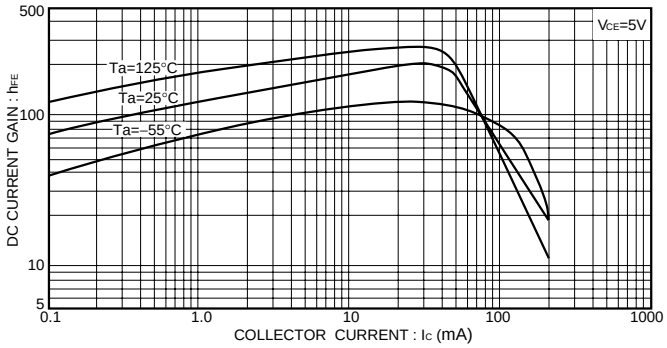


Fig.4 DC current gain vs. collector current (Ⅱ)

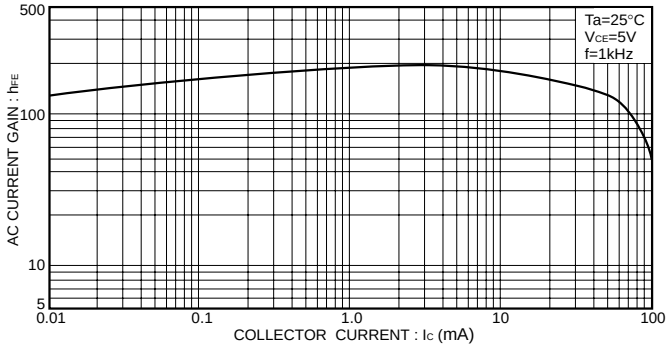


Fig.5 AC current gain vs. collector current

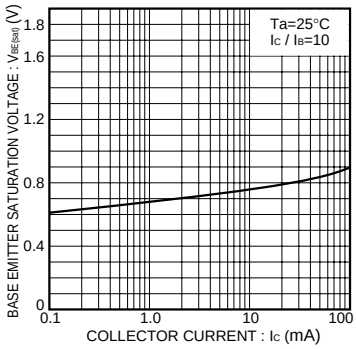


Fig.6 Base-emitter saturation voltage vs. collector current

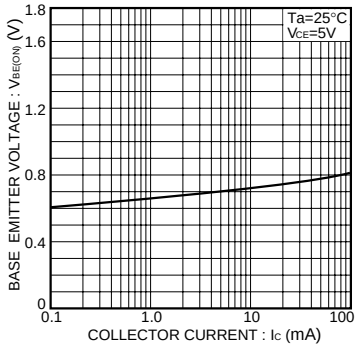


Fig.7 Grounded emitter propagation characteristics

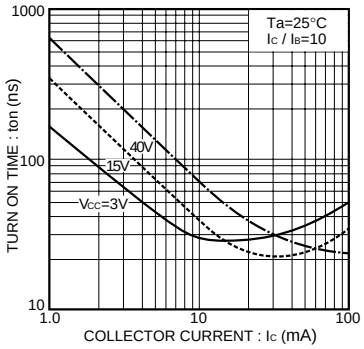


Fig.8 Turn-on time vs. collector current

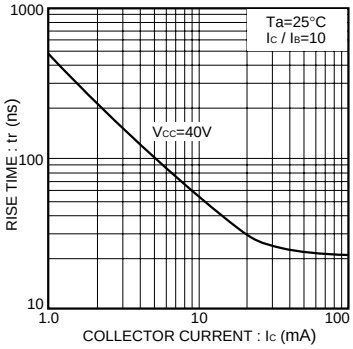


Fig.9 Rise time vs. collector current

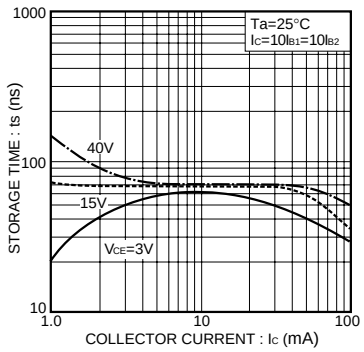


Fig.10 Storage time vs. collector current

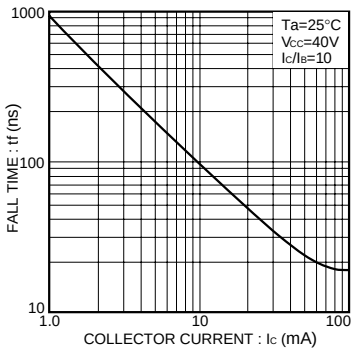


Fig.11 Fall time vs. collector current

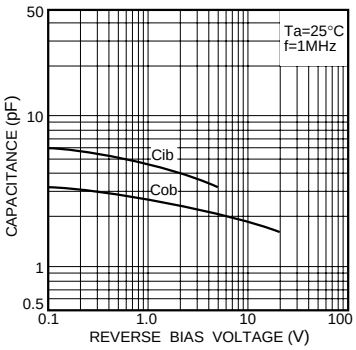


Fig.12 Input / output capacitance vs. voltage

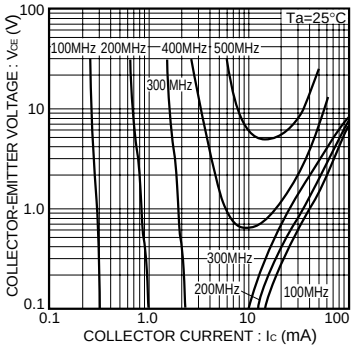


Fig.13 Gain bandwidth product

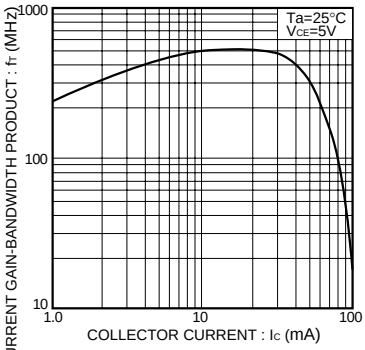


Fig.14 Gain bandwidth product vs. collector current

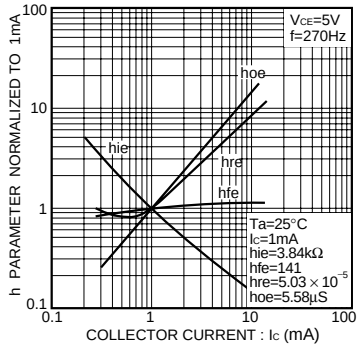


Fig.15 h parameter vs. collector current

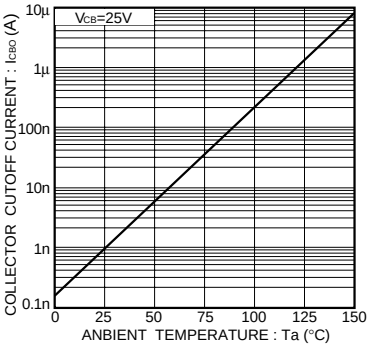


Fig.16 Noise characteristics (Ⅰ)

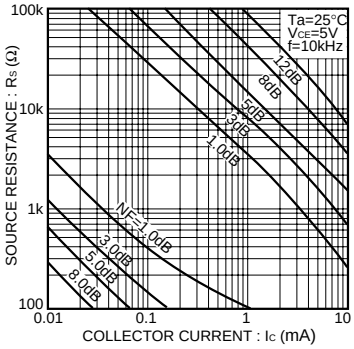


Fig.17 Noise characteristics (Ⅱ)

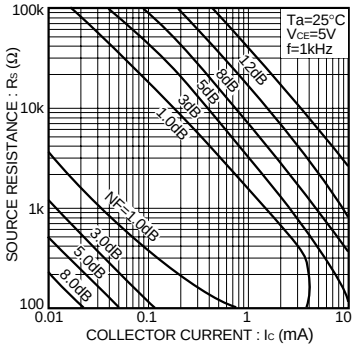


Fig.18 Noise characteristics (Ⅲ)

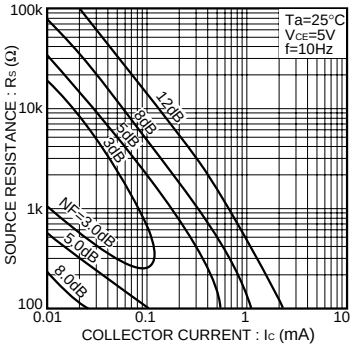


Fig.19 Noise characteristics (Ⅳ)

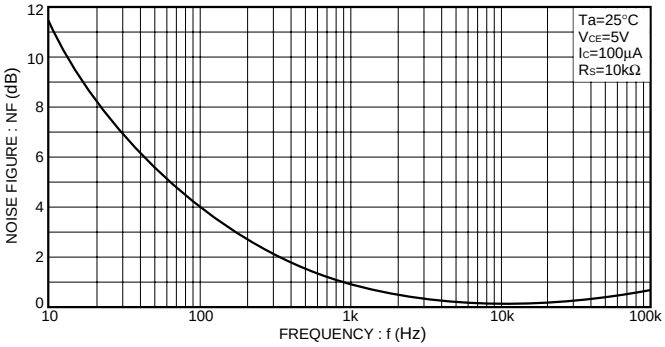


Fig.20 Noise vs. collector current

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