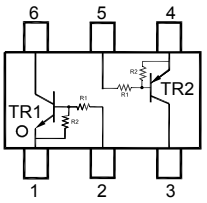
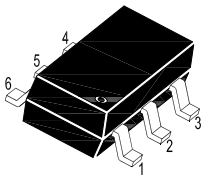
NPN/PNP Silicon Epitaxial Planar Digital Transistor

for switching and interface circuit and drivecircuit applications





1. Emitter 2. Base 3. Collector
4. Emitter 5. Base 6. Collector

Simplified outline(SOT-363)

Features

- Transistors with different polarity and built-in bias resistors R1(47 KΩ) and R2(47 KΩ)
- Simplification of circuit design
- Reduces number of components and board space

Absolute Maximum Ratings (T_a = 25℃)

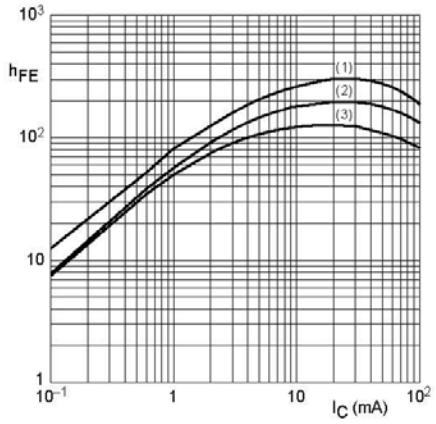
Parameter	Symbol	Value	Unit
Collector Base Voltage	V_{CBO}	50	V
Collector Emitter Voltage	V_{CEO}	50	V
Emitter Base Voltage	V_{EBO}	10	V
InputVoltage Positive Negative	V_I	+ 40 - 10	V
Collector Current	I_C	100	mA
Peak Collector Current	I_{CM}	100	mA
Total Power Dissipation	P_{tot}	200	mW
Junction Temperature	T_j	150	℃
Operating ambient and Storage Temperature Range	T_{stg}	- 65 to + 150	℃

Characteristics at T_a = 25℃ (TR1:NPN)

Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at V_{CE} = 5 V, I_C = 5 mA	h_{FE}	80	-	-	-
Collector Base Cutoff Current at V_{CB} = 50 V	I_{CBO}	-	-	100	nA
Collector Emitter Cutoff Current at V_{CE} = 30 V	I_{CEO}	-	-	1	μA
Emitter Base Cutoff Current at V_{EB} = 5 V	I_{EBO}	-	-	90	μA
Collector Emitter Saturation Voltage at I_C = 10 mA, I_B = 0.5 mA	$V_{CE(sat)}$	-	-	0.15	V
Input Voltage (OFF) at V_{CE} = 5 V, I_C = 100 μA	$V_{I(OFF)}$	0.8	-	-	V
Input Voltage (ON) at V_{CE} = 0.3 V, I_C = 2 mA	$V_{I(ON)}$	-	-	3	V
Collector Output capacitance at V_{CB} = 10 V, f = 1 MHz	C_{ob}	-	-	2.5	pF
Input Resistance	R_1	33	47	61	KΩ
Resistance Ratio	R_1/R_2	0.8	1	1.2	-

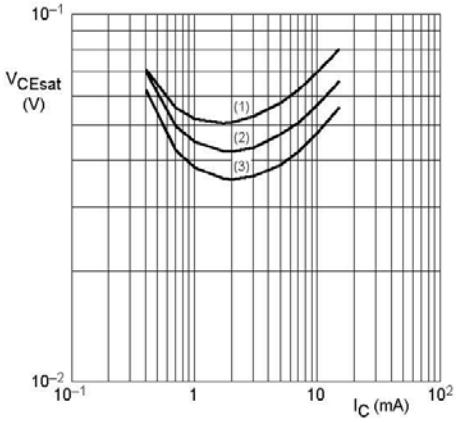
■ **Characteristics at T_a = 25℃ (TR2:PNP)**

Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at $-V_{CE}$ = 5 V, $-I_C$ = 5 mA	h_{FE}	80	-	-	-
Collector Base Cutoff Current at $-V_{CB}$ = 50 V	$-I_{CBO}$	-	-	100	nA
Collector Emitter Cutoff Current at $-V_{CE}$ = 30 V	$-I_{CEO}$	-	-	1	μA
Emitter Base Cutoff Current at $-V_{EB}$ = 5 V	$-I_{EBO}$	-	-	90	μA
Collector Emitter Saturation Voltage at $-I_C$ = 10 mA, $-I_B$ = 0.5 mA	$-V_{CEsat}$	-	-	0.15	V
Input Voltage (OFF) at $-V_{CE}$ = 5 V, $-I_C$ = 100 μA	$-V_{I(OFF)}$	0.8	-	-	V
Input Voltage (ON) at $-V_{CE}$ = 0.3 V, $-I_C$ = 2 mA	$-V_{I(ON)}$	-	-	3	V
Collector Output capacitance at $-V_{CB}$ = 10 V, f = 1 MHz	C_{ob}	-	-	3	pF
Input Resistance	R_1	33	47	61	KΩ
Resistance Ratio	R_1/R_2	0.8	1	1.2	-



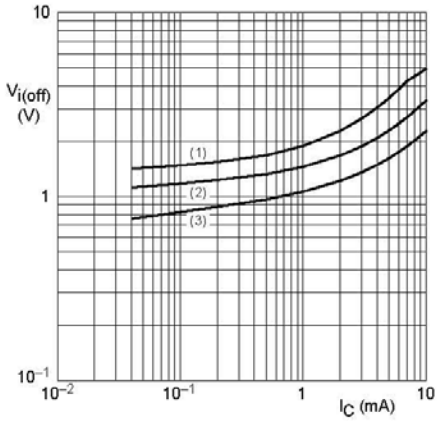
TR1 (NPN); V_{CE} = 5 V.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −40 °C.

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



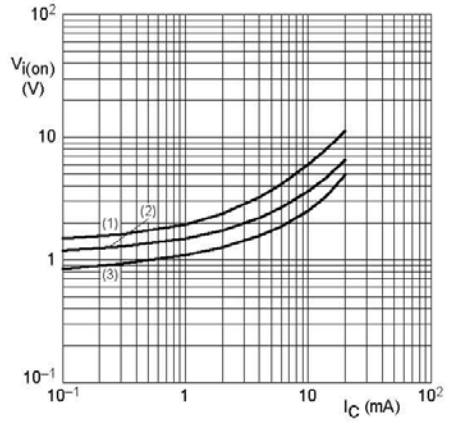
TR1 (NPN); I_C/I_B = 20.
(1) T_{amb} = 100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −40 °C.

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



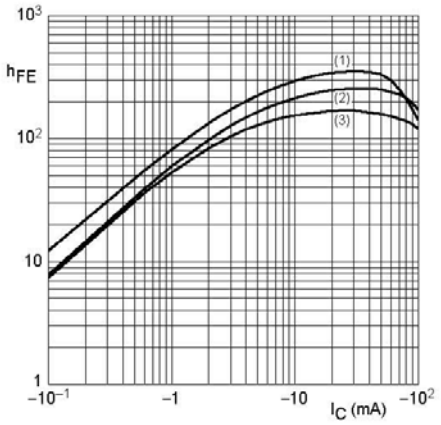
TR1 (NPN); V_{CE} = 5 V.
(1) T_{amb} = −40 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 100 °C.

Fig. 3 Input-off voltage as a function of collector current; typical values.



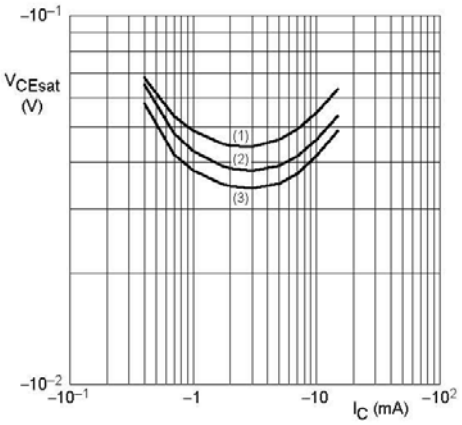
TR1 (NPN); V_{CE} = 0.3 V.
(1) T_{amb} = −40 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 100 °C.

Fig. 4 Input-on voltage as a function of collector current; typical values.



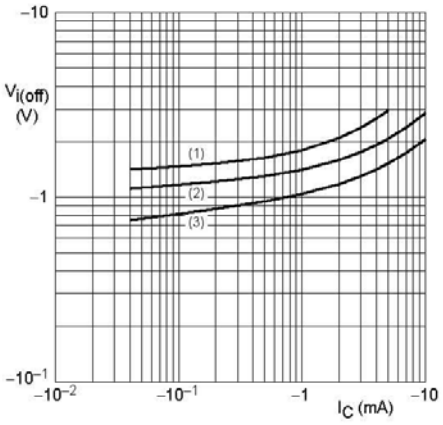
TR2 (PNP); V_{CE} = −5 V.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −40 °C.

Fig. 5 DC current gain as a function of collector current; typical values.



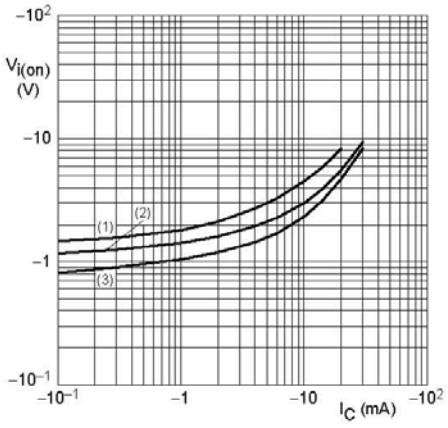
TR2 (PNP); I_C/I_B = 20.
(1) T_{amb} = 100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −40 °C.

Fig. 6 Collector-emitter saturation voltage as a function of collector current; typical values.



TR2 (PNP); V_{CE} = −5 V.
(1) T_{amb} = −40 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 100 °C.

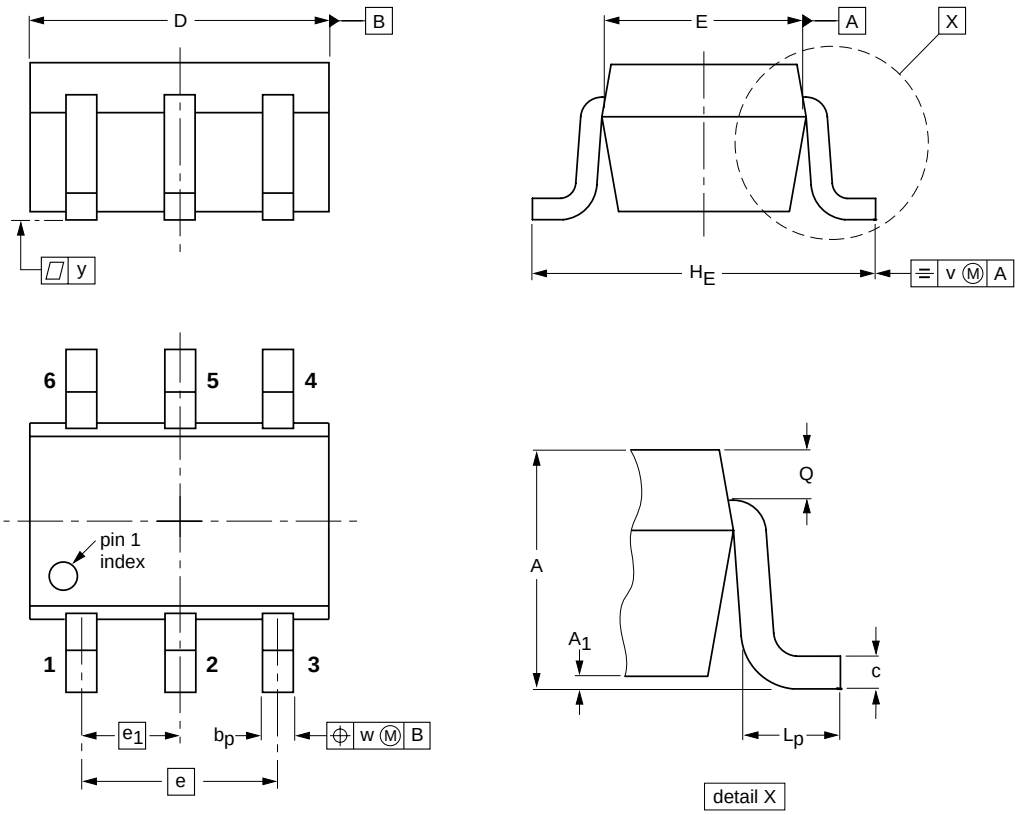
Fig. 7 Input-off voltage as a function of collector current; typical values.



TR2 (PNP); V_{CE} = −0.3 V.
(1) T_{amb} = −40 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 100 °C.

Fig. 8 Input-on voltage as a function of collector current; typical values.

Package Outline SOT-363



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w	y
mm	1.1 0.8	0.1	0.30 0.20	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.25 0.15	0.2	0.2	0.1

Summary of Packing Options

Package	Package Description	Packing Quantity	Industry Standard
SOT-363	Tape/Reel,7"reel	3000	EIA-481-1