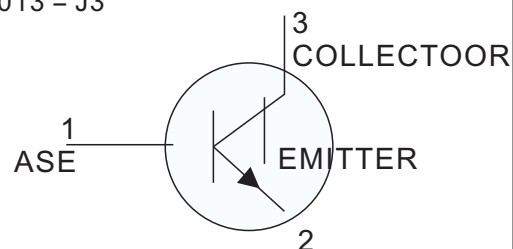




NPN Silicon

EVICE MARKING

9013 = J3



FEATURES

- High Collector Current.
- Complementary to S9013
- Excellent hFE Linearity.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	25	Vdc
Collector–Base Voltage	V_{CBO}	40	Vdc
Emitter–Base Voltage	V_{EBO}	5.0	Vdc
Collector Current — Continuous	I_C	500	mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR– 5 Board, (1) $T_A = 25^\circ\text{C}$	P_D	300	mW
Junction and Storage Temperature	T_J, T_{stg}	– 55 to +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted.)
OFF CHARACTERISTICS

Characteristic	Symbol	Min	Max	Unit
Collector–Emitter Breakdown Voltage(3) ($I_C = 1.0\text{ mAdc}$, $I_E = 0$)	$V_{(BR)CEO}$	25	–	Vdc
Collector–Base Breakdown Voltage ($I_C = 100\text{ }\mu\text{Adc}$, $I_E = 0$)	$V_{(BR)CBO}$	40	–	Vdc
Emitter–Base Breakdown Voltage ($I_E = 100\text{ }\mu\text{Adc}$, $I_C = 0$)	$V_{(BR)EBO}$	5.0	–	Vdc
Collector cut-off current ($V_{CB} = 40\text{ Vdc}$, $I_E = 0$)	I_{CBO}	–	0.1	μAdc
Collector cut-off current ($V_{CE} = 20\text{ Vdc}$, $I_B = 0$)	I_{CEO}	–	0.1	μAdc
Emitter cut-off current ($V_{EB} = 5\text{ Vdc}$, $I_C = 0$)	I_{EBO}	–	0.1	μAdc

1. FR–5 = $1.0 \times 0.75 \times 0.062\text{ in.}$ 2. Alumina = $0.4 \times 0.3 \times 0.024\text{ in.}$ 99.5% alumina. %.3. Pulse Test: Pulse Width $< 300\text{ }\mu\text{s}$, Duty Cycle < 2.0

**ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)
ON CHARACTERISTICS (3)**

Characteristic	Symbol	Min	Max	Unit
DC Current Gain	h _{FE}			—
(I _C = 50 mA _{dc} , V _{CE} = 1 V _{dc})		120	400	
(I _C = 500 mA _{dc} , V _{CE} = 1 V _{dc})		40	—	
Collector–Emitter Saturation Voltage	V _{CE(sat)}			V _{dc}
(I _C = 500 mA _{dc} , I _B = 50 mA _{dc})(3)		—	0.6	
Base–Emitter Saturation Voltage(3)	V _{BE(sat)}			V _{dc}
(I _C = 500 mA _{dc} , I _B = 50 mA _{dc})		—	1.2	
Base-emitter voltage (V _{CB} = 1V, I _C = 10mA)	V _{BE}	—	0.7	

SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product (I _C = 20mA _{dc} , V _{CE} = 6.0V _{dc} , f = 30MHz)	f _T	150	–	MHz
Collector output capacitance (V _{CB} = 6.0V _{dc} , I _E = 0, f = 1.0 MHz)	C _{ob}	–	8.0	pF

CLASSIFICATION OF h_{FE}

Rank	L	H	J
Range	120-200	200-350	300-400

3. Pulse Test: Pulse Width <300 μs, Duty Cycle <2.0%.

TYPICAL CHARACTERISTICS

Fig.1 Power Derating Curve

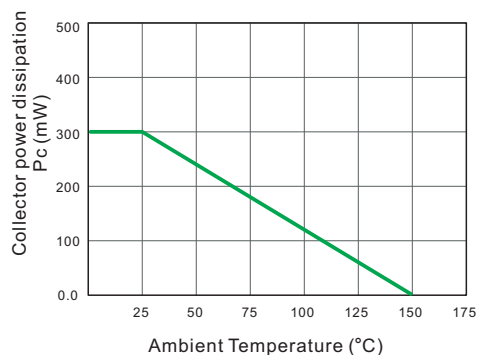
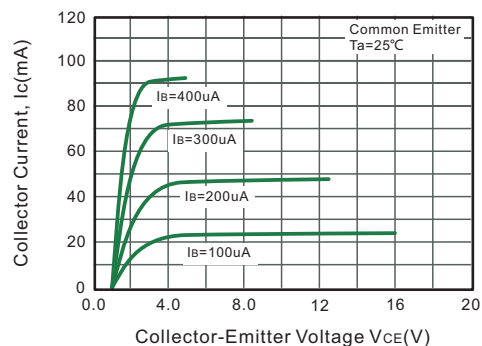
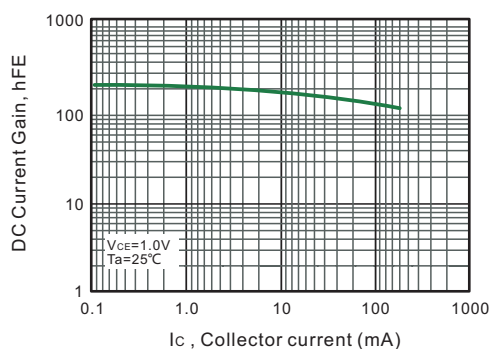
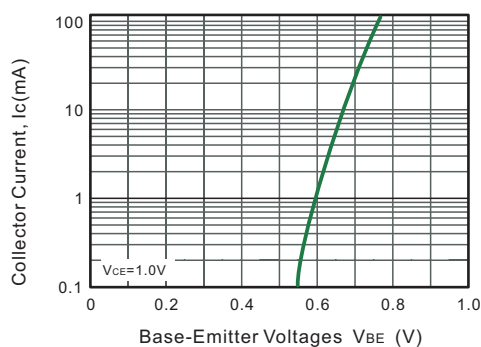
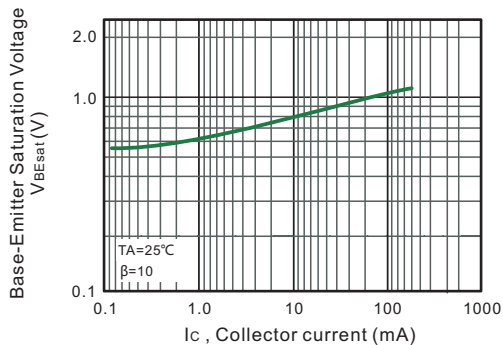
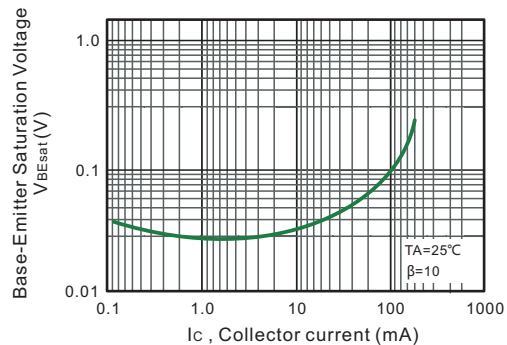
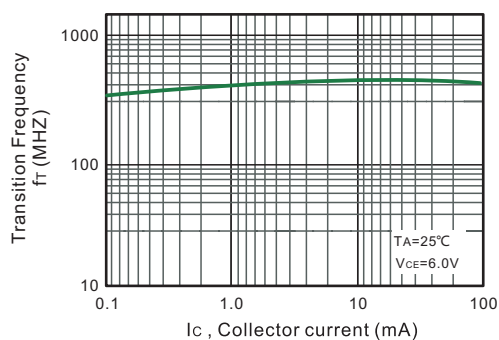


Fig.2 Static characteristics

Fig.3 h_{FE} -- I_C Fig.4 I_C -- V_{BE} Fig.5 V_{BEsat} -- I_C Fig.6 V_{CEsat} -- I_C Fig.7 f_t -- I_C Fig.8 C_{ob}/C_{ib} -- V_{CB}/V_{EB} 