

2SC3838K 2SC4083

Transistor, NPN

Features

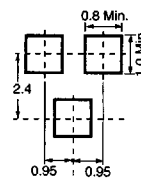
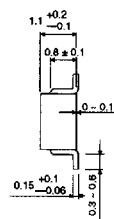
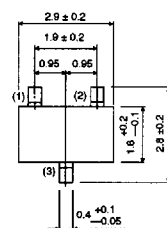
- available in SMT3 (SMT, SC-59) and UMT3 (UMT, SC-70) packages
- package marking:
 - 2SC3838K; AD★, where ★ is h_{FE} code
 - 2SC4083; 1D★, where ★ is h_{FE} code
- high transition frequency, typically $f_T = 3.2$ GHz
- high gain with low collector-to-base time constant, typically $C_C \cdot r_{bb'} = 4$ ps
- low noise (NF)

Applications

- radio frequency amplifier

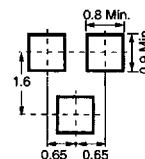
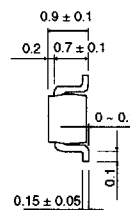
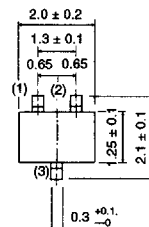
Dimensions (Units : mm)

2SC3838K (SMT3)



- (1) Emitter
- (2) Base
- (3) Collector

2SC4083 (UMT3)



- (1) Emitter
- (2) Base
- (3) Collector

2SC3838K, 2SC4083 Transistor, NPN, 2SC series**Absolute maximum ratings ($T_a = 25^\circ\text{C}$)**

Parameter	Symbol	Limits	Unit
Collector-to-base voltage	V_{CBO}	20	V
Collector-to-emitter voltage	V_{CEO}	11	V
Emitter-to-base voltage	V_{EBO}	3	V
Collector current	I_C	50	mA
Collector dissipation	P_C	200	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	$-55 \sim +150$	$^\circ\text{C}$

Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$)

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Collector-to-base breakdown voltage	BV_{CBO}	20			V	$I_C = 10 \mu\text{A}$
Collector-to-emitter breakdown voltage	BV_{CEO}	11			V	$I_C = 1 \text{ mA}$
Emitter-to-base breakdown voltage	BV_{EBO}	3			V	$I_E = 10 \mu\text{A}$
Collector cutoff current	I_{CBO}			0.5	μA	$V_{CB} = 10 \text{ V}$
Emitter cutoff current	I_{EBO}			0.5	μA	$V_{EB} = 2 \text{ V}$
DC current gain	h_{FE}	56		270		$V_{CE} = 10 \text{ V}$, $I_C = 5 \text{ mA}$
Collector-to-emitter saturation voltage	$V_{CE(sat)}$			0.5	V	$I_C/I_B = 10 \text{ mA}/5 \text{ mA}$
Transition frequency	f_T	1.4	3.2		GHz	$V_{CE} = 10 \text{ V}$, $I_C = 10 \text{ mA}$, $f = 500 \text{ MHz}$
Output capacitance	C_{ob}		0.8	1.5	pF	$V_{CB} = 10 \text{ V}$, $I_E = 0 \text{ A}$, $f = 1 \text{ MHz}$
Collector-to-base time constant	$C_C \cdot r_{bb'}$		4	12	ps	$V_{CB} = 10 \text{ V}$, $I_C = 10 \text{ mA}$, $f = 31.8 \text{ MHz}$
Noise figure	NF		3.5		dB	$V_{CE} = 6 \text{ V}$, $I_C = 2 \text{ mA}$, $f = 500 \text{ MHz}$, $R_g = 50 \Omega$

 h_{FE} rankings

Item	N	P	Q
h_{FE}	56 ~ 120	82 ~ 180	120 ~ 270

Electrical characteristic curves

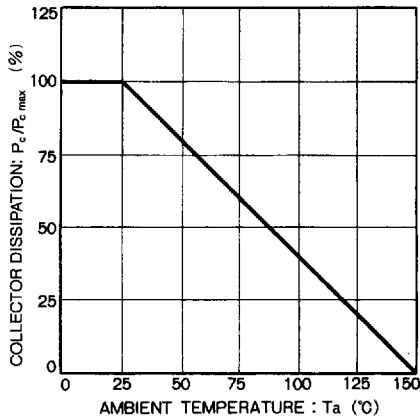


Figure 1

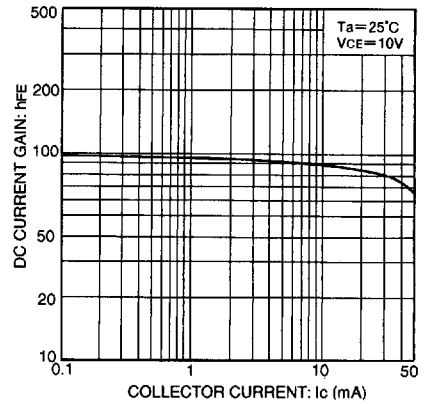


Figure 2

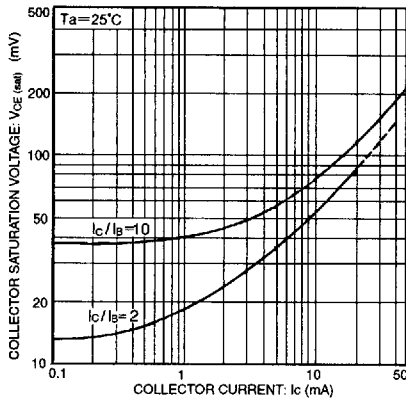


Figure 3

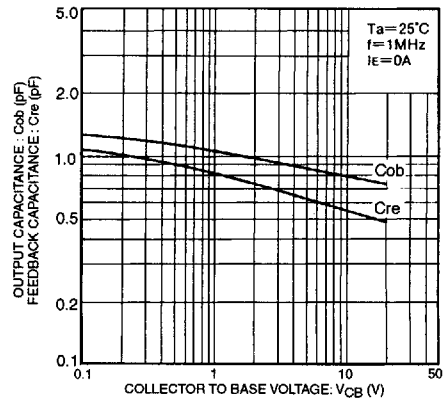


Figure 4

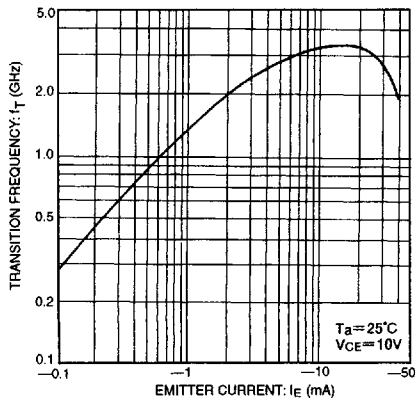


Figure 5

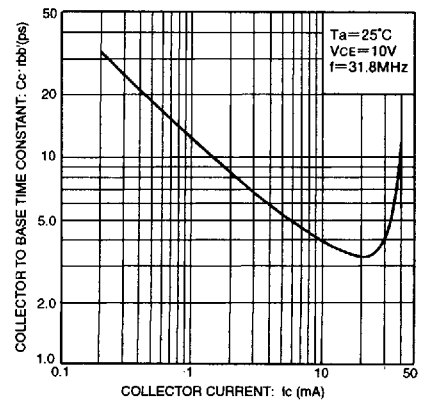


Figure 6

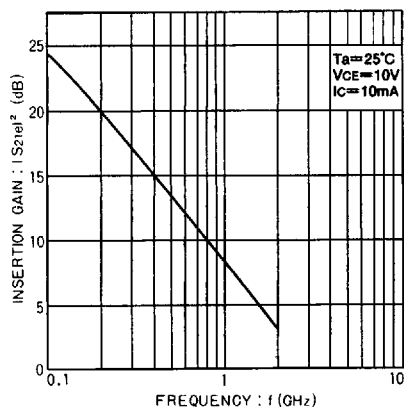


Figure 7

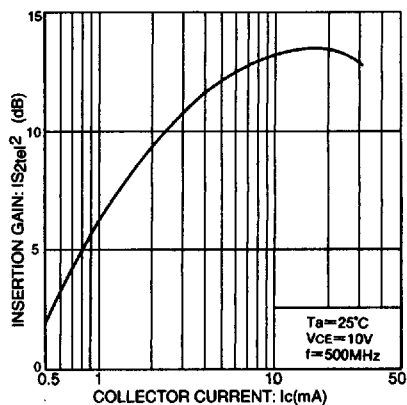


Figure 8

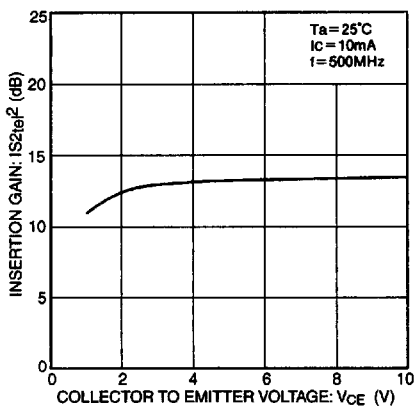


Figure 9

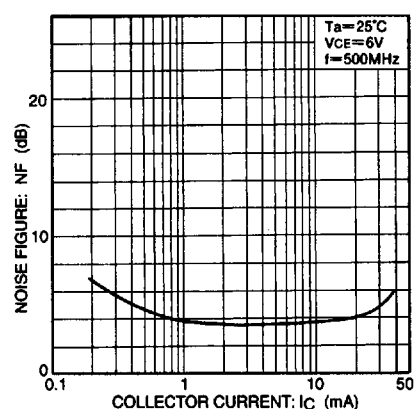


Figure 10

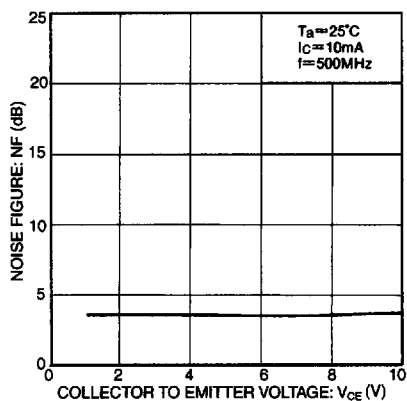
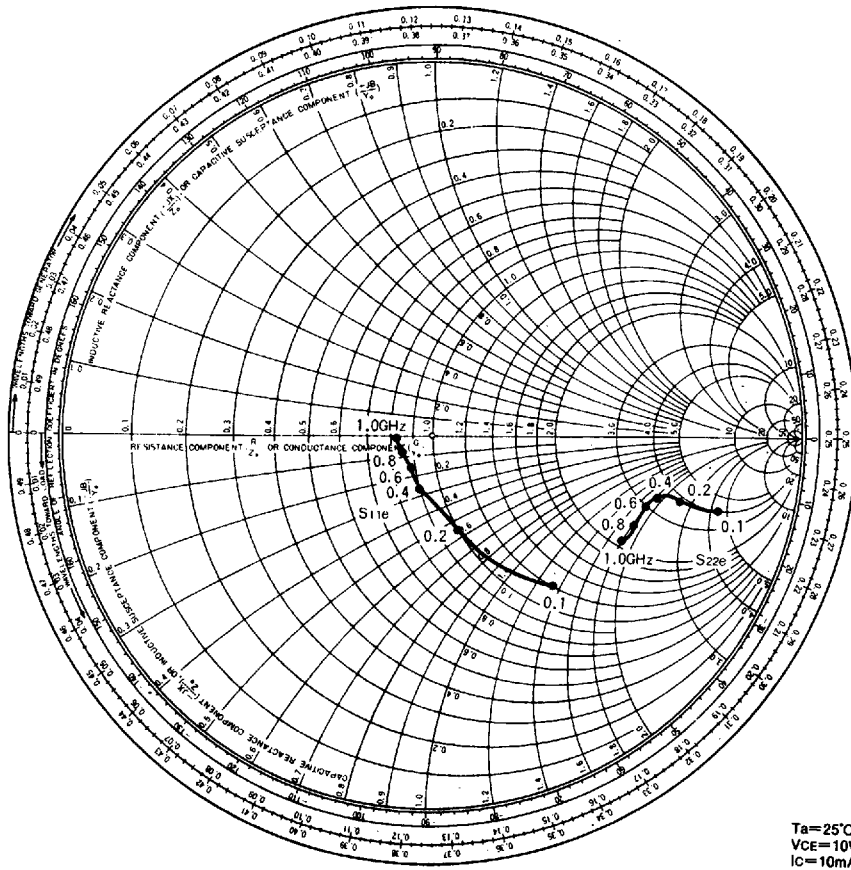


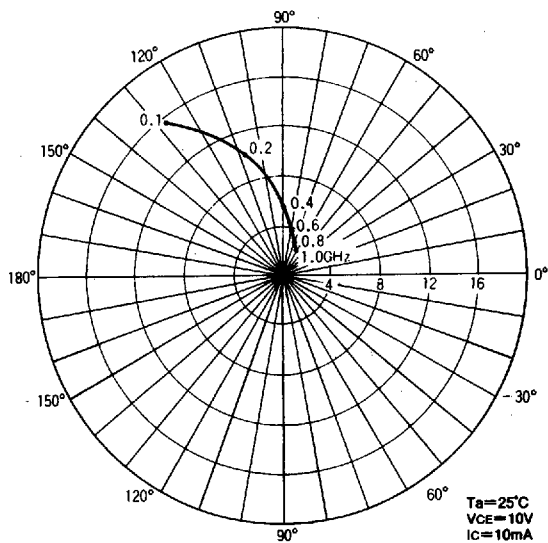
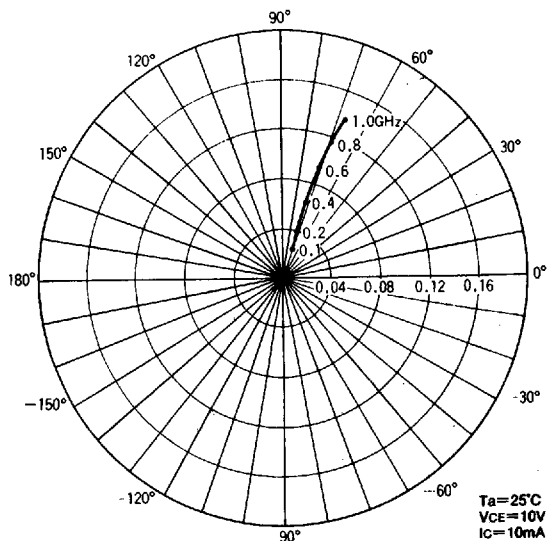
Figure 11

Figure 12 Frequency characteristics – S_{11e} and S_{22e}



2SC3838K, 2SC4083 Transistor, NPN, 2SC series

Frequency characteristics – S_{12e} and S_{21e}



f (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{12} $	$\angle S_{12}$	$ S_{21} $	$\angle S_{21}$	$ S_{22} $	$\angle S_{22}$
100	0.524	-52	0.023	71	15.650	128	0.805	-15
200	0.311	-73	0.037	70	10.174	107	0.687	-15
400	0.176	-100	0.064	72	5.623	89	0.623	-15
600	0.137	-123	0.091	71	3.981	78	0.602	-19
800	0.118	-153	0.115	69	3.126	68	0.592	-24
1000	0.132	-175	0.136	67	2.585	61	0.583	-28

2SC3838K Typical S- parameter data
 $V_{CE} = 10\text{ V}$, $I_C = 10\text{ mA}$, $Z_0 = 50\ \Omega$
 S - Magnitude and angles (degree)

Ordering information

Package	Tape	
Code	T146	T106
Basic order quantity	3000	3000
2SC3838K	★	
2SC4083		★
★ = Standard, ☆ = Semi-standard, * = Special order		