SILICON P EMITTER PLANAR TYPE
(INDUSTRIAL APPLICATIONS)

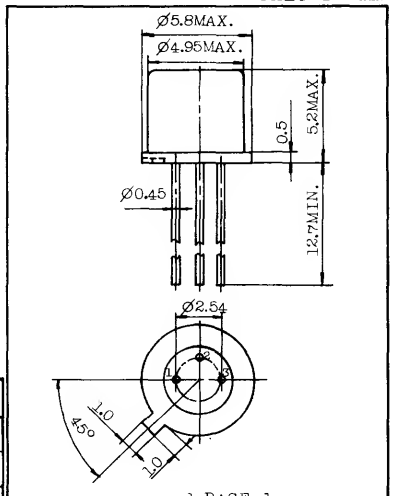
2SH20
2SH21

RELAXATION OSCILLATOR, SCR TRIGGER AND TIMER APPLICATIONS.

FEATURES:

- High Oscillation Output Voltage
  : V_{OB1}=3V (Min.)
- Low Emitter Reverse Current
  : I_{EC}=0.1μA (Max.)
- Wide Oscillation Area : I_P=3.5μA (Max.)(2SH20)
  I_V=6mA (Min.)

Unit in mm



JEDEC	TO — 18
EIAJ	TC — 7, TB — 8C
TOSHIBA	2 — 5A1A

Weight : 1.13g

MAXIMUM RATINGS (Ta=25°C)

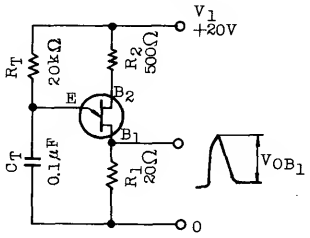
CHARACTERISTICS	SYMBOL	RATING	UNIT
Base 2 - Base 1 Voltage	V_{B2B1O}	55	V
Base 1 - Emitter Voltage	V_{B1EO}	60	V
Base 2 - Emitter Voltage	V_{B2EO}	60	V
Peak Emitter Current	$I_{E(peak)}$	1	A
Emitter Current	I_E	50	mA
Allowable Power Dissipation	P	250	mW
Junction Temperature	T_j	150	°C
Storage Temperature Range	Tstg	-65∿150	°C

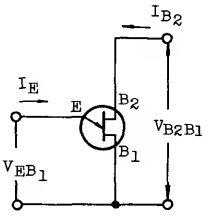
ELECTRICAL CHARACTERISTICS (Ta=25°C)

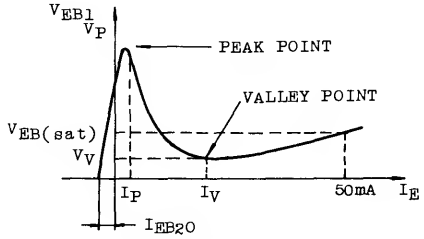
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Emitter-Base 2 Reverse Current		I_{EB2O}	V_{EB2}=-60V, I_{B1}=0	-	-	-0.1	μA
Base 1 - Base 2 Resistance		R_{BBO}	V_{B2B1}=3V, I_E=0	4	-	12	kΩ
Intrinsic Stand-off Ratio		η(Note)	V_{B2B1}=20V	0.70	-	0.85	
Emitter - Base 1 Forward Saturation Voltage		$V_{EB1(sat)}$	V_{B2B1}=10V, I_E=50mA	-	-	4	V
Peak Point Emitter Current	2SH20	I_P	V_{B2B1}=20V	-	-	3.5	μA
	2SH21			-	-	4	
Valley Point Emitter Current	2SH20	I_V	V_{B2B1}=20V	6	-	-	mA
	2SH21			4	-	-	
Valley Point Emitter Voltage		V_V	V_{B2B1}=20V	-	-	4	V
Oscillation Output Voltage		V_{OB1}	Fig.	3	-	-	V

Note: η Classification Y : 0.70∿0.80, GR : 0.75∿0.85

Fig. V_{OB1} TEST CIRCUIT





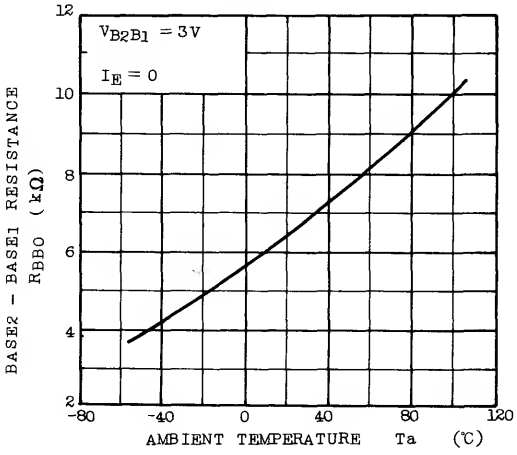


$V_P = \eta V_{B_2B_1} + V_D$

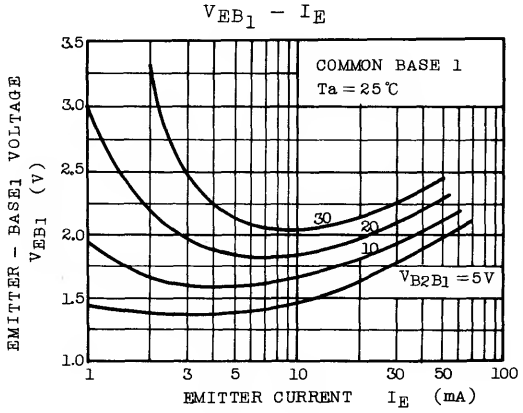
Where V_D : Contact potential of diode between emitter and base is about 0.7V at 25℃.

Approval Oscillation Frequency f = 5kHz (MAX.)

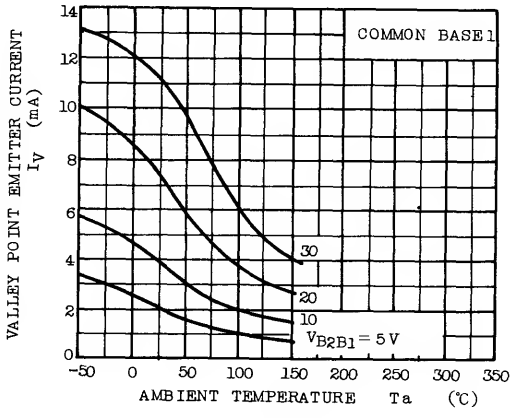
R_{BBO} – Ta



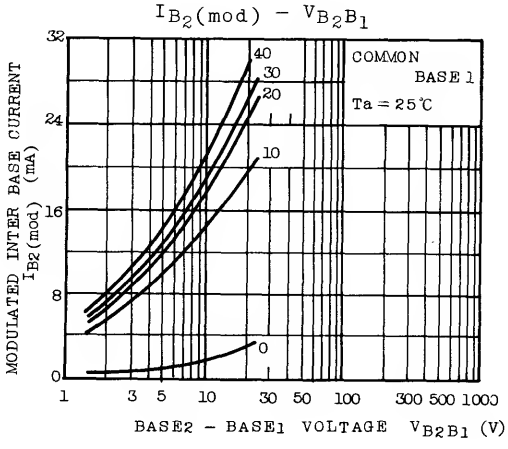
V_{EB_1} – I_E



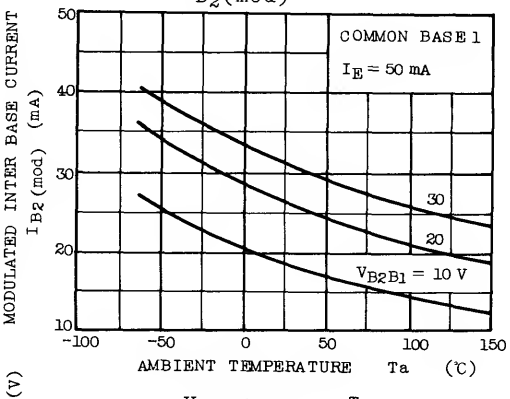
I_V – Ta



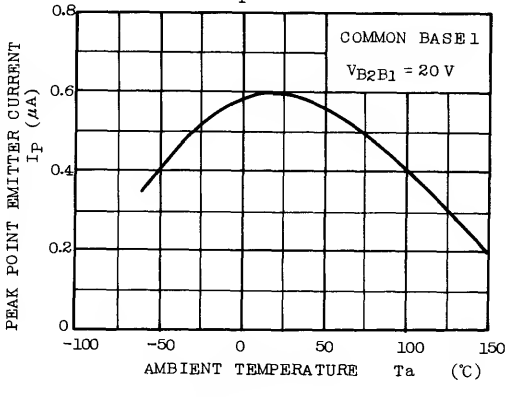
$I_{B_2(mod)}$ – $V_{B_2B_1}$



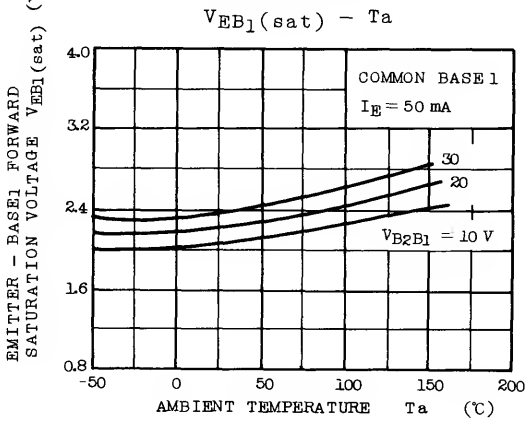
$I_{B_2(mod)}$ – Ta



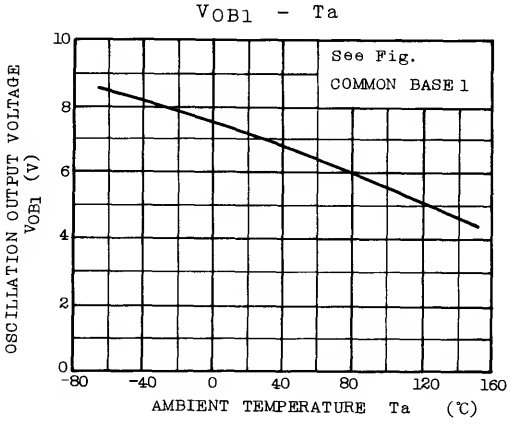
I_P – Ta

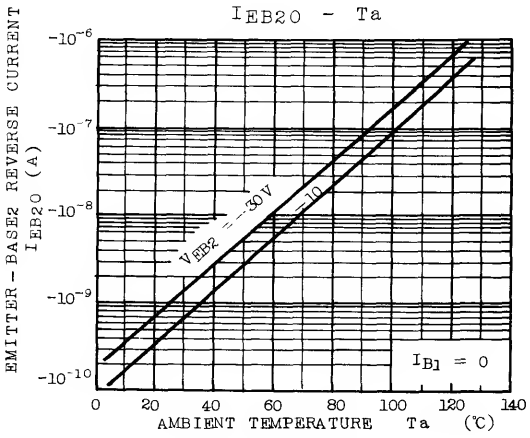


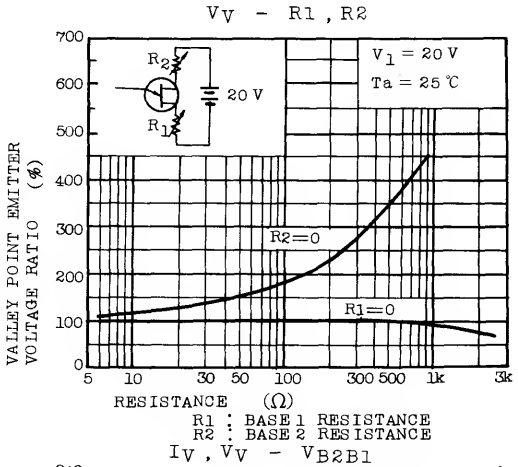
$V_{EB_1(sat)}$ – Ta

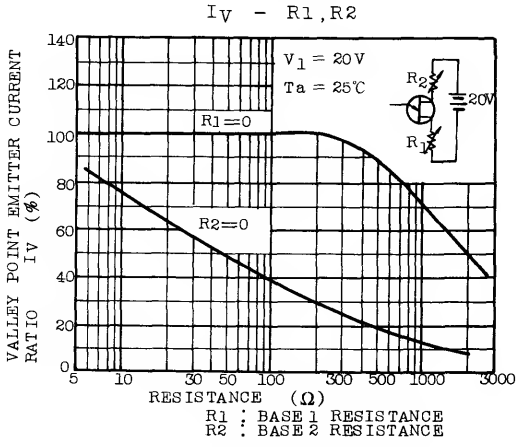


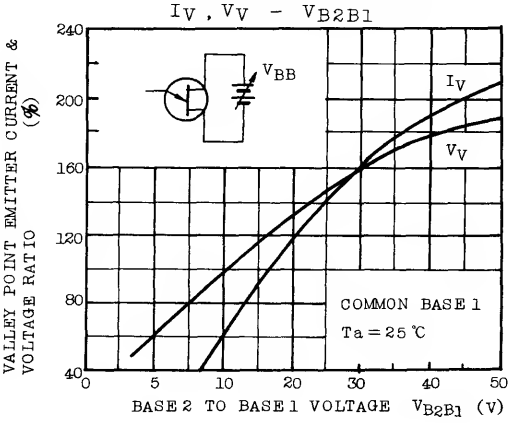
V_{OB_1} – Ta

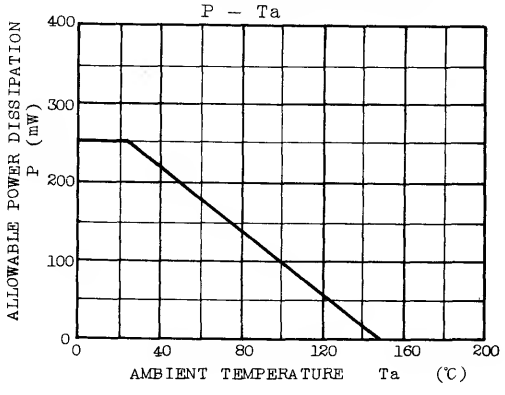



I_{EB20} - Ta
EMITTER - BASE2 REVERSE CURRENT I_{EB20} (A)
-10^{-6}
-10^{-7}
-10^{-8}
-10^{-9}
-10^{-10}
$V_{EB2} = -30$ V
-10
$I_{B1} = 0$
0 20 40 60 80 100 120 140
AMBIENT TEMPERATURE Ta (℃)


V_V - R1, R2
VALLEY POINT EMITTER VOLTAGE RATIO (%)
$V_1 = 20$ V
Ta = 25 ℃
R_2
R_1
20 V
R2=0
R1=0
700 600 500 400 300 200 100 0
5 10 30 50 100 300 500 1k 3k
RESISTANCE (Ω)
R1 : BASE 1 RESISTANCE
R2 : BASE 2 RESISTANCE


I_V - R1, R2
VALLEY POINT EMITTER CURRENT RATIO I_V (%)
$V_1 = 20$ V
Ta = 25℃
R_2
R_1
20V
R1=0
R2=0
140 120 100 80 60 40 20 0
5 10 30 50 100 300 500 1000 3000
RESISTANCE (Ω)
R1 : BASE 1 RESISTANCE
R2 : BASE 2 RESISTANCE


I_V, V_V - V_{B2B1}
VALLEY POINT EMITTER CURRENT & VOLTAGE RATIO (%)
V_{BB}
I_V
V_V
COMMON BASE 1
Ta = 25 ℃
240 200 160 120 80 40
0 5 10 20 30 40 50
BASE 2 TO BASE 1 VOLTAGE V_{B2B1} (V)


P - Ta
ALLOWABLE POWER DISSIPATION P (mW)
400 300 200 100 0
0 40 80 120 160 200
AMBIENT TEMPERATURE Ta (℃)