2SC3838K
2SC4083

Transistor, NPN

Features

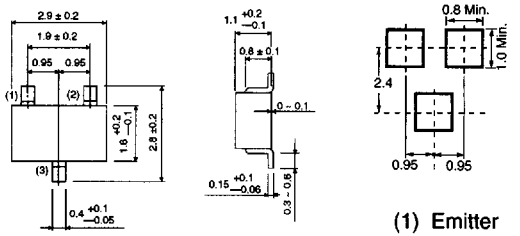
- available in SMT3 (SMT, SC-59) and UMT3 (UMT, SC-70) packages
- package marking:
  - — 2SC3838K; AD★, where ★ is h_{FE} code
  - — 2SC4083; 1D★, where ★ is h_{FE} code
- high transition frequency, typically $f_T = 3.2$ GHz
- high gain with low collector-to-base time constant, typically $C_C \cdot r_{bb'}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

Applications

- radio frequency amplifier

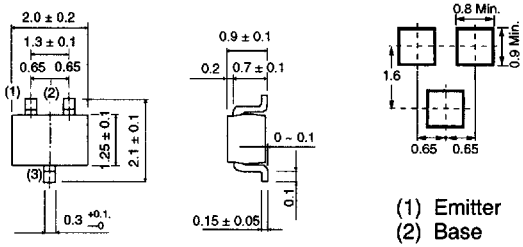
Dimensions (Units : mm)

2SC3838K (SMT3)



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

2SC4083 (UMT3)



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

Absolute maximum ratings (T_a = 25°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	°C
Storage temperature	T_{stg}	−55 ~ +150	°C

Electrical characteristics (unless otherwise noted, T_a = 25°C)

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

h_{FE} rankings

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

Electrical characteristic curves

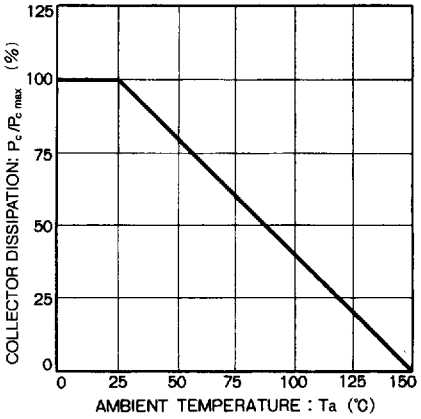


Figure 1

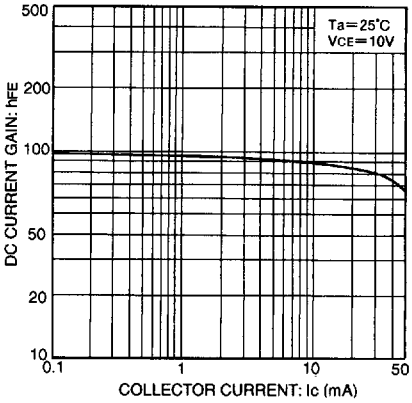


Figure 2

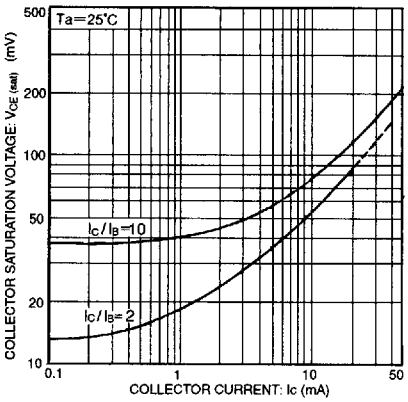


Figure 3

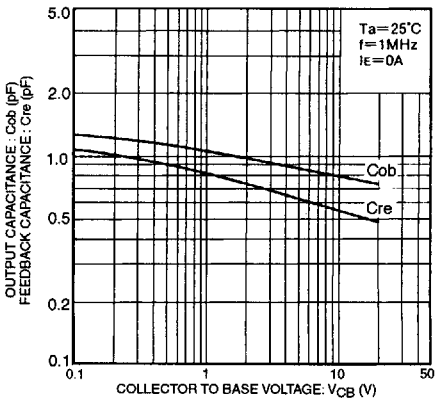


Figure 4

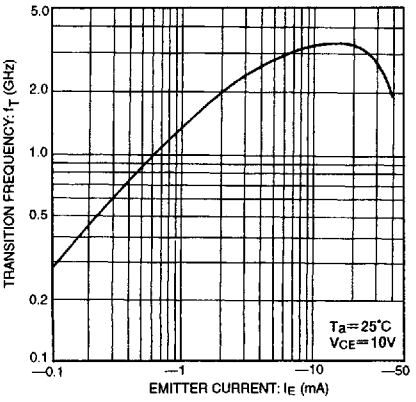


Figure 5

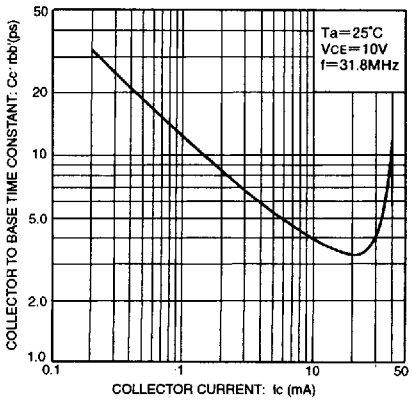


Figure 6

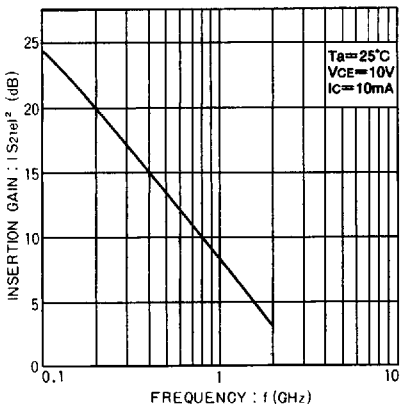


Figure 7

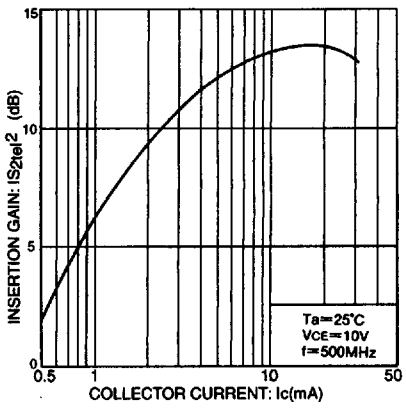


Figure 8

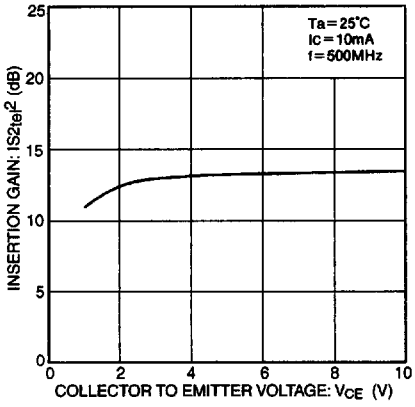


Figure 9

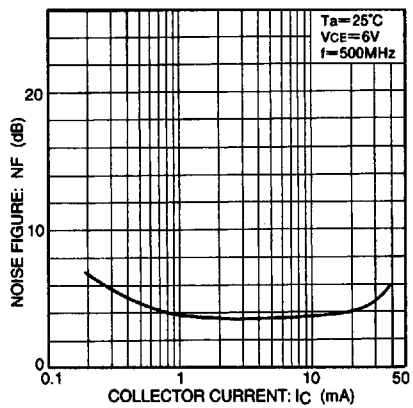


Figure 10

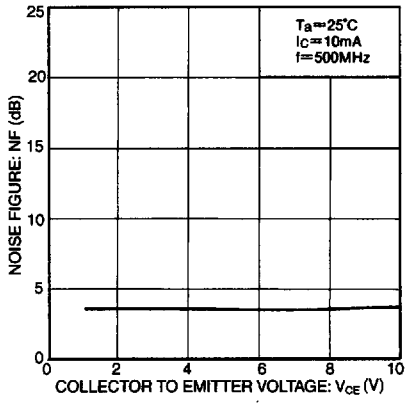
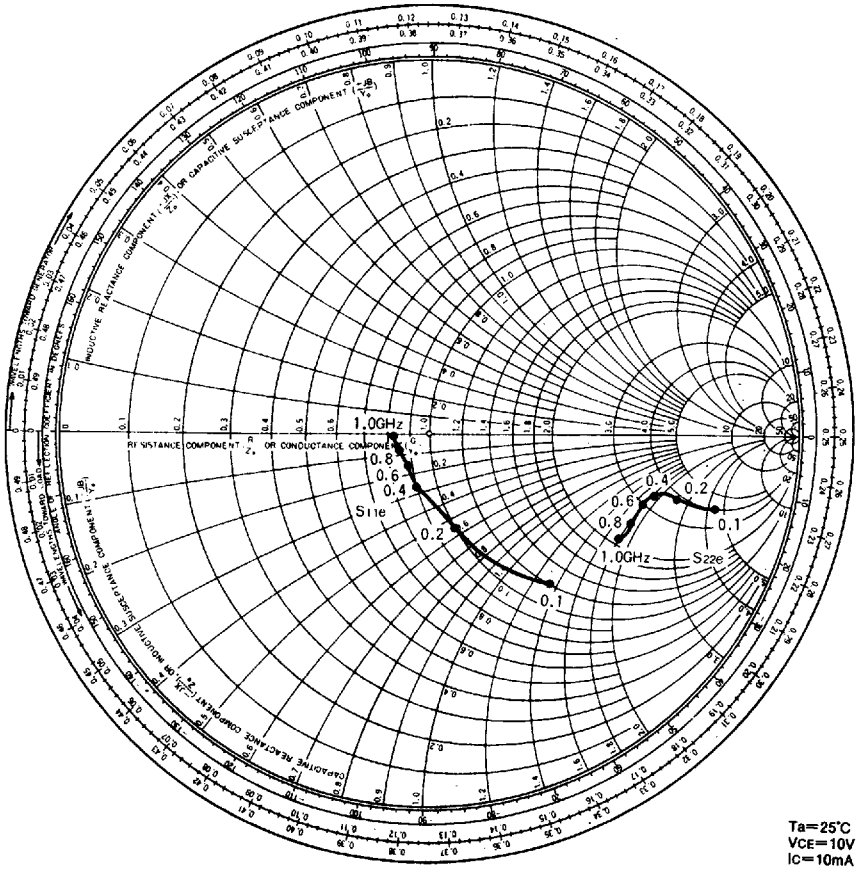


Figure 11

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



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

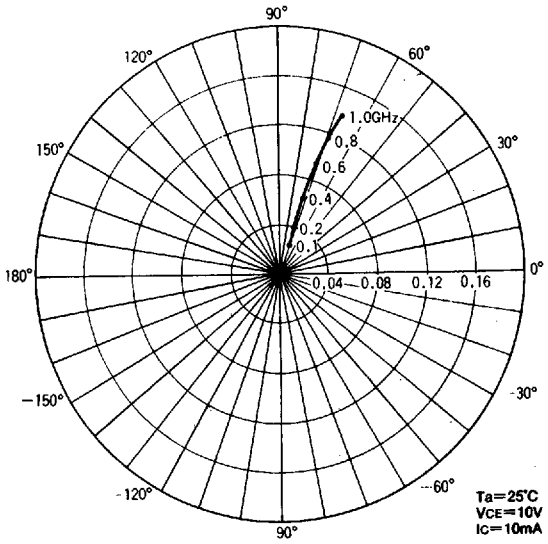


Figure 13 S_{12e}

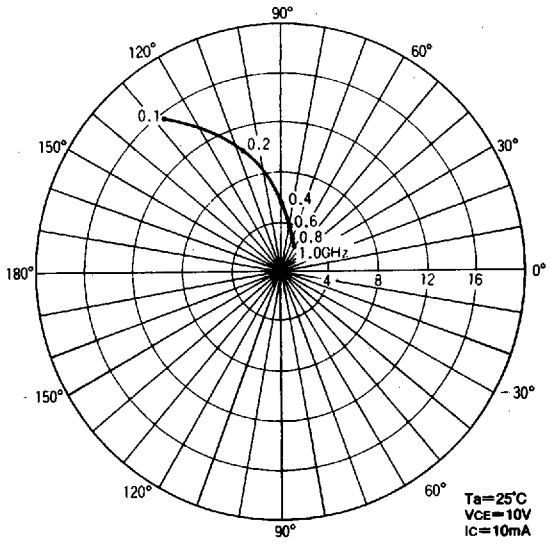


Figure 14 S_{21e}

f (MHz)	$\lvert S_{11} \rvert$	$\angle S_{11}$	$\lvert S_{12} \rvert$	$\angle S_{12}$	$\lvert S_{21} \rvert$	$\angle S_{21}$	$\lvert S_{22} \rvert$	$\angle S_{22}$
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 V, I_C = 10 mA, Z_0 = 50 Ω
S – Magnitude and angles (degree)

Ordering information

Package	Tape	
Code	T146	T106
Basic order quantity	3000	3000
2SC3838K	★	
2SC4083		★

★ = Standard, ☆ = Semi–standard, ✳ = Special order