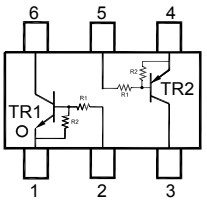
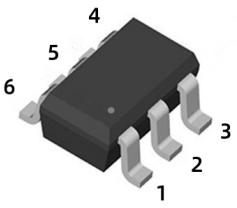
NPN/PNP Silicon Epitaxial Planar Digital Transistor

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 (Ta=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	℃

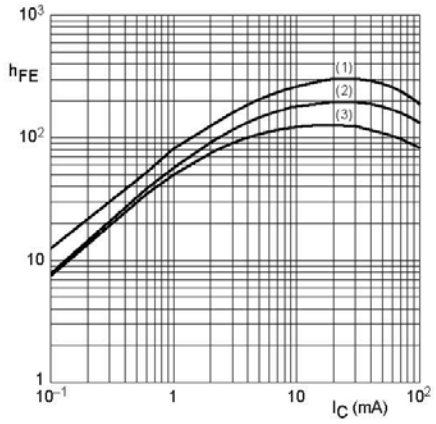
Characteristics at Ta = 25℃ (TR1:NPN)

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 Ta = 25℃ (TR2:PNP)

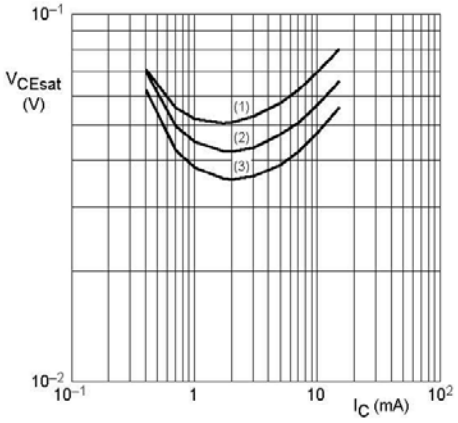
Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at $-V_{CE}$ = 5 V, $-I_C$ = 5 mA	h_{FE}	80	-	-	-
Collector Base Cutoff Current at $-V_{CB}$ = 50 V	$-I_{CBO}$	-	-	100	nA
Collector Emitter Cutoff Current at $-V_{CE}$ = 30 V	$-I_{CEO}$	-	-	1	μA
Emitter Base Cutoff Current at $-V_{EB}$ = 5 V	$-I_{EBO}$	-	-	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	-

Typical Characteristics



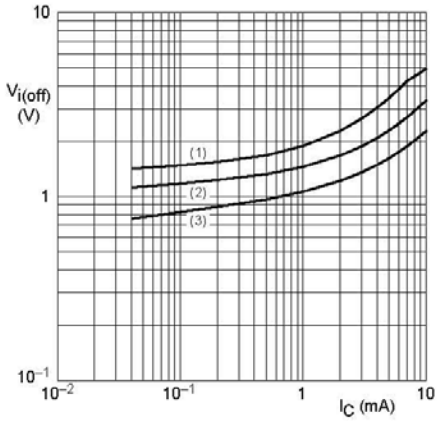
TR1 (NPN); V_{CE} = 5 V.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −40 °C.

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



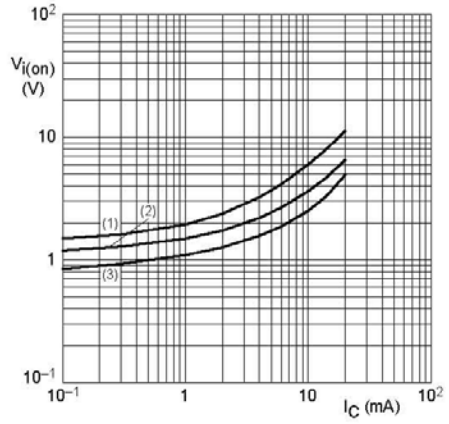
TR1 (NPN); I_C/I_B = 20.
(1) T_{amb} = 100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −40 °C.

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.

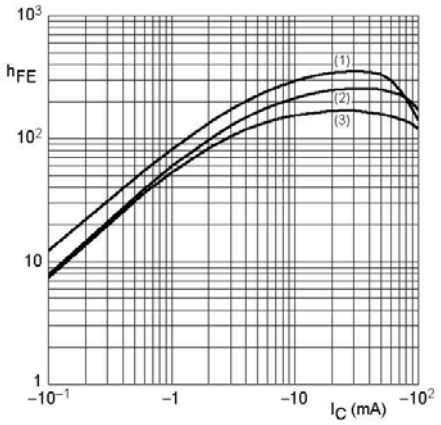
Fig. 3 Input-off voltage as a function of collector current; typical values.



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

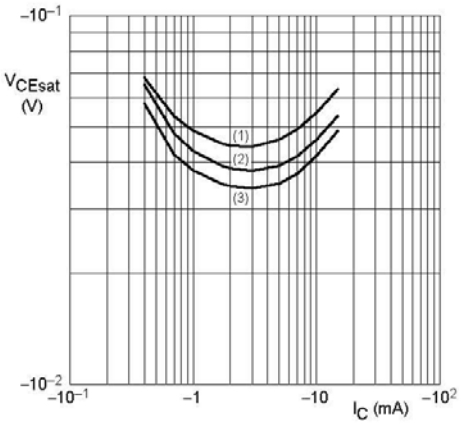
Fig. 4 Input-on voltage as a function of collector current; typical values.

Typical Characteristics



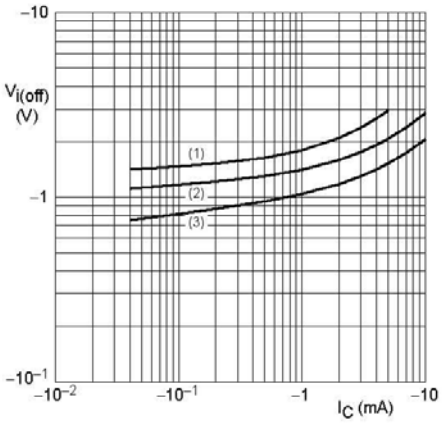
TR2 (PNP); $V_{CE} = -5$ V.
(1) $T_{amb} = 150$ °C.
(2) $T_{amb} = 25$ °C.
(3) $T_{amb} = -40$ °C.

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



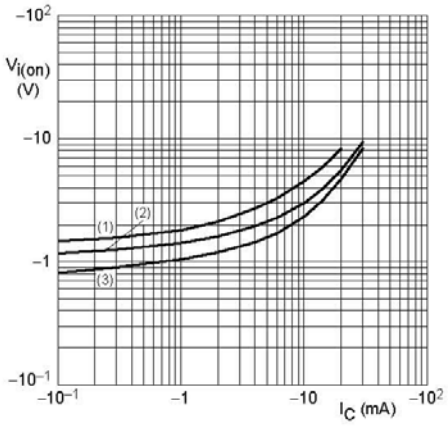
TR2 (PNP); $I_C/I_B = 20$.
(1) $T_{amb} = 100$ °C.
(2) $T_{amb} = 25$ °C.
(3) $T_{amb} = -40$ °C.

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.

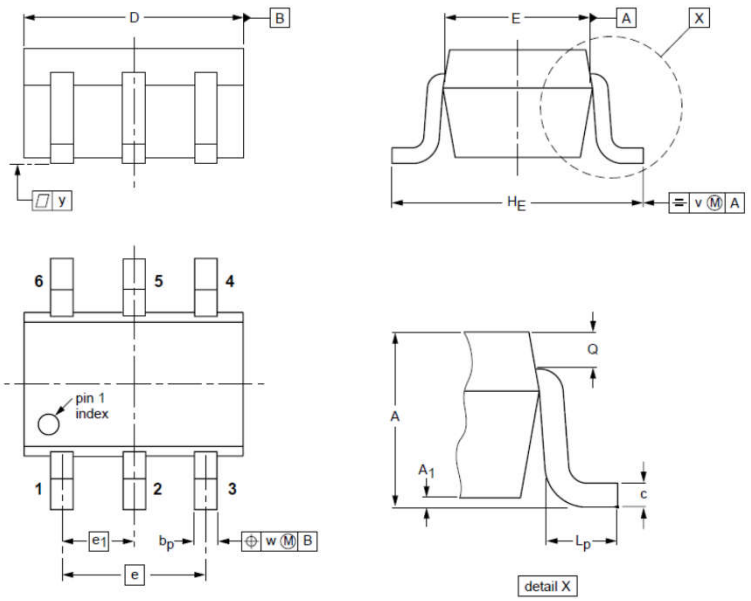
Fig. 8 Input-on voltage as a function of collector current; typical values.

Ordering information

Package	Packing Description	Packing Quantity
SOT-363	Tape/Reel,7"reel	3000PCS/Reel 120000PCS/Carton

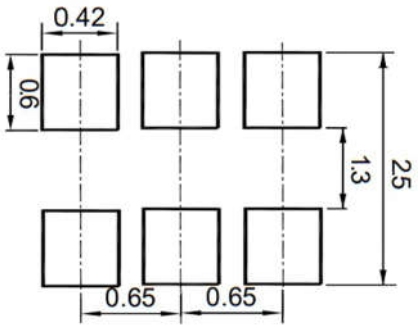
Package Dimensions

SOT-363



Dim.	Millimeter(mm)		mil	
	Min.	Max.	Min.	Max.
A	0.8	1.1	32	43
A1	-	0.1	-	3.94
bp	0.20	0.30	7.87	11.81
c	0.10	0.25	3.94	9.84
D	1.8	2.2	70.87	86.61
E	1.15	1.35	45.28	53.15
e	1.3		51.18	
e1	0.65		25.6	
HE	2.0	2.2	78.74	86.6
Lp	0.15	0.45	5.90	17.71
Q	0.15	0.25	5.90	9.84
v	0.2		7.78	
w	0.2		7.78	
y	0.1		3.94	

The recommended mounting pad size



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