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# NPN Medium Power Transistor (Switching)

UMT2222A/SST2222A/MMST2222A/RXT2222A/PN2222A

●Features

- 1)  $V_{CE0} < 40V$  ( $I_C = 10mA$ )
- 2) Complements the UMT2907A/SST2907A/MMST2907A /RXT2907A/PN2907A.

●Package, marking and packaging specifications

Type	UMT2222A	SST2222A	MMST2222A	RXT2222A	PN2222A
Package	UMT3	SST3	SMT3	MPT3	TO-92
Marking	R1P	R1P	R1P	CB *	—
Code	T106	T116	T146	T100	T93
Basic ordering unit (pieces)	3000	3000	3000	1000	3000

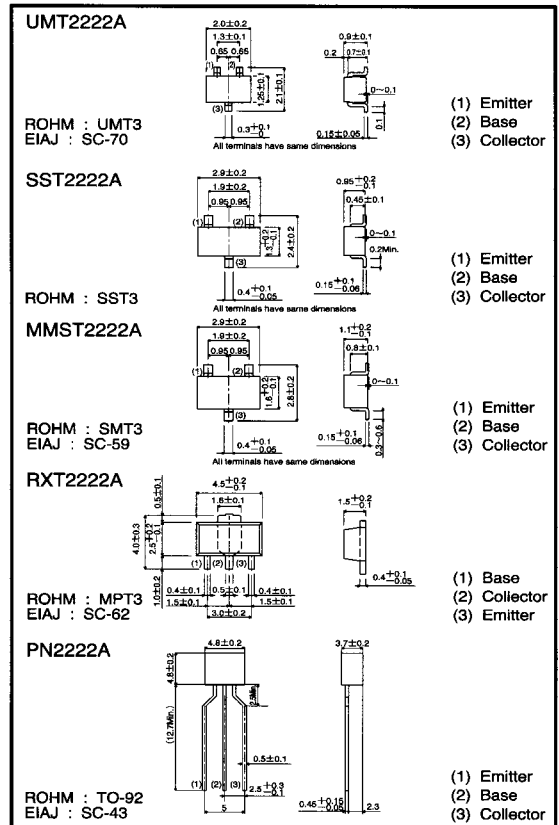
\* Indicates lot number.

●Absolute maximum ratings ( $T_a = 25^\circ C$ )

Parameter	Symbol	Limits	Unit
Collector-base voltage	$V_{CBO}$	75	V
Collector-emitter voltage	$V_{CEO}$	40	V
Emitter-base voltage	$V_{EBO}$	6	V
Collector current	$I_C$	0.6	A
Collector power dissipation	UMT2222A, SST2222AV, MMST2222A	0.2	W *
	SST2222A	0.35	
	RXT2222A	0.5	
	PN2222A	0.625	
Junction temperature	$T_J$	150	$^\circ C$
Storage temperature	$T_{stg}$	-55~150	$^\circ C$

\* On 7 x 5 x 0.6 mm ceramic board

●External dimensions (Units : mm)



●Electrical characteristics ( $T_a = 25^\circ C$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	75	—	—	V	$I_C = 10 \mu A$
Collector-emitter breakdown voltage	$BV_{CEO}$	40	—	—	V	$I_C = 10mA$
Emitter-base breakdown voltage	$BV_{EBO}$	6	—	—	V	$I_E = 10 \mu A$
Collector cutoff current	$I_{C0}$	—	—	100	nA	$V_{CE} = 60V$
Emitter cutoff current	$I_{E0}$	—	—	100	nA	$V_{EE} = 3V$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	0.3	V	$I_C/I_B = 150mA/15mA$
		—	—	1	V	$I_C/I_B = 500mA/50mA$
Base-emitter saturation voltage	$V_{BE(sat)}$	0.6	—	1.2	V	$I_C/I_B = 150mA/15mA$
		—	—	2	V	$I_C/I_B = 500mA/50mA$
DC current transfer ratio	$h_{FE}$	35	—	—	—	$V_{CE} = 10V, I_C = 0.1mA$
		50	—	—	—	$V_{CE} = 10V, I_C = 1mA$
		75	—	—	—	$V_{CE} = 10V, I_C = 10mA$
		50	—	—	—	$V_{CE} = 1V, I_C = 150mA$
		100	—	300	—	$V_{CE} = 10V, I_C = 150mA$
		40	—	—	—	$V_{CE} = 10V, I_C = 500mA$
Transition frequency	$f_T$	300	—	—	MHz	$V_{CE} = 20V, I_C = -20mA, f = 100MHz$
Output capacitance	$C_{ob}$	—	—	8	pF	$V_{CB} = 10V, f = 100kHz$
Emitter input capacitance	$C_{ib}$	—	—	25	pF	$V_{EE} = 0.5V, f = 100kHz$
Delay time	$t_d$	—	—	10	ns	$V_{CC} = 30V, V_{BE(OFF)} = 0.5V, I_C = 150mA, I_{B1} = 15mA$
Rise time	$t_r$	—	—	25	ns	$V_{CC} = 30V, V_{BE(OFF)} = 0.5V, I_C = 150mA, I_{B1} = 15mA$
Storage time	$t_{stg}$	—	—	225	ns	$V_{CC} = 30V, I_C = 150mA, I_{B1} = -I_{B2} = 15mA$
Fall time	$t_f$	—	—	60	ns	$V_{CC} = 30V, I_C = 150mA, I_{B1} = -I_{B2} = 15mA$

● Electrical characteristic curves

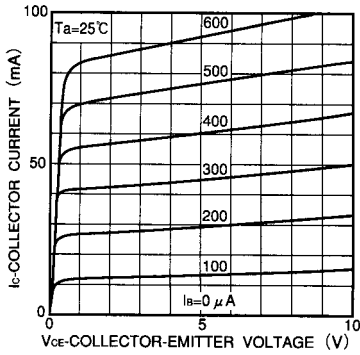


Fig.1 Grounded emitter output characteristics

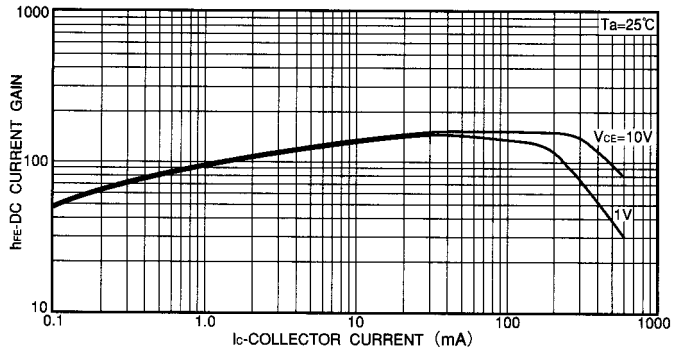


Fig.3 DC current gain vs. collector current ( I )

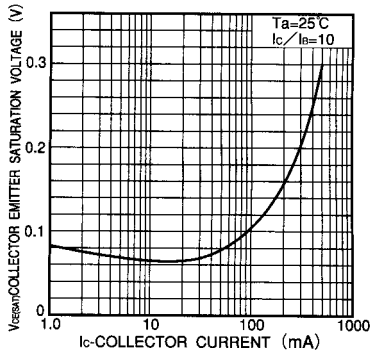


Fig.2 Collector-emitter saturation voltage vs. collector current

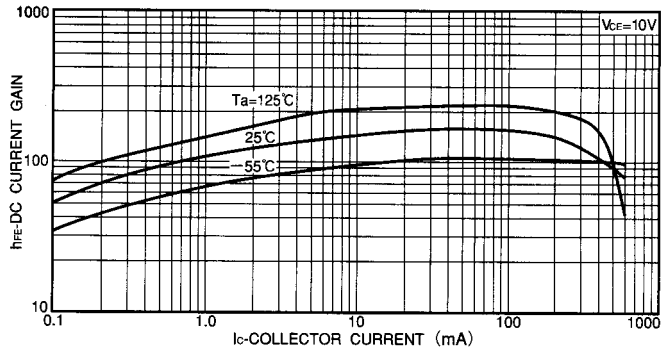


Fig.4 DC current gain vs. collector current ( II )

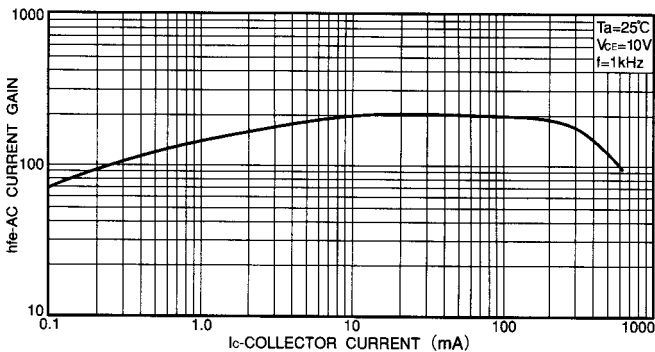


Fig.5 AC current gain vs. collector current

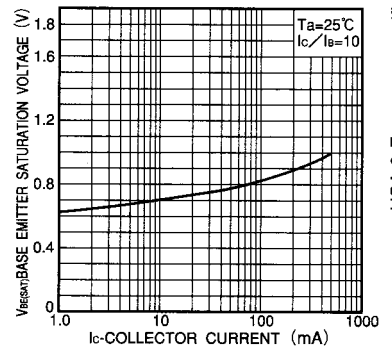


Fig.6 Base-emitter saturation voltage vs. collector current

USA & European specification models

● Electrical characteristic curves

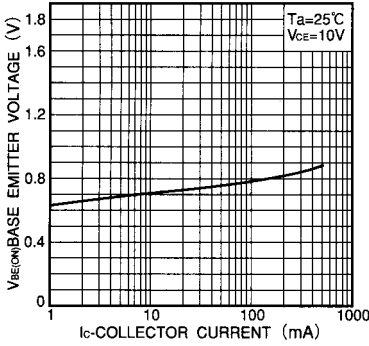


Fig.7 Grounded emitter propagation characteristics

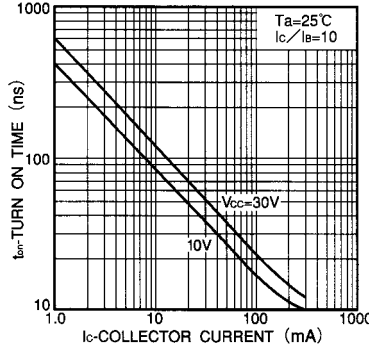


Fig.8 Turn-on time vs. collector current

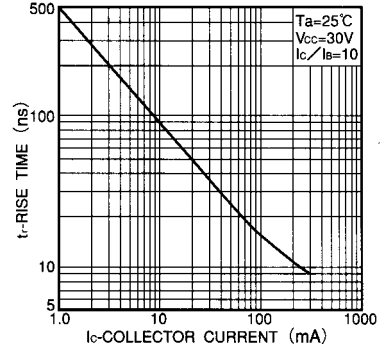


Fig.9 Rise time vs. collector current

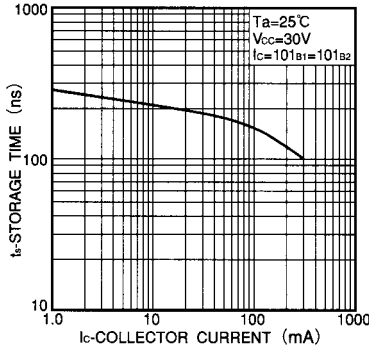


Fig.10 Storage time vs. collector current

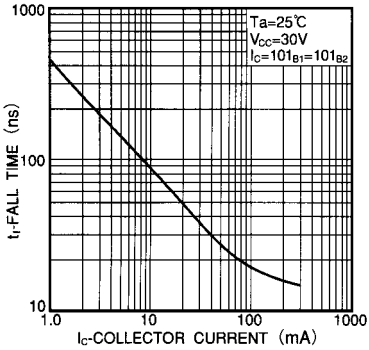


Fig.11 Fall time vs. collector current

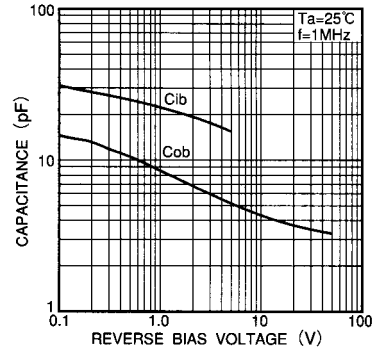


Fig.12 Input/output capacitance vs. voltage

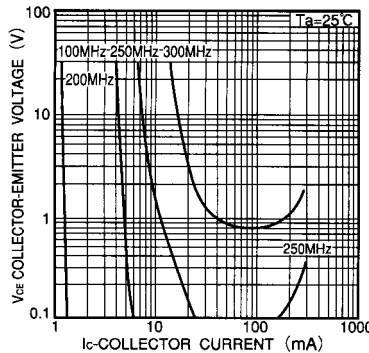


Fig.13 Gain bandwidth product

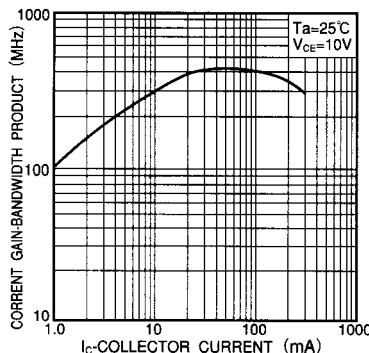


Fig.14 Gain bandwidth product vs. collector current