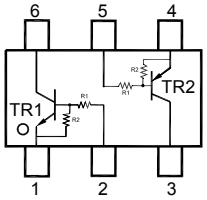
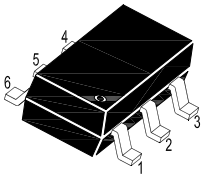
NPN/PNP Silicon Epitaxial Planar Digital Transistor

for switching and interface circuit and drivecircuit applications

Features

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





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

Simplified outline(SOT-363)

Absolute Maximum Ratings at T_a = 25℃ (TR1)

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
Collector Current	I_C	100	mA

Absolute Maximum Ratings at T_a = 25℃ (TR2)

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
Collector Current	$-I_C$	100	mA

Absolute Maximum Ratings at T_a = 25℃ (TR1 and TR2)

Parameter	Symbol	Value	Unit
Total Power Dissipation	P_{tot}	200	mW
Junction Temperature	T_j	150	℃
Storage Temperature Range	T_{stg}	- 55 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 = 10 mA	h_{FE}	70	-	-	-
Collector Base Cutoff Current at V_{CB} = 50 V	I_{CBO}	-	-	100	nA
Collector Emitter Cutoff Current at V_{CE} = 50 V	I_{CEO}	-	-	500	nA
Emitter Base Cutoff Current at V_{EB} = 10 V	I_{EBO}	0.17	-	0.33	mA
Collector Emitter Saturation Voltage at I_C = 5 mA, I_B = 0.25 mA	V_{CEsat}	-	-	0.3	V
Input Voltage (OFF) at V_{CE} = 5 V, I_C = 100 μA	$V_{I(OFF)}$	1	-	1.5	V
Input Voltage (ON) at V_{CE} = 0.2 V, I_C = 5 mA	$V_{I(ON)}$	1.3	-	3	V
Gain Bandwidth Product at V_{CE} = 10 V, I_C = 5 mA, f = 100 MHz	f_T	-	250	-	MHz
Collector output capacitance at V_{CB} = 10 V, f = 1 MHz	Cob	-	-	6	pF

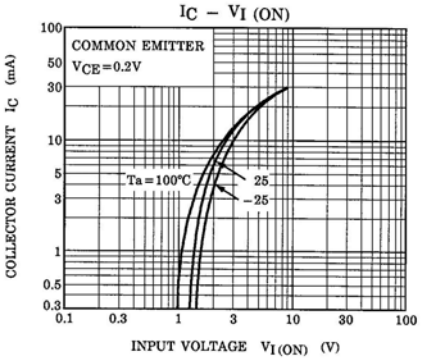
■ **Characteristics at T_a = 25℃ (TR2:PNP)**

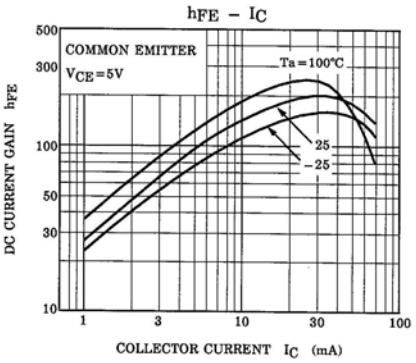
Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at $-V_{CE}$ = 5 V, $-I_C$ = 10 mA	h_{FE}	70	-	-	-
Collector Base Cutoff Current at $-V_{CB}$ = 50 V	$-I_{CBO}$	-	-	100	nA
Collector Emitter Cutoff Current at $-V_{CE}$ = 50 V	$-I_{CEO}$	-	-	500	nA
Emitter Base Cutoff Current at $-V_{EB}$ = 10 V	$-I_{EBO}$	0.17	-	0.33	mA
Collector Emitter Saturation Voltage at $-I_C$ = 5 mA, $-I_B$ = 0.25 mA	$-V_{CEsat}$	-	-	0.3	V
Input Voltage (OFF) at $-V_{CE}$ = 5 V, $-I_C$ = 100 μA	$-V_{I(OFF)}$	1	-	1.5	V
Input Voltage (ON) at $-V_{CE}$ = 0.2 V, $-I_C$ = 5 mA	$-V_{I(ON)}$	1.3	-	3	V
Gain Bandwidth Product at $-V_{CE}$ = 10 V, $-I_C$ = 5 mA, f = 100 MHz	f_T	-	200	-	MHz
Collector output capacitance at $-V_{CB}$ = 10 V, f = 1 MHz	Cob	-	-	6	pF

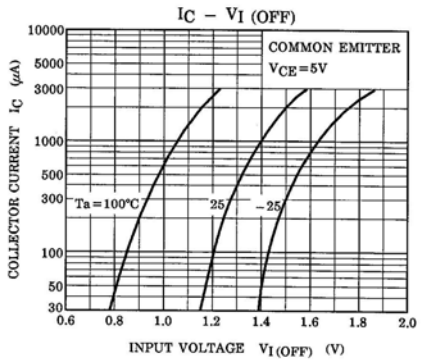
■ **Characteristics at T_a = 25℃ (TR1 and TR2)**

Input Resistance	R_1	15.4	22	28.6	KΩ
Resistance Ratio	R_1/R_2	0.9	1	1.1	-

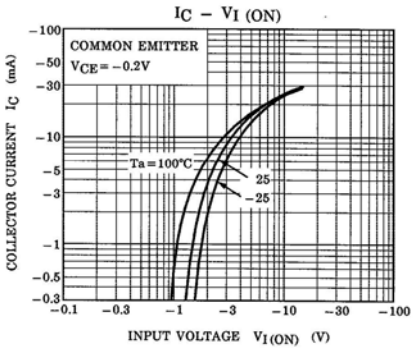
TR1

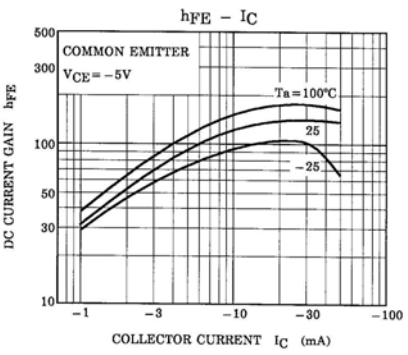

IC – VI (ON)
COMMON EMITTER
VCE=0.2V
Ta=100°C
25
–25
COLLECTOR CURRENT IC (mA)
INPUT VOLTAGE VI(ON) (V)

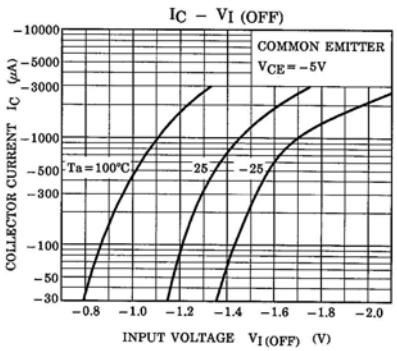

hFE – IC
COMMON EMITTER
VCE=5V
Ta=100°C
25
–25
DC CURRENT GAIN hFE
COLLECTOR CURRENT IC (mA)


IC – VI (OFF)
COMMON EMITTER
VCE=5V
Ta=100°C
25
–25
COLLECTOR CURRENT IC (μA)
INPUT VOLTAGE VI(OFF) (V)

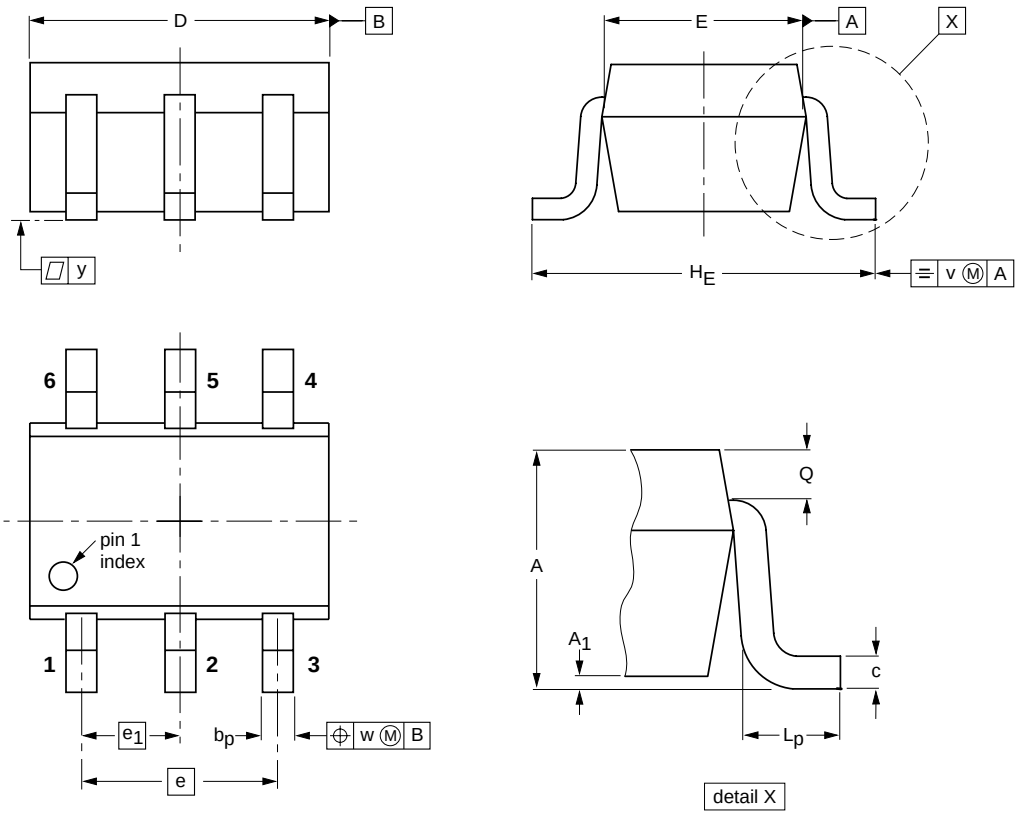
TR2


IC – VI (ON)
COMMON EMITTER
VCE=–0.2V
Ta=100°C
25
–25
COLLECTOR CURRENT IC (mA)
INPUT VOLTAGE VI(ON) (V)


hFE – IC
COMMON EMITTER
VCE=–5V
Ta=100°C
25
–25
DC CURRENT GAIN hFE
COLLECTOR CURRENT IC (mA)


IC – VI (OFF)
COMMON EMITTER
VCE=–5V
Ta=100°C
25
–25
COLLECTOR CURRENT IC (μA)
INPUT VOLTAGE VI(OFF) (V)

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