Ordering number:ENN4926

TR:NPN Epitaxial Planar Silicon Transistor
SBD:Schottky Barrier Diode

FP304

DC-DC Converter

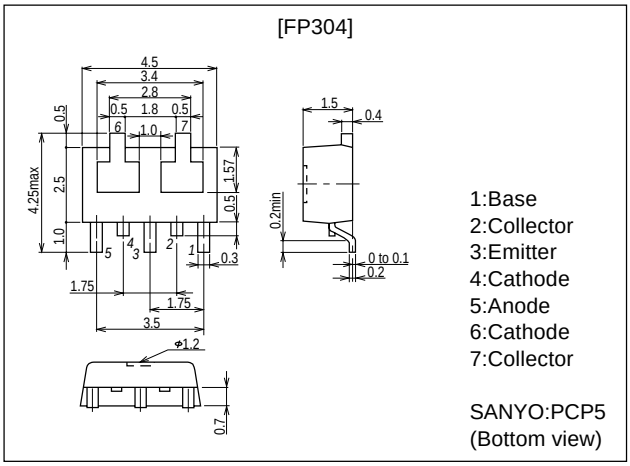
Features

- Complex type with an NPN transistor and a Schottoky barrier diode facilitating high-density mounting.
- The FP304 is composed of 2 chips, one being equivalent to the 2SD1620 and the other the SB07-03C, placed in one package.

Package Dimensions

unit:mm

2099A



Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
[TR]				
Collector-to-Base Voltage	V_{CBO}		30	V
Collector-to-Emitter Voltage	V_{CEO}		10	V
Emitter-to-Base Voltage	V_{EBO}		6	V
Collector Current	I_C		3	A
Collector Current (Pulse)	I_{CP}		5	A
Base Current	I_B		500	mA
Collector Dissipation	P_C	Mounted on ceramic board (250mm²×0.8mm)	0.8	W
Junction Temperature	Tj		150	˚C
[SBD]				
Repetitive Peak Reverse Voltage	V_{RRM}		30	V
Non-repetitive Peak Reverse Surge Voltage	V_{RSM}		35	V
Average Rectified Current	I_O		700	mA
Surge Forward Current	I_{FSM}	50Hz sine wave, 1 cycle	5	A
Junction Temperature	Tj		–55 to +125	˚C
Storage Temperature	Tstg		–55 to +125	˚C

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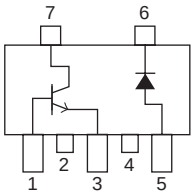
Electrical Connection



1:Base
2:Collector
3:Emitter
4:Cathode
5:Anode
6:Cathode
7:Collector

(Top view)

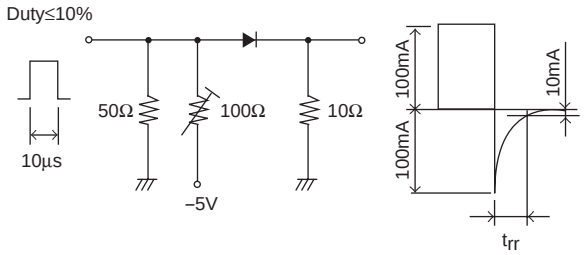
Electrical Characteristics at Ta=25˚C

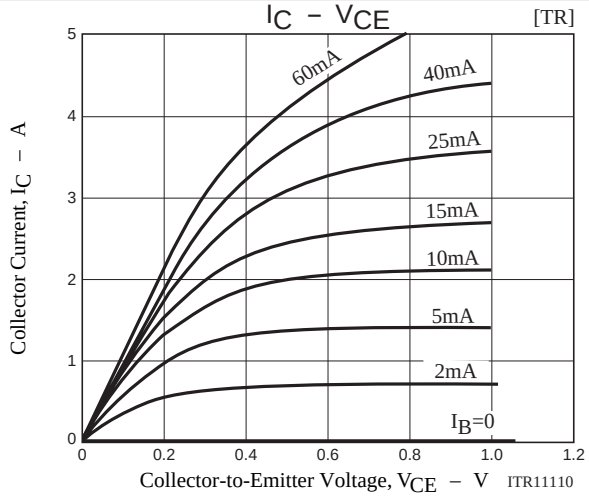
Parameter	Symbol	Conditons	Ratings			Unit
			min	typ	max	
[TR]						
Collector Cutoff Current	I_{CBO}	V_{CB}=20V, I_E=0			0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=4V, I_C=0			0.1	μA
DC Current Gain	$h_{FE}1$	V_{CE}=2V, I_C=500mA	200			
	$h_{FE}2$	V_{CE}=2V, I_C=3A	140			
Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=50mA		200		MHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		30		pF
C-E Saturation Voltage	$V_{CE(sat)}$	I_C=3A, I_B=60mA		0.3	0.4	V
B-E Saturation Voltage	$V_{BE(sat)}$	I_C=3A, I_B=60mA		0.95	1.35	V
C-B Breakdown Voltage	$V_{(BR)CBO}$	I_C=10μA, I_E=0	30			V
C-E Breakdown Voltage	$V_{(BR)CEO}$	I_C=1mA, R_{BE}=∞	10			V
E-B Breakdown Voltage	$V_{(BR)EBO}$	I_E=10μA, I_C=0	6			V
[SBD]						
Reverse Voltage	V_R	I_R=300μA	30			V
Forward Voltage	V_F	I_F=700mA			0.55	V
Reverse Current	I_R	V_R=15V			80	μA
Interterminal Capacitance	C	V_R=10V, f=1MHz		28		pF
Reverse Recovery Time	t_{rr}	I_F=I_R=100mA, See sepcified Test Circuit.			10	ns
Thermal Resistance	Rthj-a	Mounted on ceramic board (250mm²×0.8mm)		170		˚C/W

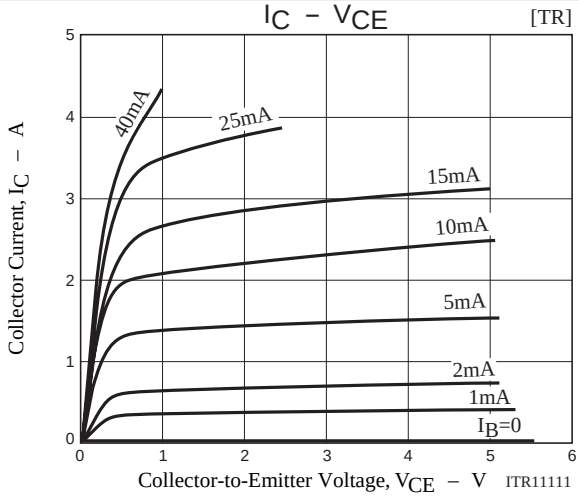
Marking:304

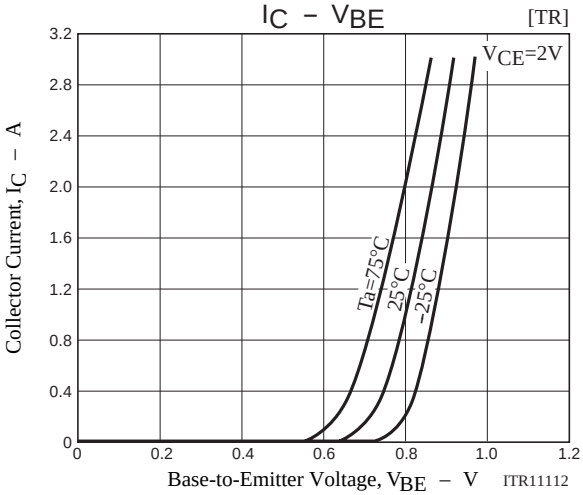
Switching Time Test Circuit

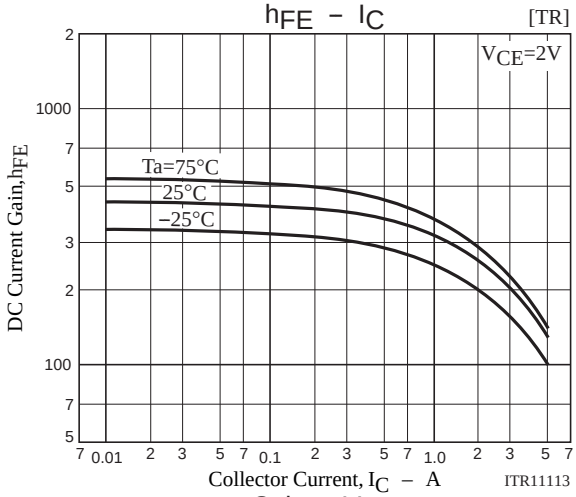
[SBD]

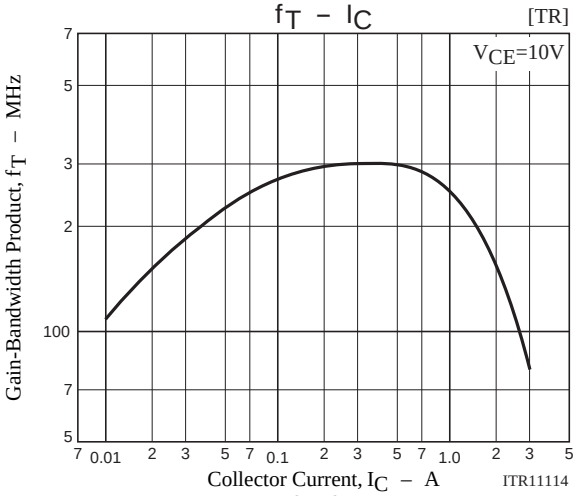


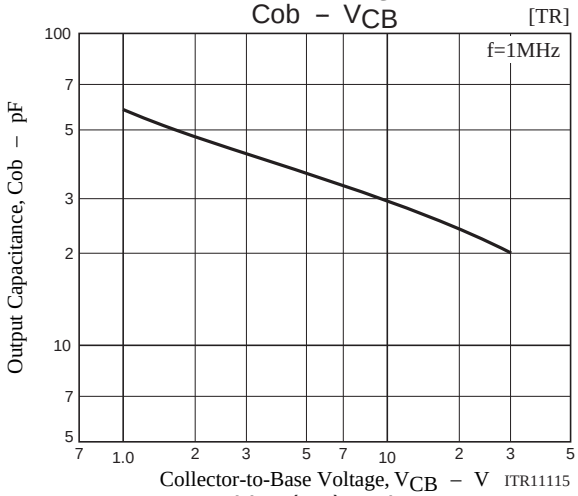

IC – VCE
[TR]
Collector Current, IC – A
60mA
40mA
25mA
15mA
10mA
5mA
2mA
IB=0
Collector-to-Emitter Voltage, VCE – V
ITR11110

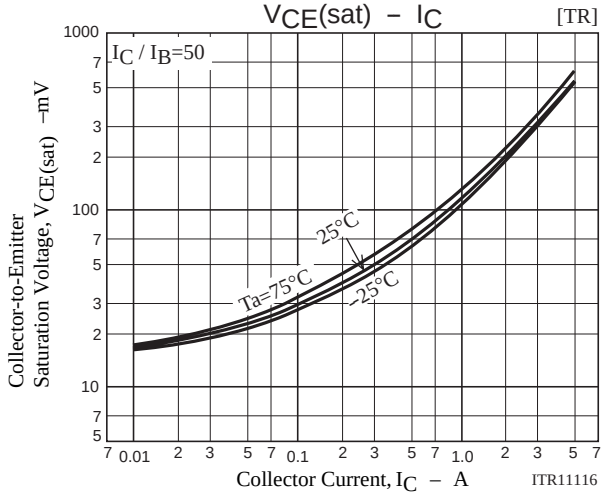

IC – VCE
[TR]
Collector Current, IC – A
40mA
25mA
15mA
10mA
5mA
2mA
1mA
IB=0
Collector-to-Emitter Voltage, VCE – V
ITR11111

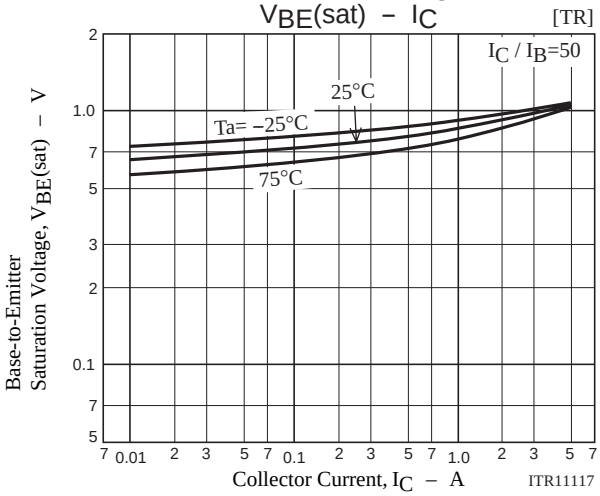

IC – VBE
[TR]
VCE=2V
Collector Current, IC – A
Ta=75°C
25°C
–25°C
Base-to-Emitter Voltage, VBE – V
ITR11112


hFE – IC
[TR]
VCE=2V
DC Current Gain, hFE
Ta=75°C
25°C
–25°C
Collector Current, IC – A
ITR11113

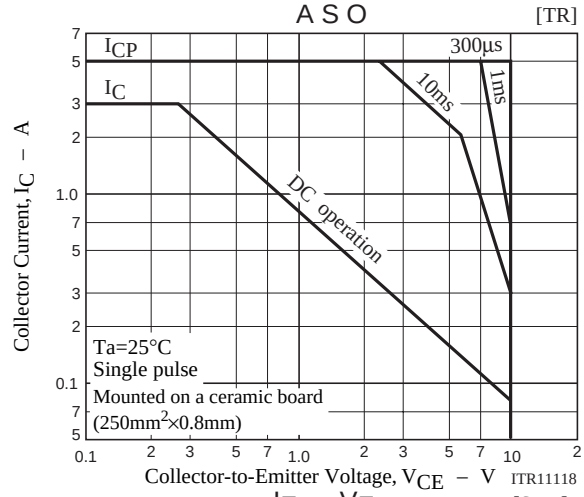

fT – IC
[TR]
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
ITR11114


Cob – VCB
[TR]
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
ITR11115

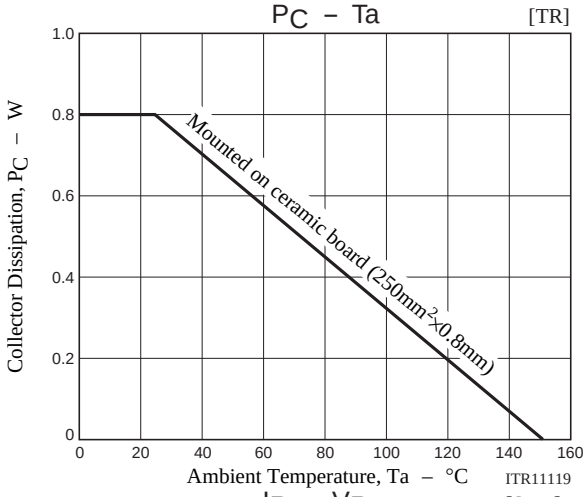

VCE(sat) – IC
[TR]
IC / IB=50
Collector-to-Emitter Saturation Voltage, VCE(sat) –mV
Ta=75°C
25°C
–25°C
Collector Current, IC – A
ITR11116


VBE(sat) – IC
[TR]
IC / IB=50
Base-to-Emitter Saturation Voltage, VBE(sat) – V
25°C
Ta= –25°C
75°C
Collector Current, IC – A
ITR11117

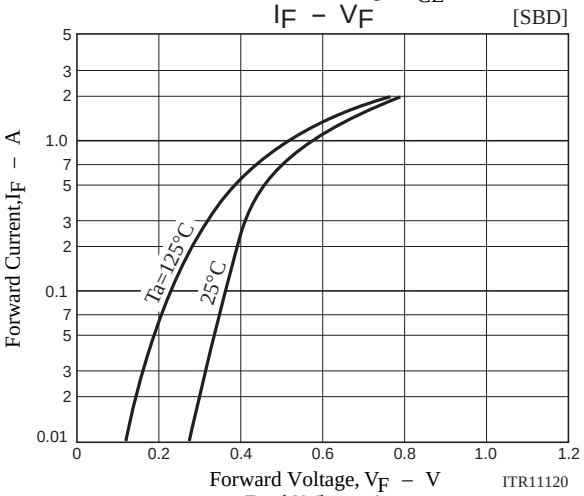
ASO [TR]



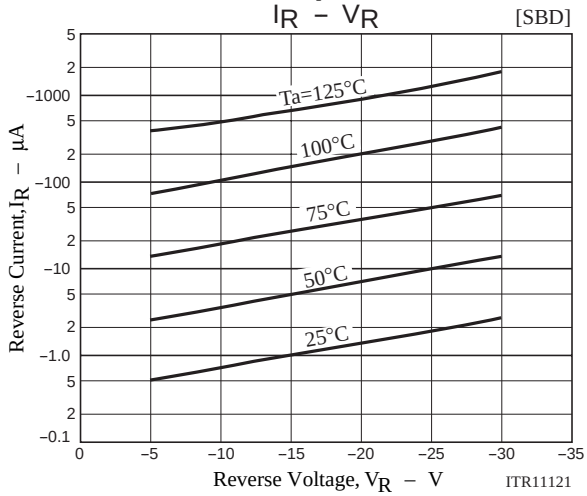
P_C – Ta [TR]



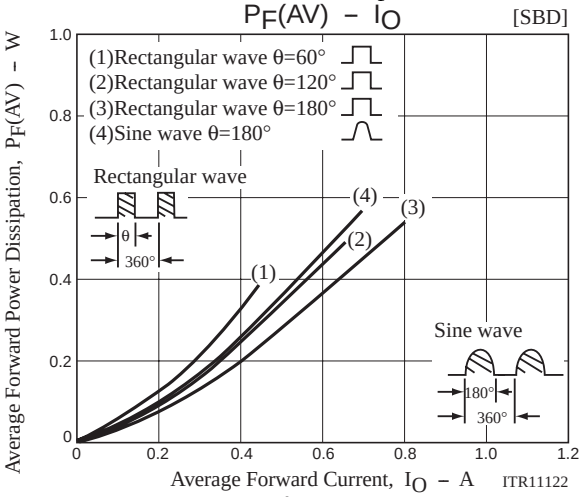
I_F – V_F [SBD]



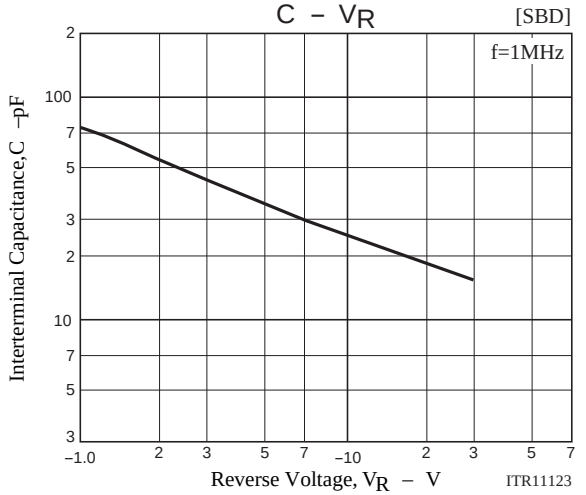
I_R – V_R [SBD]



$P_{F(AV)}$ – I_O [SBD]



C – V_R [SBD]



I_S – t [SBD]