

NEC[®]**PNP SILICON HIGH SPEED
SWITCHING TRANSISTOR****NE71100
NE71111****FEATURES**

- **HIGH GAIN BANDWIDTH PRODUCT**
 $f_T = 1.0 \text{ GHz}$
- **LOW OUTPUT CAPACITANCE**
 $C_{CB} = 2.5 \text{ pF}$
- **HIGH SPEED SWITCHING**
 $t_{STB} = 90 \text{ ns}$
- **HIGH VOLTAGE**
 $V_{CE0} = -40 \text{ V}$

DESCRIPTION AND APPLICATIONS

The NE711 series of PNP silicon transistors is designed for HF and VHF amplifier and switching applications. The series has a very high voltage and current handling capability providing good dynamic range. The part is available either in the 11 package (TO-18) or as an aluminum metallized chip for hybrid circuits. The NE71111 is a good PNP complement to several NPN transistors, including the NE66912, for amplifier and switching applications.

PERFORMANCE SPECIFICATIONS ($T_A = 25^\circ\text{C}$)

PART NUMBER EIAJ ¹ REGISTERED NUMBER PACKAGE OUTLINE			NE71111 2SA711 11 (TO-18)		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
f_T	Gain Bandwidth Product at $V_{CE} = -10 \text{ V}$, $I_C = 10 \text{ mA}$	GHz	0.8	1	
$ S_{21E} ^2$	Insertion Power Gain at $V_{CE} = -10 \text{ V}$, $I_C = 20 \text{ mA}$ $f = 200 \text{ MHz}$ $f = 500 \text{ MHz}$	dB dB		13 6	
MAG	Maximum Available Gain at $V_{CE} = -10 \text{ V}$, $I_C = 10 \text{ mA}$ $f = 200 \text{ MHz}$ $f = 500 \text{ MHz}$	dB dB		15 9	
Rise Time	See Test Circuit	ns		45	70
Storage Time		ns		90	130
Fall Time		ns		130	170

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

PART NUMBER EIAJ ¹ REGISTERED NUMBER PACKAGE OUTLINE			NE71111 2SA711 11 (TO-18)		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
I_{CBO}	Collector Cutoff Current at $V_{CB} = -30 \text{ V}$, $I_E = 0$	μA			0.1
I_{EBO}	Emitter Cutoff Current at $V_{EB} = -3 \text{ V}$, $I_C = 0$	μA			0.1
$V_{CE(sat)}$	Collector Saturation Voltage at $I_C = 10 \text{ mA}$, $I_B = 1 \text{ mA}$	V		0.12	0.2
$V_{BE(sat)}$	Base Saturation Voltage at $I_C = 10 \text{ mA}$, $I_B = 1 \text{ mA}$	V		0.79	0.9
h_{FE}	DC Current Gain at $V_{CE} = -1 \text{ V}$, $I_C = 1 \text{ mA}$ $V_{CE} = -1 \text{ V}$, $I_C = 10 \text{ mA}$		60 70	105 120	240
C_{CB}	Collector to Base Capacitance ² at $V_{CB} = -10 \text{ V}$, $I_E = 0 \text{ mA}$, $f = 1.0 \text{ MHz}$	pF		2.5	4
R_{TH}	Thermal Resistance (Junction-to-Case)	$^\circ\text{C/W}$			150
P_t	Total Device Dissipation	mW			300

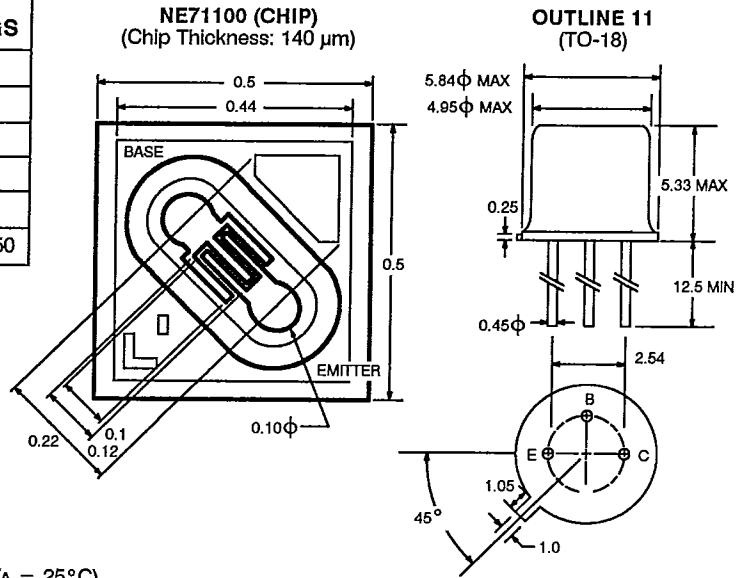
Notes:

1. Electronic Industrial Association of Japan.
2. C_{CB} measurement employs a three terminal bridge incorporating a guard circuit.

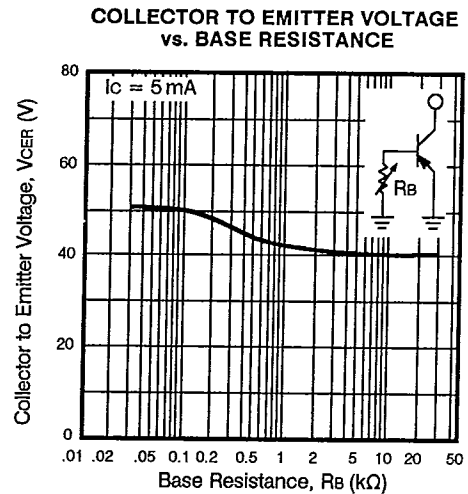
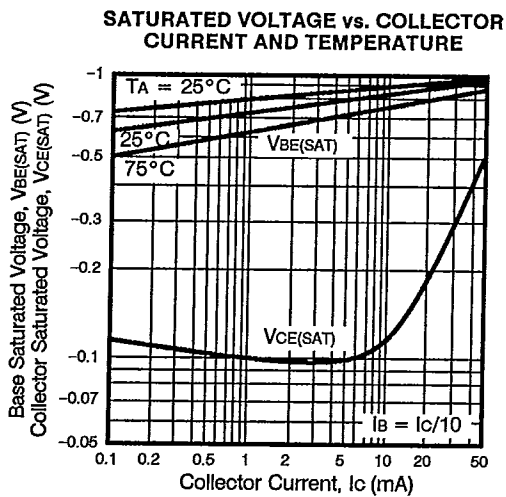
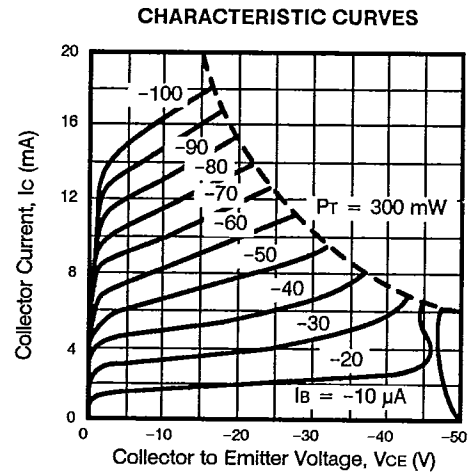
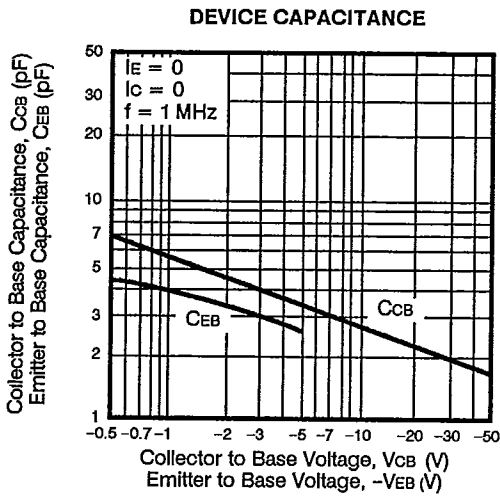
ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CB0}	Collector to Base Voltage	V	-50
V _{CE0}	Collector to Emitter Voltage	V	-40
V _{EB0}	Emitter to Base Voltage	V	-5.0
I _c	Collector Current	mA	100
T _J	Junction Temperature	°C	150
T _{STG}	Storage Temperature	°C	-65 to +150

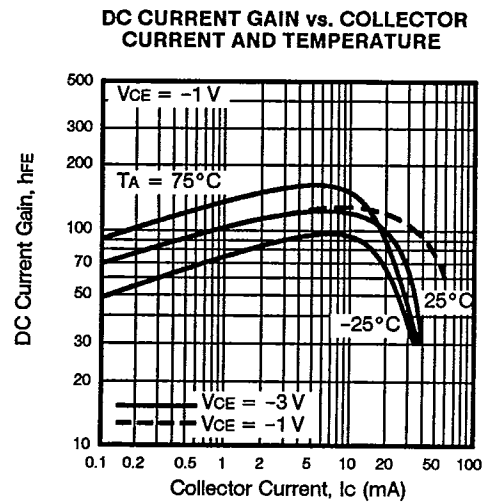
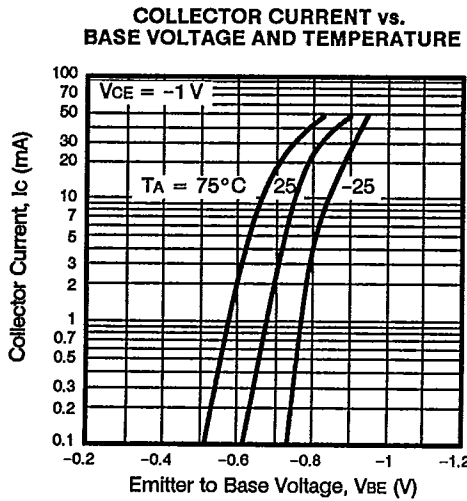
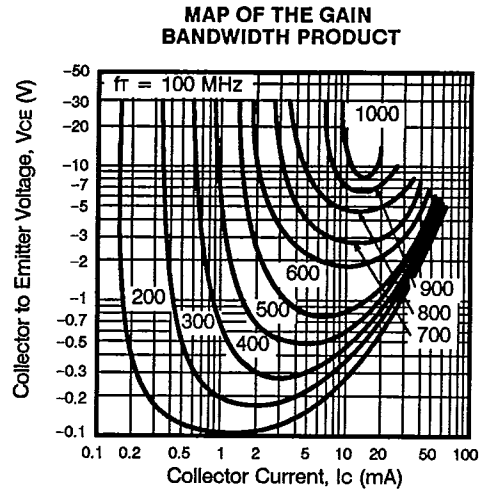
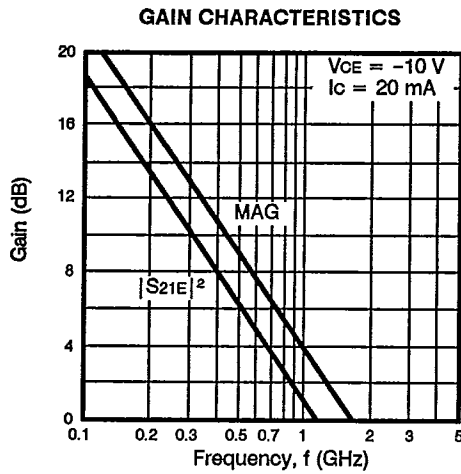
OUTLINE DIMENSIONS (Units in mm)



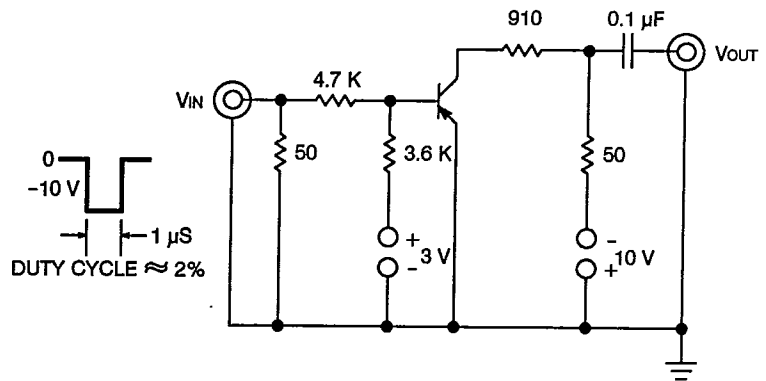
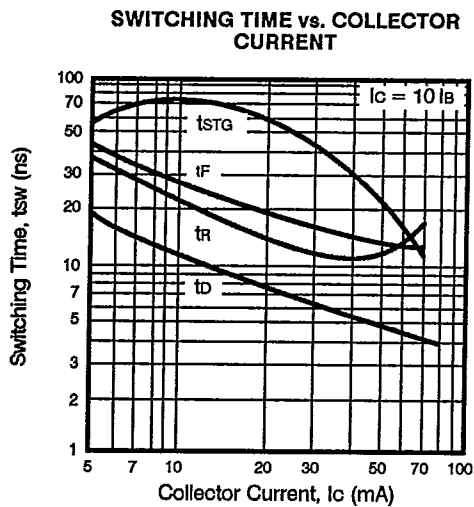
TYPICAL DEVICE CHARACTERISTICS (TA = 25°C)



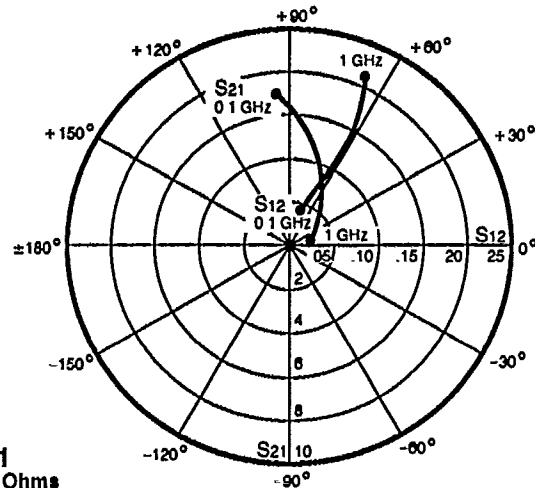
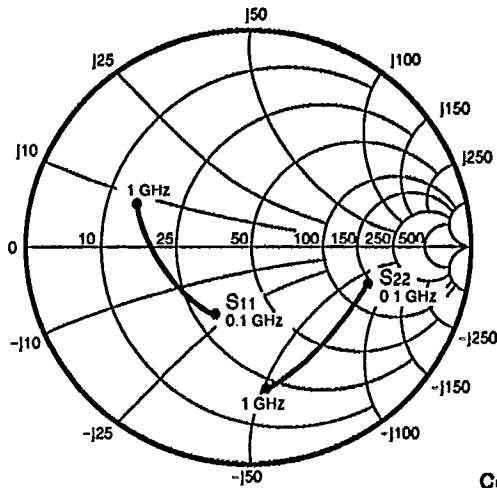
TYPICAL PERFORMANCE CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



TYPICAL SWITCHING CHARACTERISTICS



TYPICAL COMMON EMITTER SCATTERING PARAMETERS



NE71111
Coordinates in Ohms
Frequency in GHz
(VCE = -10 V, IC = 20 mA)

S-MAGN AND ANGLES:

VCE = -10 V, IC = 5 mA

FREQUENCY (MHz)

	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
100	.46	-89	6.15	106	.05	56	.67	-24
200	.35	-117	3.44	86	.08	59	.61	-32
400	.34	-146	1.83	66	.12	55	.61	-46
600	.37	165	1.28	50	.15	52	.63	-62
800	.39	180	.99	38	.17	56	.66	-77
1000	.42	167	.80	28	.20	60	.69	-90

VCE = -10 V, IC = 10 mA

100	.36	-104	7.09	98	.05	62	.59	-22
200	.32	-130	3.84	83	.07	64	.54	-29
400	.35	-157	2.06	66	.11	61	.55	-42
600	.38	-174	1.42	51	.15	59	.58	-58
800	.41	171	1.12	39	.18	62	.61	-73
1000	.44	160	.92	29	.22	64	.64	-86

VCE = -10 V, IC = 20 mA

100	.32	-118	7.43	94	.04	64	.55	-20
200	.34	-142	3.97	81	.07	66	.52	-29
400	.38	-166	2.10	64	.11	65	.53	-43
600	.42	179	1.43	50	.14	63	.56	-60
800	.44	166	1.11	37	.18	65	.60	-75
1000	.46	155	.90	27	.21	66	.64	-88

VCE = -10 V, IC = 30 mA

100	.33	-126	6.98	93	.04	66	.54	-19
200	.37	-149	3.75	80	.06	65	.52	-28
400	.41	-172	1.97	62	.10	67	.54	-43
600	.44	175	1.35	48	.14	65	.57	-59
800	.46	163	1.03	36	.17	67	.61	-75
1000	.49	152	.84	26	.21	69	.64	-88