UNA0228 (UN228)

Silicon PNP epitaxial planar type (2 elements)
Silicon NPN epitaxial planar type (2 elements)

For motor drives

■ Features

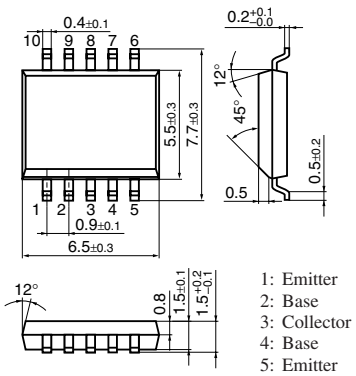
- Small and lightweight
- Low power consumption
- Low voltage drive
- With 4 elements incorporated

■ Absolute Maximum Ratings $T_a = 25°C$

Parameter		Symbol	Rating	Unit
PNP	Collector-base voltage (Emitter open)	V_{CBO}	−12	V
	Collector-emitter voltage (Base open)	V_{CEO}	−10	V
	Emitter-base voltage (Collector open)	V_{EBO}	−7	V
	Collector current	I_C	−1	A
	Peak collector current	I_{CP}	−2.5	A
NPN	Collector-base voltage (Emitter open)	V_{CBO}	12	V
	Collector-emitter voltage (Base open)	V_{CEO}	10	V
	Emitter-base voltage (Collector open)	V_{EBO}	7	V
	Collector current	I_C	1	A
	Peak collector current	I_{CP}	2.5	A
Overall	Total power dissipation *	P_T	0.5	W
	Junction temperature	T_j	150	°C
	Storage temperature	T_{stg}	−55 to +150	°C

Note) ∗: When the dissipation on one device is $T_C = 25°C$

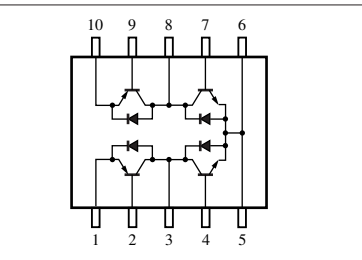
Unit: mm



1: Emitter
2: Base
3: Collector
4: Base
5: Emitter
6: Emitter
7: Base
8: Collector
9: Base
10: Emitter
SO10-G1 Package

Marking Symbol: UN228

Internal Connection



Note) The part number in the parenthesis shows conventional part number.

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

• PNP

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_C = -10$ µA, $I_E = 0$	−12			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_C = -1$ mA, $I_B = 0$	−10			V
Emitter-base voltage (Collector open)	V_{EBO}	$I_E = -10$ µA, $I_C = 0$	−7			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{CB} = -10$ V, $I_E = 0$			−1	µA
Forward current transfer ratio *1	h_{FE}	$V_{CE} = -1$ V, $I_C = -0.5$ A	200		800	—
Collector-emitter saturation voltage *1	$V_{CE(sat)}$	$I_C = -1$ A, $I_B = -30$ mA		− 0.2	− 0.3	V
Transition frequency	f_T	$V_{CB} = -6$ V, $I_E = 50$ mA, f = 200 MHz		150		MHz
Collector output capacitance (Common base, input open circuited)	C_{ob}	$V_{CB} = -10$ V, $I_E = 0$, f = 1 MHz		65		pF
Forward voltage *2	V_F	$I_F = -1$ A			−1.5	V

• NPN

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_C = 10$ µA, $I_E = 0$	12			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_C = 1$ mA, $I_B = 0$	10			V
Emitter-base voltage (Collector open)	V_{EBO}	$I_E = 10$ µA, $I_C = 0$	7			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{CB} = 10$ V, $I_E = 0$			1	µA
Forward current transfer ratio *1	h_{FE}	$V_{CE} = 1$ V, $I_C = 0.5$ A	200		800	—
Collector-emitter saturation voltage *1	$V_{CE(sat)}$	$I_C = 1$ A, $I_B = 30$ mA		0.2	0.3	V
Transition frequency	f_T	$V_{CB} = 6$ V, $I_E = -50$ mA, f = 200 MHz		150		MHz
Collector output capacitance (Common base, input open circuited)	C_{ob}	$V_{CB} = 10$ V, $I_E = 0$, f = 1 MHz		50		pF
Forward voltage *2	V_F	$I_F = 1$ A			1.5	V

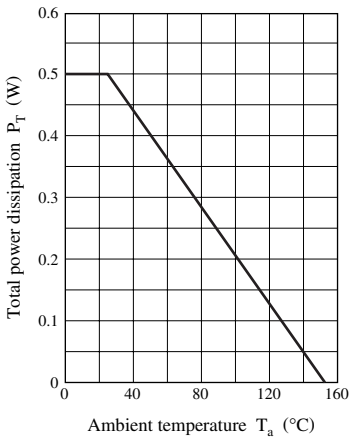
Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

2. ∗1: Pulse measurement

∗2: Application to the built-in diode

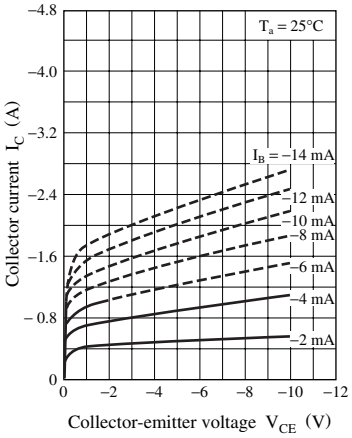
Common characteristics chart

P_T — T_a

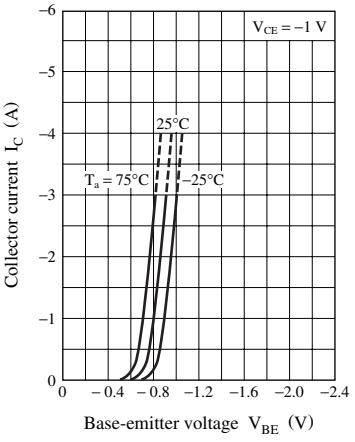


Characteristics charts of PNP transistor block

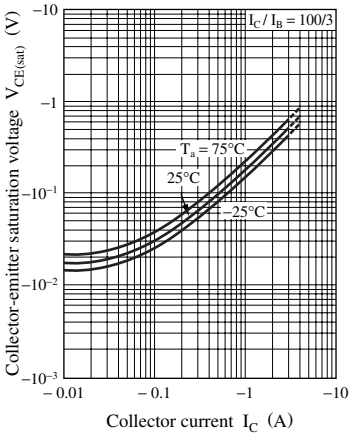
I_C — V_{CE}



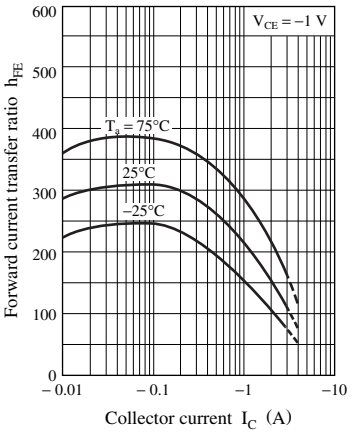
I_C — V_{BE}



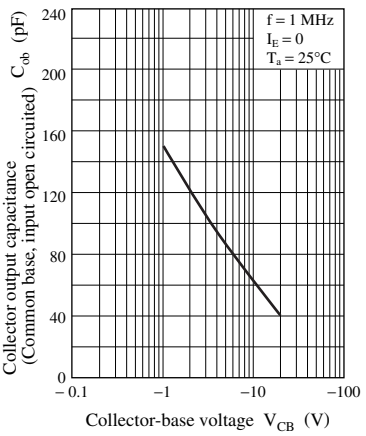
$V_{CE(sat)}$ — I_C



h_{FE} — I_C

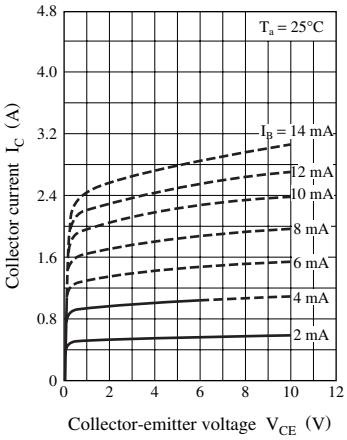


C_{ob} — V_{CB}

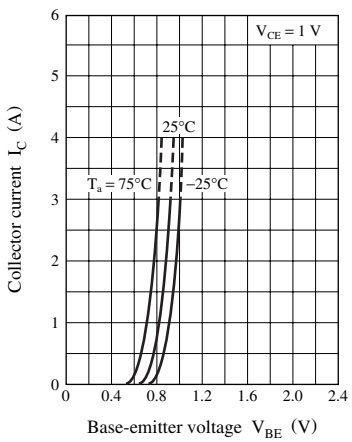


Characteristics charts of NPN transistor block

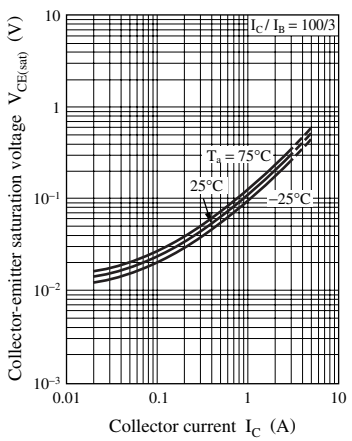
I_C — V_{CE}



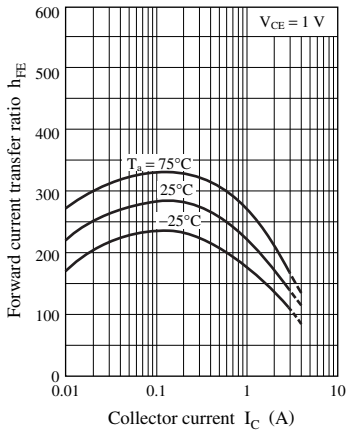
I_C — V_{BE}



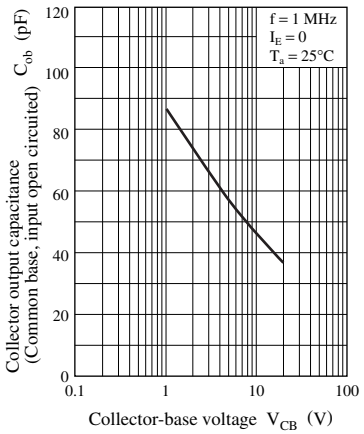
$V_{CE(sat)}$ — I_C



h_{FE} — I_C



C_{ob} — V_{CB}



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