

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**
 $t_{sw} = 90 \text{ ns}$
- **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

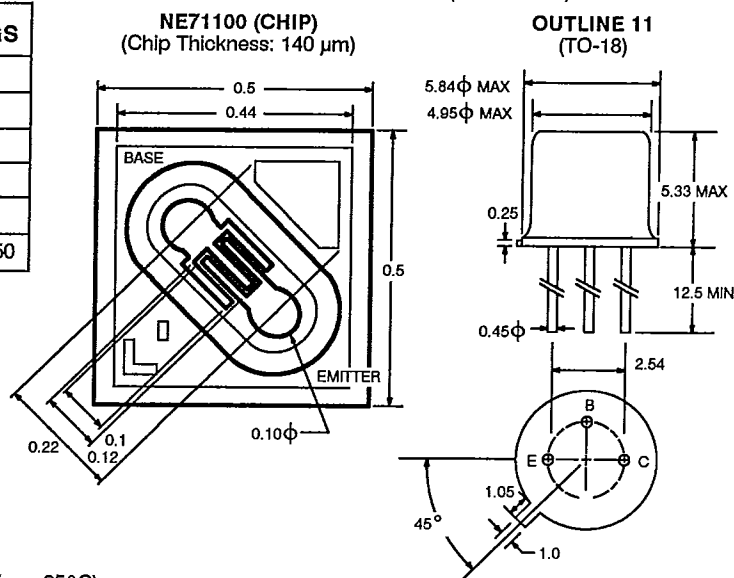
Notes:

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)

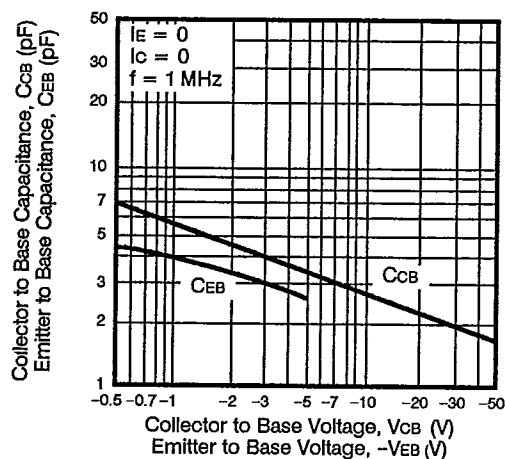
SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CB0}	Collector to Base Voltage	V	-50
V _{CE0}	Collector to Emitter Voltage	V	-40
V _{EB0}	Emitter to Base Voltage	V	-5.0
I _C	Collector Current	mA	100
T _J	Junction Temperature	°C	150
T _{STG}	Storage Temperature	°C	-65 to +150

OUTLINE DIMENSIONS (Units in mm)

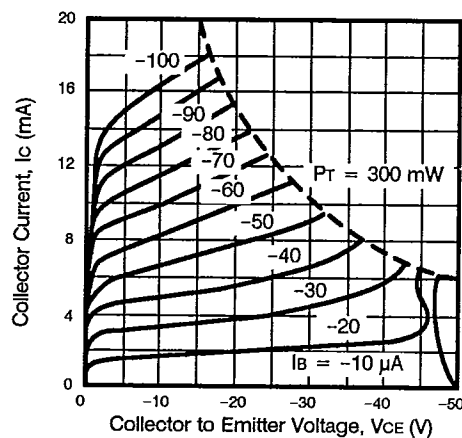


TYPICAL DEVICE CHARACTERISTICS (TA = 25°C)

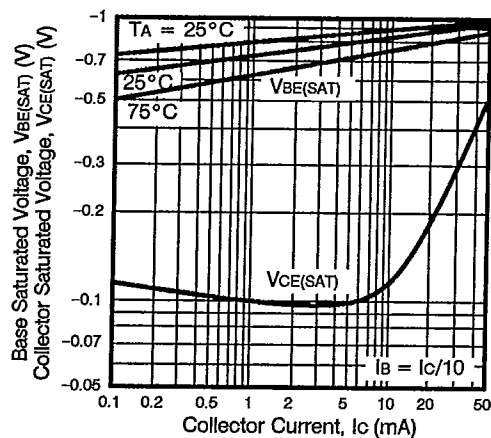
DEVICE CAPACITANCE



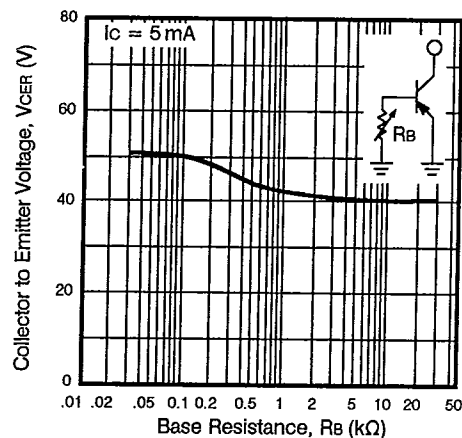
CHARACTERISTIC CURVES



SATURATED VOLTAGE vs. COLLECTOR CURRENT AND TEMPERATURE

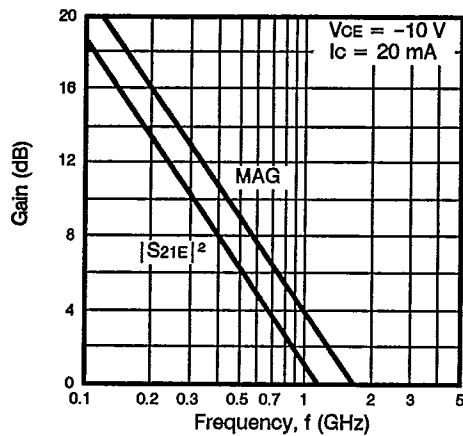


COLLECTOR TO EMITTER VOLTAGE vs. BASE RESISTANCE

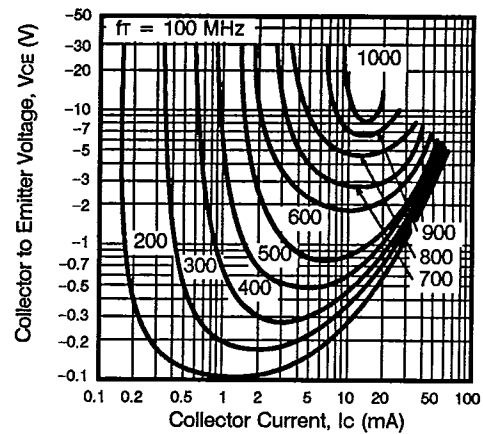


TYPICAL PERFORMANCE CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

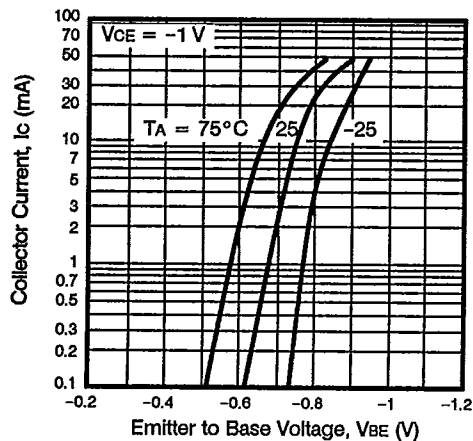
GAIN CHARACTERISTICS



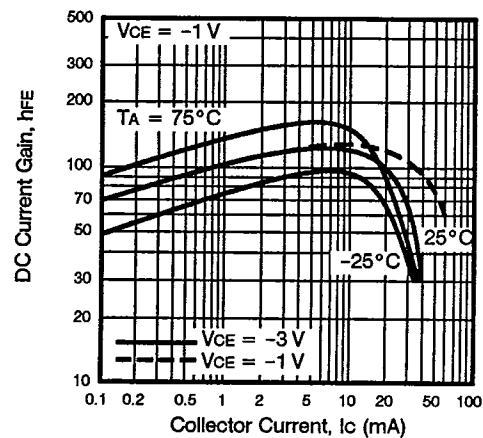
MAP OF THE GAIN BANDWIDTH PRODUCT



COLLECTOR CURRENT vs. BASE VOLTAGE AND TEMPERATURE

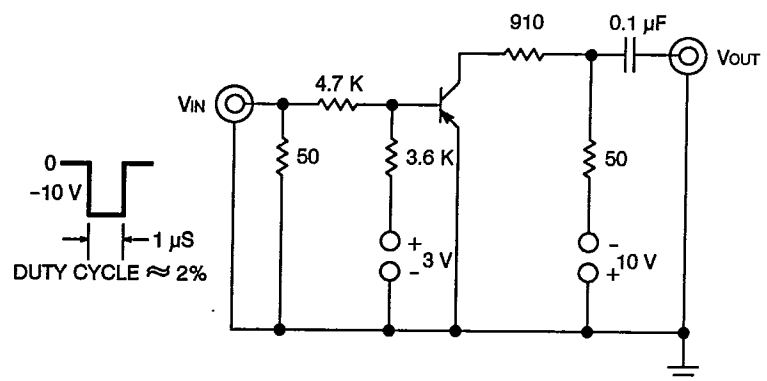
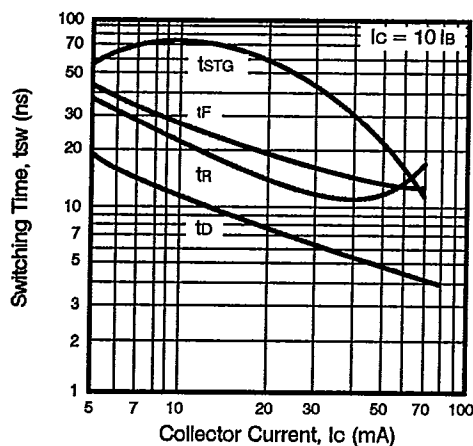


DC CURRENT GAIN vs. COLLECTOR CURRENT AND TEMPERATURE

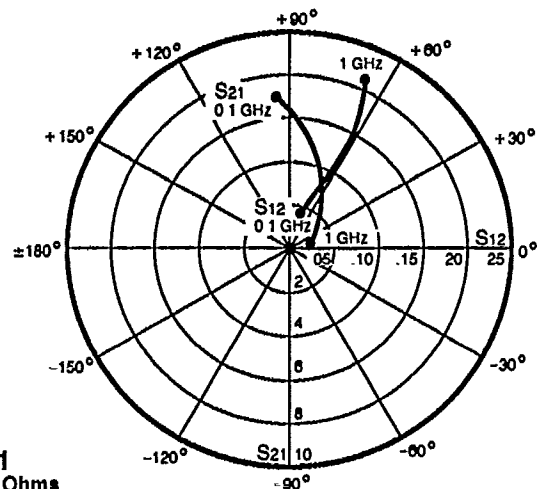
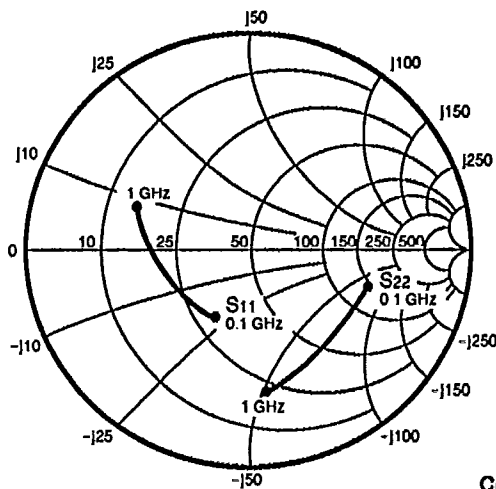


TYPICAL SWITCHING CHARACTERISTICS

SWITCHING TIME vs. COLLECTOR CURRENT



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)

	S11		S21		S12		S22	
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

	S11		S21		S12		S22	
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

	S11		S21		S12		S22	
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

	S11		S21		S12		S22	
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