NEC
ELECTRON DEVICE

TRIGGER DEVICE (EUJT)
2SH25

The 2SH25 is a mold type (TO-92) monolithic IC Unijunction Transistor with an equivalent function to a traditional UJT, showing outstanding temperature characteristics and long term stability as compared with traditional one.

Simple oscillation circuit with 2SH25 can be designed, which are suitable for use in phase controllers, inverters and timers.

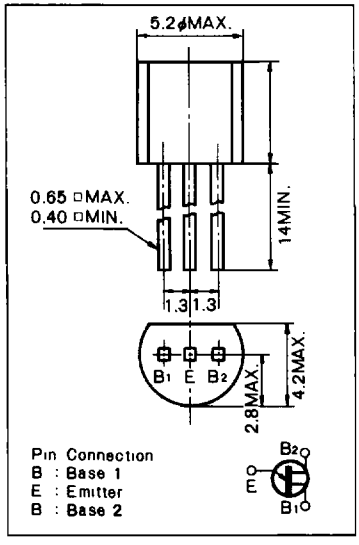
FEATURES

- Planer passivated structure
- Superior reliability and temperature stability
- Fast, high energy trigger pulse
- High interbase resistance (twice as high as traditional one)
- Constant valley point current against load resistance and bias voltage
- Small deviation of η (±5%)
- Tight instrinstic standoff ratio distribution

APPLICATIONS

- Trigger for SCR phase control circuit
- Timers
- Oscillators
- Sweep circuits
- Stable voltage
- Frequency divider

Outline Drawing (Unit : mm)



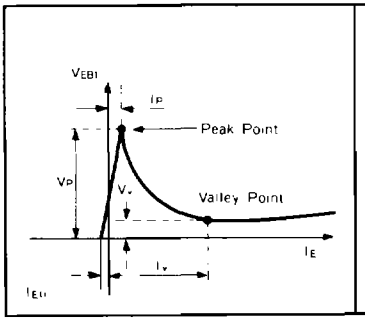
MAXIMUM RATINGS

Items	Symbol * **	Specifications	Units	Notes
Power Dissipation	P	300	mW	Ta=25°C
Emitter Reverse Voltage	V_{B2E}	30	V	
Interbase Voltage	V_{BB}	30	V	
Peak Emitter Current	I_{EM}	1	A	Pulse width 20μs
DC Emitter Current	I_E	75	mA	
Junction Temperature	T_j	125	°C	
Storage Temperature	T_{stg}	−40~150	°C	

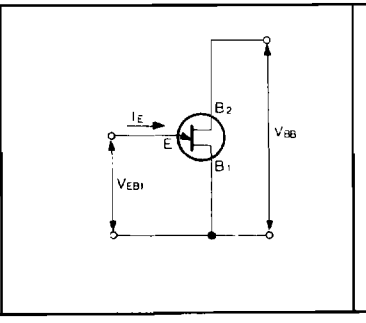
ELECTRICAL CHARACTERISTICS

Items	Symbol * **	Test Conditions	Specifications			Units
			MIN.	TYP.	MAX	
Interbase Resistance	R_{BB}	V_{BB}=30V, I_E=0	8	15.5	20	kΩ
Emitter Reverse Current	I_{EO}	V_{BB}=30V, V_{B1}=0	–	0.01	0.2	μA
Emitter Saturation Voltage	V_{EB1}(sat)	V_{BB}=20V, I_E=50mA	–	3.3	4.0	V
Instrinsic Stand-off Ratio	η	V_{BB}=20V	0.58	0.61	0.64	–
Peak Point Emitter Current	Ip	V_{BB}=20V	–	1	2.0	μA
Valley Point Current	I_V	V_{BB}=20V	7	18	25	mA
Valley Point Voltage	V_V	V_{BB}=20V	–	2.5	3.0	V
Base-one Peak Pulse Voltage	V_{OB1}	R_{B1}=20Ω, C_T=0.2μF ***	4	5.5	–	V

*Static Emitter Characteristic



**Symbol



***Basic Oscillation Circuit

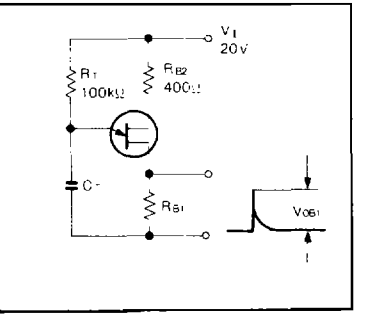


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Fig. 1 $I_V - R_{B1}$ Characteristic

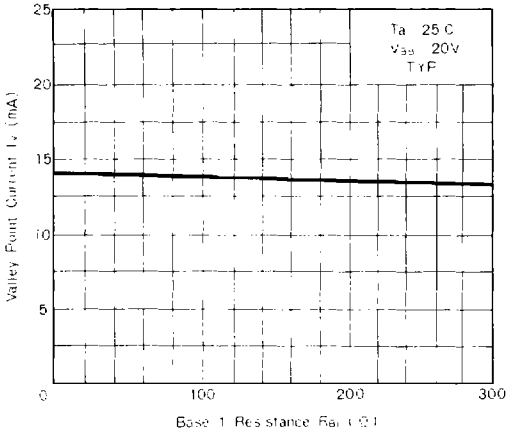


Fig. 2 $I_V - V_{BB}$ Characteristic

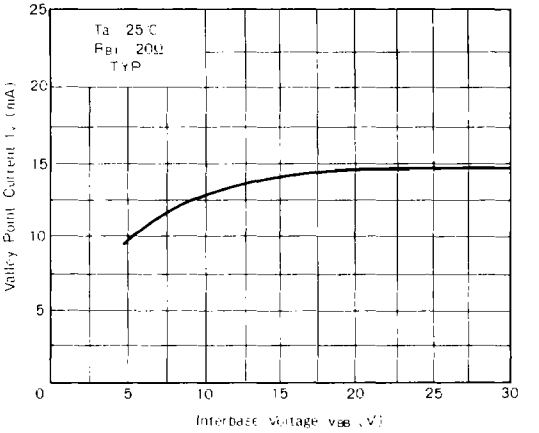


Fig. 3 $I_V - Ta$ Characteristic

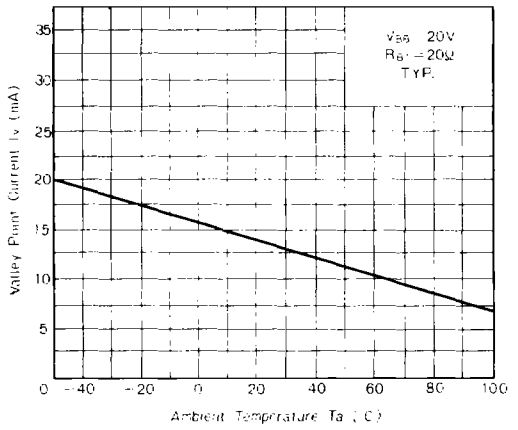


Fig. 4 $V_{OB1} - R_{B1}$ Characteristic

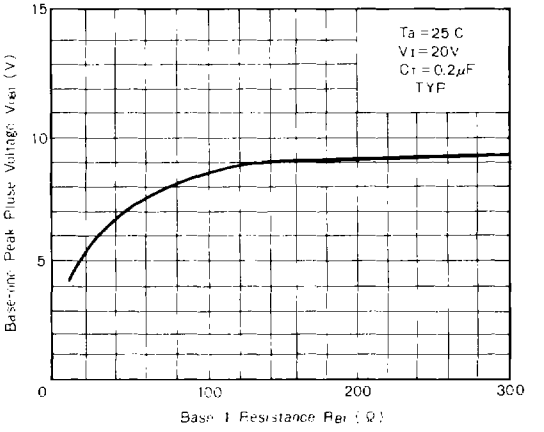


Fig. 5 $V_{OB1} - C_T$ Characteristic

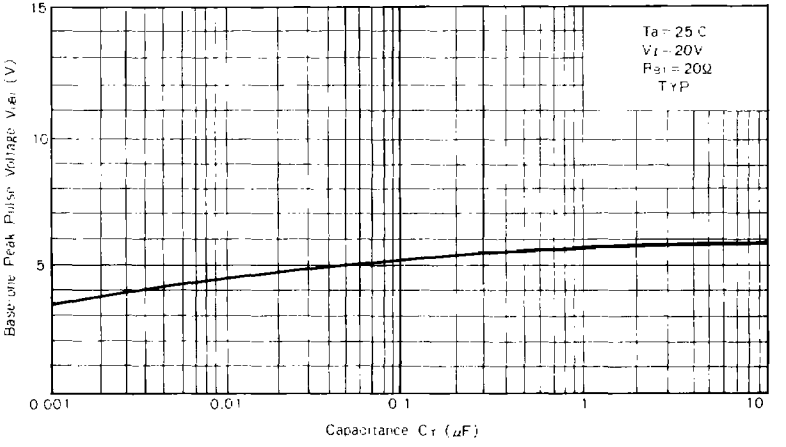


Fig. 6 $I_P - V_{BB}$ Characteristic

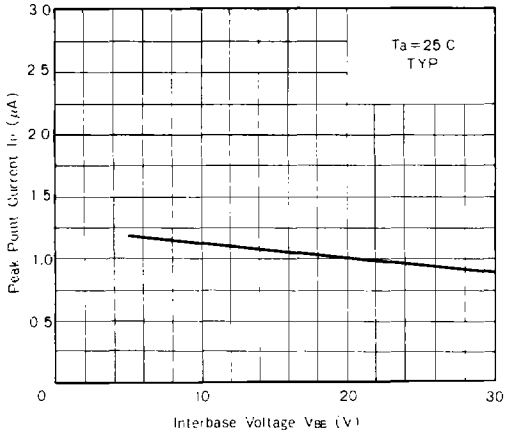
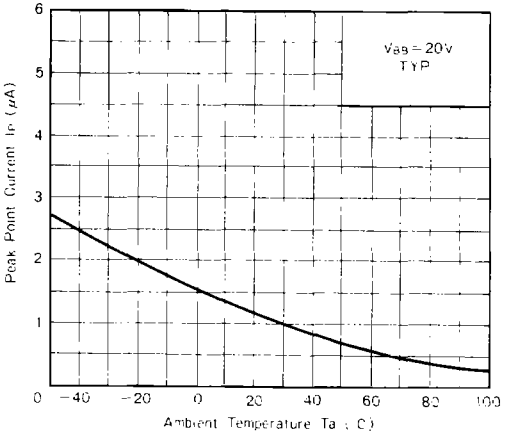


Fig. 7 $I_P - Ta$ Characteristic



MATTERS TO BE ATTENDED ON USE

(1) Modulation base current

Modulation base current of 2SH25 is about 3mA, while that of a traditional UJT is about 15mA. Therefore in the circuit as shown in Fig. 8-a, which catches signals from B_2 unsufficient output pulse can be gained. In this case it is recommendable to use the circuits shown in Fig. 8-b and Fig. 8-c.

(2) R_{B1} and R_{BB}

In the circuits of larger R_{B1} (more than 200Ω) or of using pulse transformer with turn ratio of more than 2 to 1, the discharge current from C_T might not be reached to I_V (see Fig. 9). Or in case bias voltage V_1 is 5 to 6 volts, careful consideration should be required for replacing traditional UJT to 2SH25. It is possible to amplify output pulse in the circuit shown in Fig. 11 as well as one in Fig. 10.

(3) Series resistance

Small emitter saturation voltage and internal resistance of 2SH25 require to insert a series resistance of more than 5Ω in the discharge circuit loop of oscillation capacitor as shown in Fig. 12 to suppress peak current.

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Fig. 8-a Circuit obtained Signal from B2 Terminal (unrecommendable)

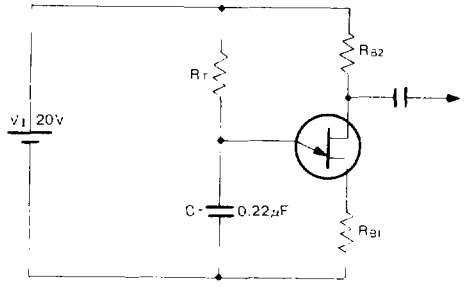


Fig. 8-b An Example 1 of improved circuit of Fig. 8-a

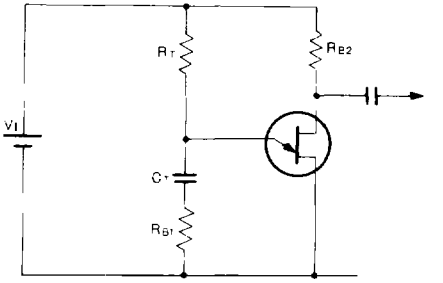


Fig. 8-c An Example 2 of improved circuit of Fig. 8-a

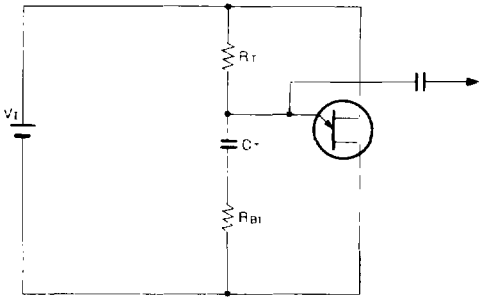


Fig. 9 An Example of improved circuit with Pulse Transformer

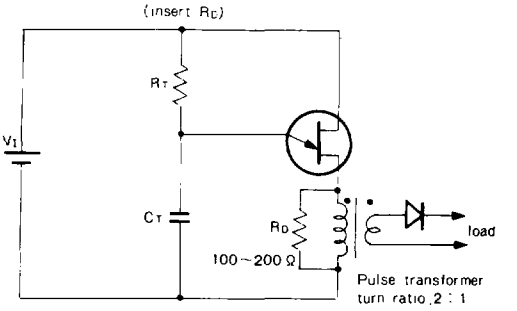
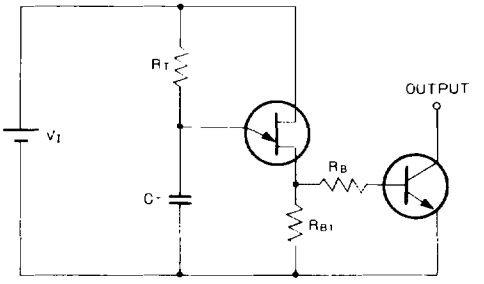
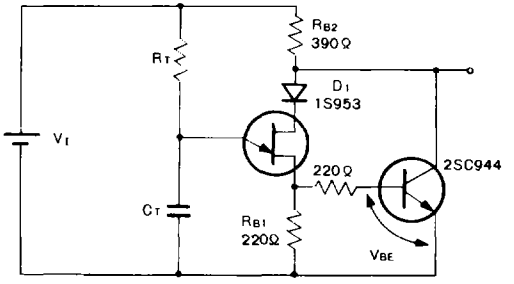


Fig. 10 Pulse amplifier circuit



$$\frac{V_{OB1}}{R_{B1}+R_B} < I_V < \frac{V_I - V_v}{R_T} \qquad \because \frac{R_{B1}}{R_{B1}+R_{BB}} V_I < V_{BE}$$

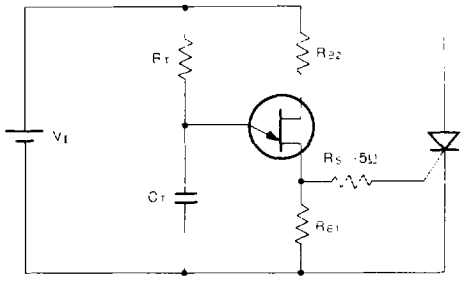
Fig. 11 Pulse amplifier circuit



$$I_V \fallingdotseq \frac{V_{BE}}{R_{B1}}$$

$$\because \frac{R_{B1}}{R_T /\!/ R_{BB}} V_I < V_{BE}$$

Fig. 12 Insertion of series resistance



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