

NPN 500 mA, 50 V resistor-equipped transistor

General description

500 mA NPN Resistor-Equipped Transistors (RET) family.

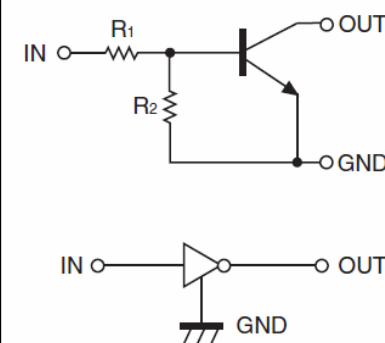
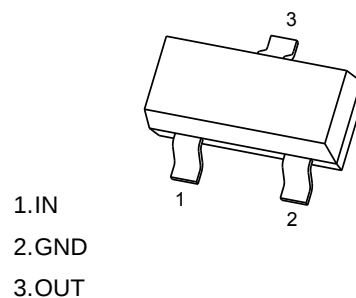
Features

- Built-in bias resistors
- Simplifies circuit design
- 500 mA output current capability
- Reduces component count
- Reduces pick and place costs
- $\pm 10\%$ resistor ratio tolerance

Applications

- Digital application in automotive and industrial segments
- Controlling IC inputs
- Switching loads

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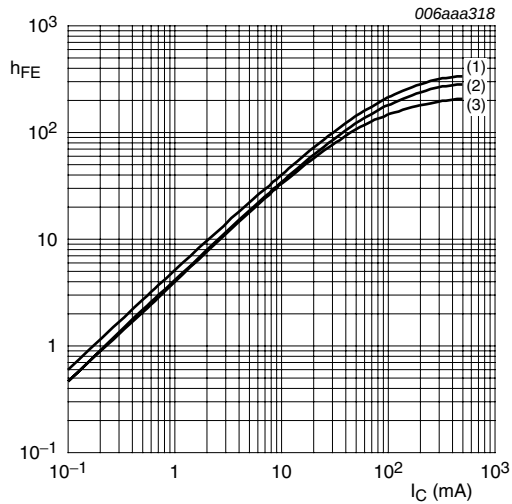
THERMAL CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Max	Unit
Per transistor					
V_{CBO}	collector-base voltage	open emitter	-	50	V
V_{CEO}	collector-emitter voltage	open base	-	50	V
V_{EBO}	emitter-base voltage	open collector	-	7	V
V_I	input voltage				
	positive		-	+12	V
	negative		-	-7	V
I_O	output current		-	500	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	-	250	mW
T_j	junction temperature		-	150	$^{\circ}\text{C}$
T_{amb}	ambient temperature		-65	+150	$^{\circ}\text{C}$
T_{stg}	storage temperature		-65	+150	$^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted, common for Q_1 and Q_2 .) (Continued)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
I_{CBO}	collector-base cut-off current	$V_{CB} = 50\text{ V}; I_E = 0\text{ A}$	-	-	100	nA
I_{CEO}	collector-emitter cut-off current	$V_{CE} = 50\text{ V}; I_B = 0\text{ A}$	-	-	0.5	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}$	-	-	3.8	mA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}; I_C = 50\text{ mA}$	40	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 50\text{ mA}; I_B = 2.5\text{ mA}$	-	-	0.3	V
$V_{I(off)}$	off-state input voltage	$V_{CE} = 5\text{ V}; I_C = 100\text{ }\mu\text{A}$	0.5	-	-	V
$V_{I(on)}$	on-state input voltage	$V_{CE} = 0.3\text{ V}; I_C = 20\text{ mA}$	-	-	3.0	V
R1	bias resistor 1 (input)		1.54	2.2	2.86	k Ω
R2/R1	bias resistor ratio		0.8	1.0	1.2	
C_c	collector capacitance	$V_{CB} = 10\text{ V}; I_E = i_e = 0\text{ A};$ $f = 1\text{ MHz}$	-	7	-	pF

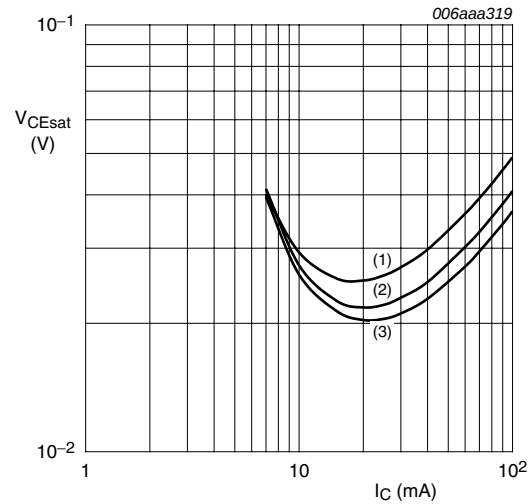
Typical Characteristi



$V_{CE} = 5 \text{ V}$

- (1) $T_{amb} = 100 \text{ }^{\circ}\text{C}$
- (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$
- (3) $T_{amb} = -40 \text{ }^{\circ}\text{C}$

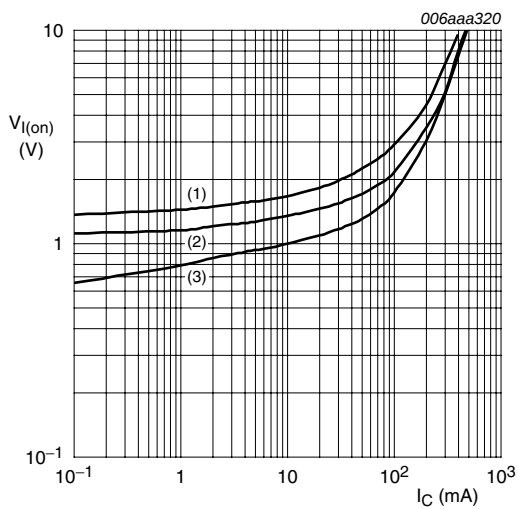
Fig 1. DC current gain as a function of collector current; typical values



$I_C/I_B = 20$

- (1) $T_{amb} = 100 \text{ }^{\circ}\text{C}$
- (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$
- (3) $T_{amb} = -40 \text{ }^{\circ}\text{C}$

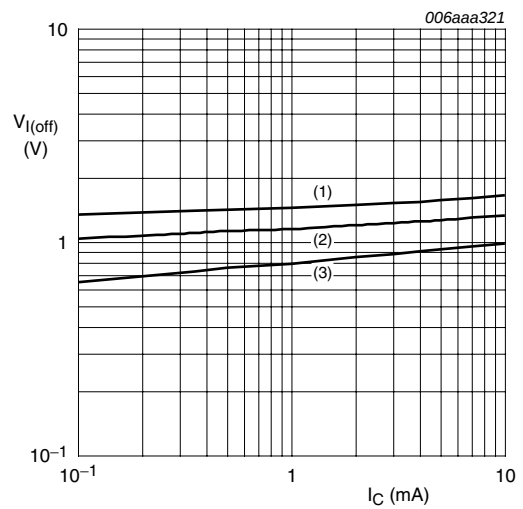
Fig 2. Collector-emitter saturation voltage as a function of collector current; typical values



$V_{CE} = 0.3 \text{ V}$

- (1) $T_{amb} = -40 \text{ }^{\circ}\text{C}$
- (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$
- (3) $T_{amb} = 100 \text{ }^{\circ}\text{C}$

Fig 3. On-state input voltage as a function of collector current; typical values



$V_{CE} = 5 \text{ V}$

- (1) $T_{amb} = -40 \text{ }^{\circ}\text{C}$
- (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$
- (3) $T_{amb} = 100 \text{ }^{\circ}\text{C}$

Fig 4. Off-state input voltage as a function of collector current; typical values