

NPN Medium Power Transistor (Switching)

UMT2222A / SST2222A / MMST2222A / PN2222A

●Features

- 1) $BV_{CEO} > 40V$ ($I_C=10mA$)
- 2) Complements the UMT2907A / SST2907A / MMST2907A / PN2907A.

●Package, marking, and packaging specifications

Part No.	UMT2222A	SST2222A	MMST2222A	PN2222A
Packaging type	UMT3	SST3	SMT3	TO-92
Marking	R1P	R1P	R1P	—
Code	T106	T116	T146	T93
Basic ordering unit (pieces)	3000	3000	3000	3000

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

Parameter	Symbol	Limits	Unit
Collector-base voltage	V_{CB0}	75	V
Collector-emitter voltage	V_{CE0}	40	V
Emitter-base voltage	V_{EB0}	6	V
Collector current	I_C	0.6	A
Collector power dissipation	P_C	0.2	W
		0.35	W *
		0.625	W
Junction temperature	T_J	150	$^\circ C$
Storage temperature	T_{stg}	-55 ~ +150	$^\circ C$

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

●External dimensions (Units : mm)

UMT2222A ROHM : UMT3 EIAJ : SC-70		(1) Emitter (2) Base (3) Collector
SST2222A ROHM : SST3		(1) Emitter (2) Base (3) Collector
MMST2222A ROHM : SMT3 EIAJ : SC-59		(1) Emitter (2) Base (3) Collector
PN2222A ROHM : TO-92 EIAJ : SC-43		(1) Emitter (2) Base (3) Collector

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CB0}	75	—	—	V	$I_C=10\mu A$
Collector-emitter breakdown voltage	BV_{CE0}	40	—	—	V	$I_C=10mA$
Emitter-base breakdown voltage	BV_{EB0}	6	—	—	V	$I_E=10\mu A$
Collector cutoff current	I_{CBO}	—	—	100	nA	$V_{CB}=60V$
Emitter cutoff current	I_{EBO}	—	—	100	nA	$V_{EB}=3V$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	0.3	V	$I_C/I_B=150mA/15mA$
		—	—	1	V	$I_C/I_B=500mA/50mA$
		—	—	1.2	V	$I_C/I_B=150mA/15mA$
Base-emitter saturation voltage	$V_{BE(sat)}$	0.6	—	2	V	$I_C/I_B=500mA/50mA$
		—	—	—	V	$V_{CE}=10V, I_C=0.1mA$
		—	—	—	V	$V_{CE}=10V, I_C=1mA$
DC current transfer ratio	h_{FE}	35	—	—	—	$V_{CE}=10V, I_C=10mA$
		50	—	—	—	$V_{CE}=1V, I_C=150mA$
		75	—	—	—	$V_{CE}=10V, I_C=150mA$
		50	—	—	—	$V_{CE}=10V, I_C=500mA$
		100	—	300	—	$V_{CE}=10V, I_C=500mA$
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	$V_{EB}=0.5V, f=100kHz$
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	$V_{CC}=30V, I_C=150mA, I_{B1}=-I_{B2}=15mA$

Transistors

●Electrical characteristic curves

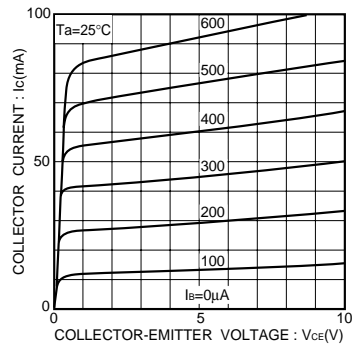


Fig.1 Grounded emitter output characteristics

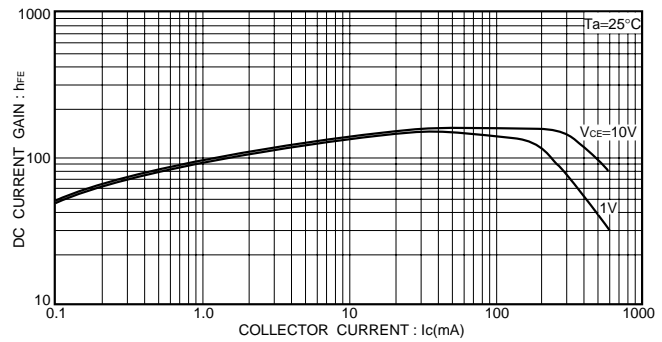


Fig.3 DC current gain vs. collector current(I)

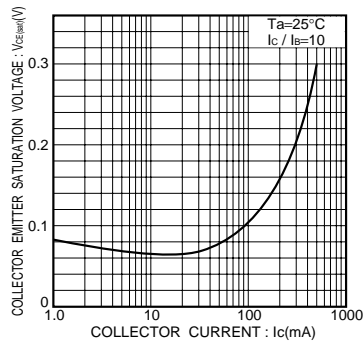


Fig.2 Collector-emitter saturation voltage vs. collector current

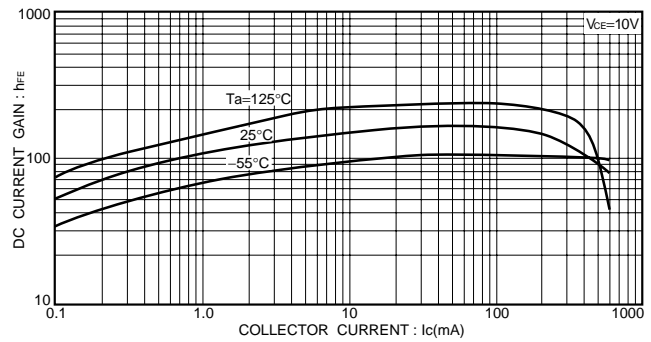


Fig.4 DC current gain vs. collector current(II)

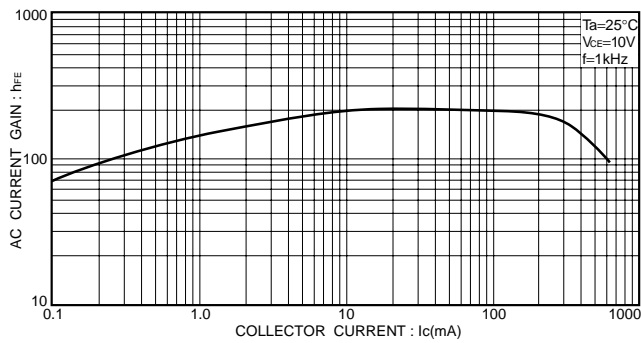


Fig.5 AC current gain vs. collector current

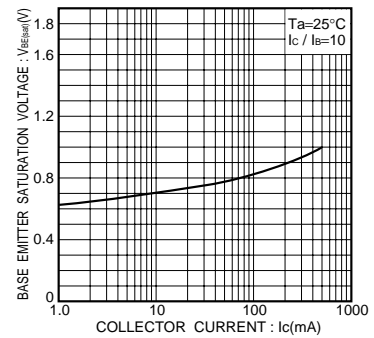


Fig.6 Base-emitter saturation voltage vs. collector current

UMT2222A / SST2222A / MMST2222A / PN2222A

Transistors

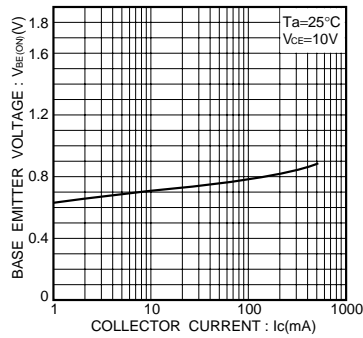


Fig.7 Grounded emitter propagation characteristics

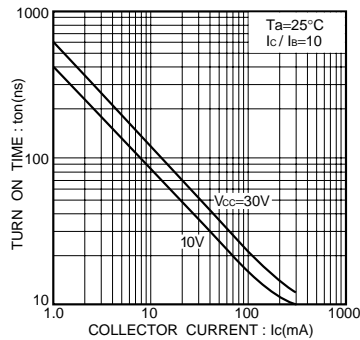


Fig.8 Turn-on time vs. collector current

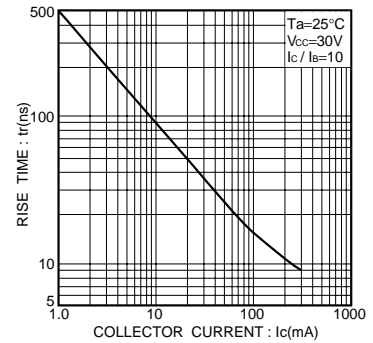


Fig.9 Rise time vs. collector current

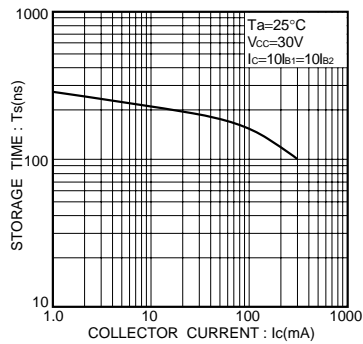


Fig.10 Storage time vs. collector current

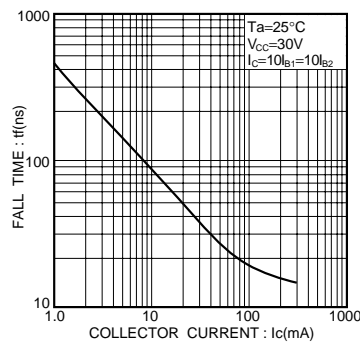


Fig.11 Fall time vs. collector current

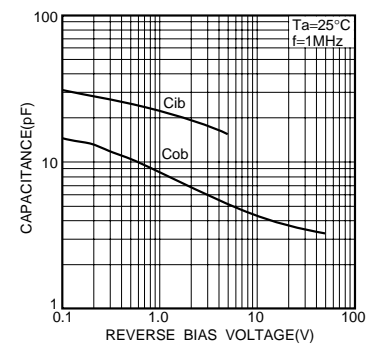


Fig.12 Input / output capacitance vs. voltage

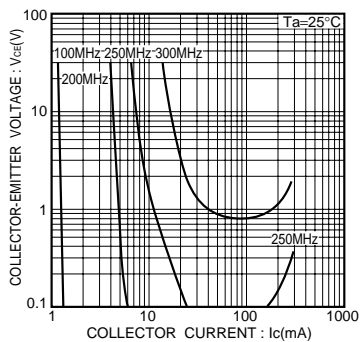


Fig.13 Gain bandwidth product

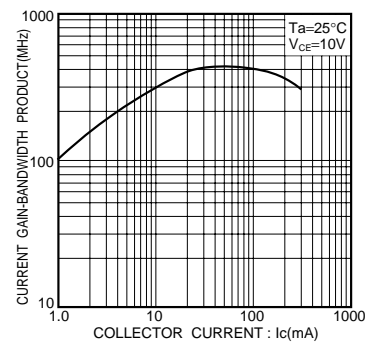


Fig.14 Gain bandwidth product vs. collector current