UP0KG8D

Silicon epitaxial planar type (SBD)
Silicon PNP epitaxial planar type (Tr)

For digital circuits

■ Features

- Two elements incorporated into one package (SBD + Tr)
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts

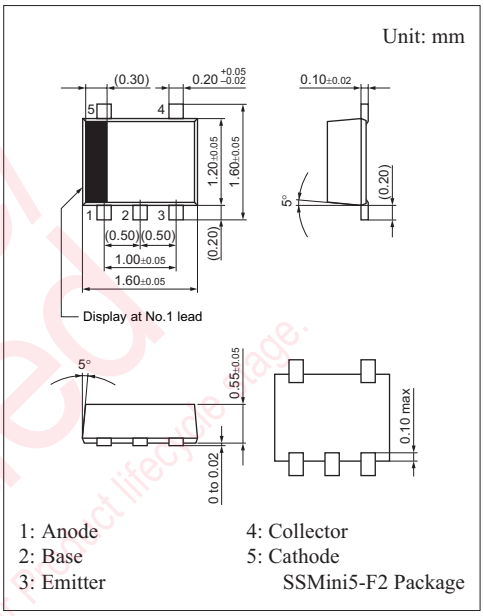
■ Basic Part Number

- MA2SD24 + UNR31A3

■ Absolute Maximum Ratings $T_a = 25°C$

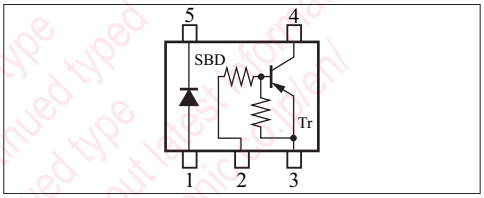
Parameter		Symbol	Rating	Unit
SBD	Reverse voltage	V_R	20	V
	Repetitive peak reverse voltage	V_{RRM}	20	V
	Forward current (Average)	$I_{F(AV)}$	200	mA
	Peak forward current	I_{FM}	300	mA
	Non-repetitive peak forward surge current	I_{FSM}	1	A
Tr	Collector-base voltage (Emitter open)	V_{CBO}	−50	V
	Collector-emitter voltage (Base open)	V_{CEO}	−50	V
	Collector current	I_C	−80	mA
Overall	Total power dissipation	P_T	125	mW
	Junction temperature	T_j	125	°C
	Storage temperature	T_{stg}	−55 to +125	°C

Note) *: 50 Hz sine wave 1 cycle (Non-repetitive peak current)



Marking Symbol: 6K

Internal Connection

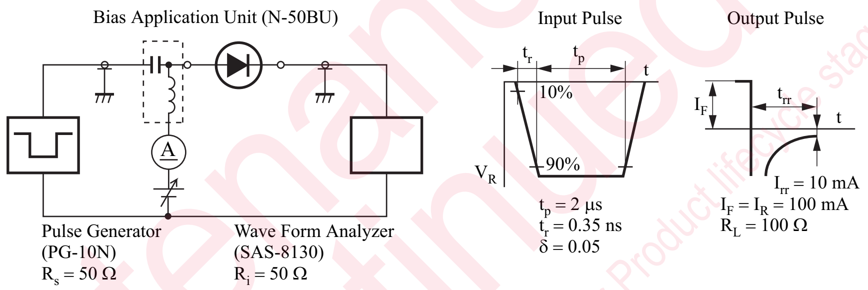


■ Electrical Characteristics $T_a = 25°C \pm 3°C$

• SBD

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Forward voltage	V_F	$I_F = 200$ mA		0.50	0.58	V
Reverse current	I_R	$V_R = 10$ V		0.1	1	μA
Terminal capacitance	C_t	$V_R = 0$ V, f = 1 MHz		25		pF
Reverse recovery time *	t_{rr}	$I_F = I_R = 100$ mA, $I_{rr} = 10$ mA, $R_L = 100\ \Omega$		3		ns

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7031 measuring methods for diodes.
2. Absolute frequency of input and output is 250 MHz
2. This product is sensitive to electric shock (static electricity, etc.). Due attention must be paid on the charge of a human body and the leakage of current from the operating equipment.
3. *: t_{rr} measurement circuit

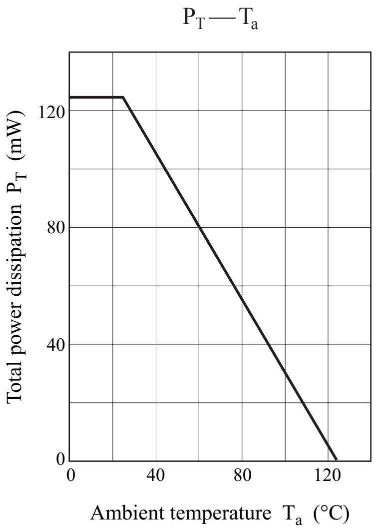


• Tr2

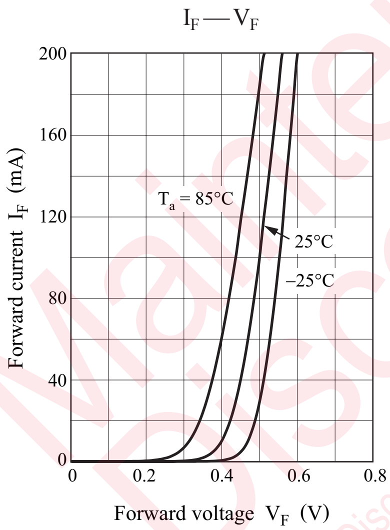
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_C = -10$ μA, $I_E = 0$	–50			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_C = -2$ mA, $I_B = 0$	–50			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{CB} = -50$ V, $I_E = 0$			– 0.1	μA
Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{CE} = -50$ V, $I_B = 0$			– 0.5	μA
Emitter-base cutoff current (Collector open)	I_{EBO}	$V_{EB} = -6$ V, $I_C = 0$			– 0.1	mA
Forward current transfer ratio	h_{FE}	$V_{CE} = -10$ V, $I_C = -5$ mA	80			—
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -10$ mA, $I_B = -0.3$ mA			– 0.25	V
Output voltage high-level	V_{OH}	$V_{CC} = -5$ V, $V_B = -0.5$ V, $R_L = 1$ kΩ	–4.9			V
Output voltage low-level	V_{OL}	$V_{CC} = -5$ V, $V_B = -3.5$ V, $R_L = 1$ kΩ			– 0.2	V
Input resistance	R_1		–30%	47	+30%	kΩ
Resistance ratio	R_1 / R_2		0.8	1.0	1.2	—
Transition frequency	f_T	$V_{CB} = -10$ V, $I_E = 2$ mA, f = 200 MHz		80		MHz

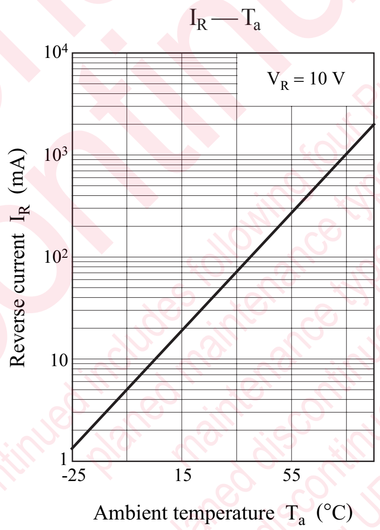
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

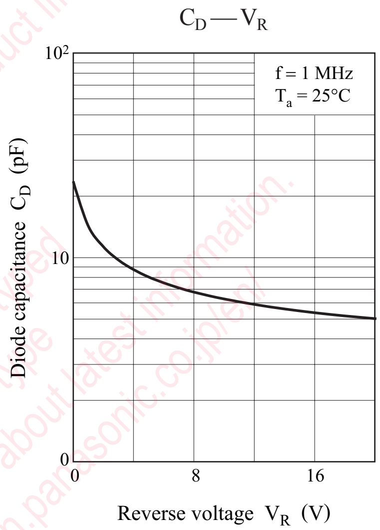
Common characteristics chart



Characteristics charts of SBD

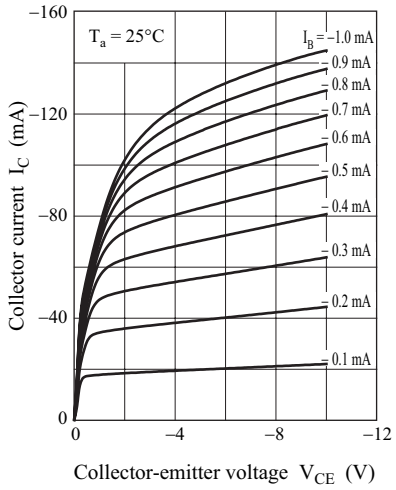




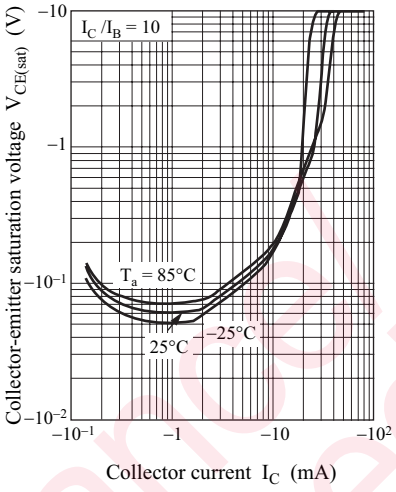


Characteristics charts of Tr

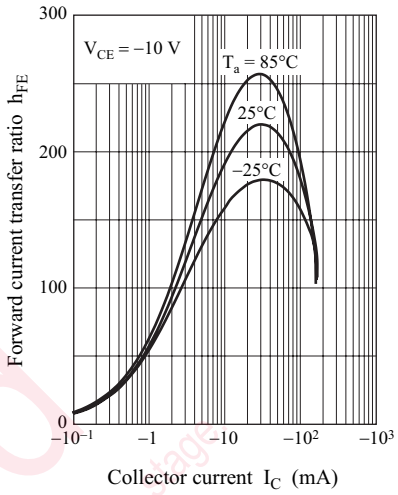
I_C — V_{CE}



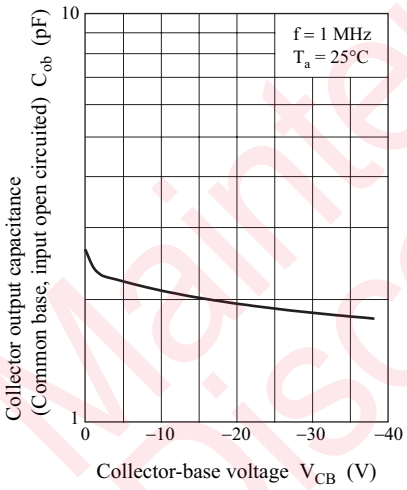
$V_{CE(sat)}$ — I_C



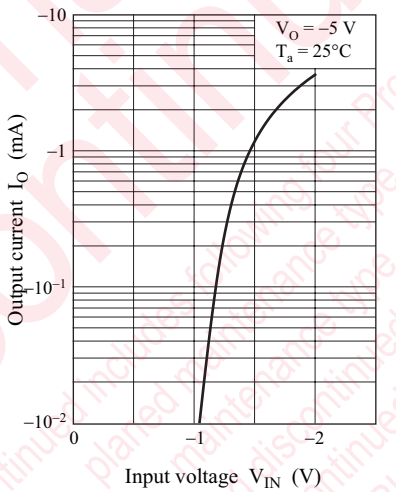
h_{FE} — I_C



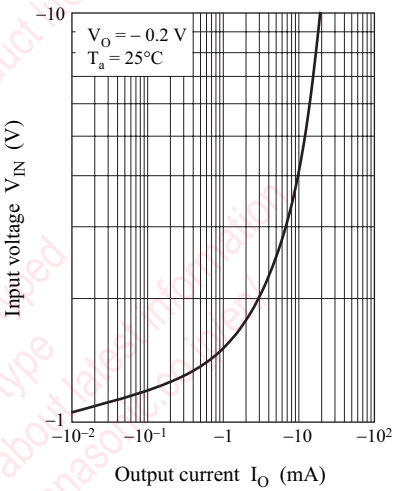
C_{ob} — V_{CB}



I_O — V_{IN}



V_{IN} — I_O



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