



# FP302

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

## DC-DC Converter Applications

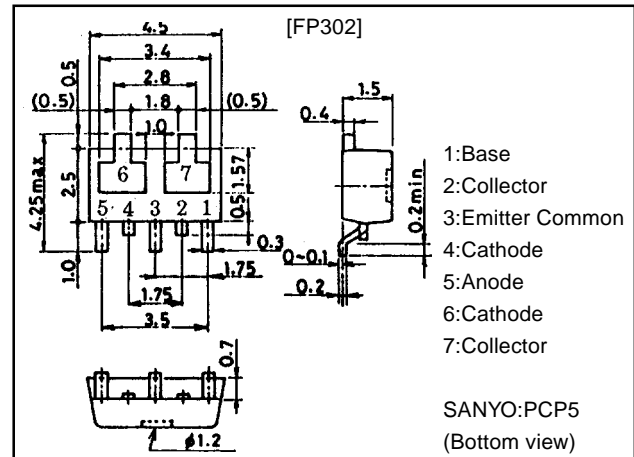
### Features

- Composite type with NPN transistor and Schottky barrier diode facilitating high-density mounting.
- The FP302 is composed of chips equivalent to the 2SC4520 and SB05-05CP, which are placed in one package.

### Package Dimensions

unit:mm

2099A



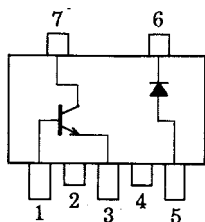
### Specifications

#### Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
[TR]				
Collector-to-Base Voltage	$V_{CB0}$		60	V
Collector-to-Emitter Voltage	$V_{CE0}$		45	V
Emitter-to-Base Voltage	$V_{EB0}$		5	V
Collector Current	$I_C$		1.5	A
Collector Current (Pulse)	$I_{CP}$		3	A
Base Current	$I_B$		300	mA
Collector Dissipation	$P_C$	Mounted on ceramic board (250mm <sup>2</sup> ×0.8mm)	0.8	W
Junction Temperature	$T_J$		150	°C
Storage Temperature	$T_{stg}$		-55 to +150	°C
[SBD]				
Repetitive Peak Reverse Voltage	$V_{RRM}$		50	V
Non-repetitive Peak Reverse Surge Voltage	$V_{RSM}$		55	V
Average Rectified Current	$I_O$		500	mA
Surge Forward Current	$I_{FSM}$	50Hz sine wave, 1 cycle	5	A
Junction Temperature	$T_J$		-55 to +125	°C
Storage Temperature	$T_{stg}$		-55 to +125	°C

### Electrical Connection

Continued on next page.



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

(Top view)

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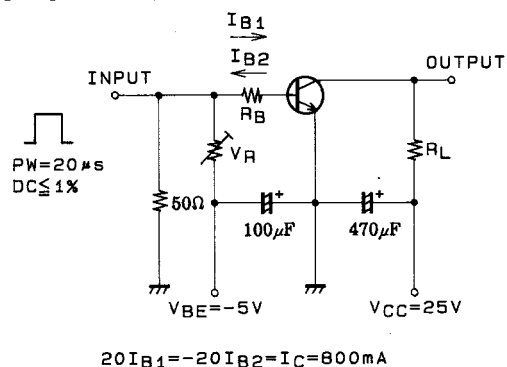
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## Electrical Characteristics at Ta=25°C

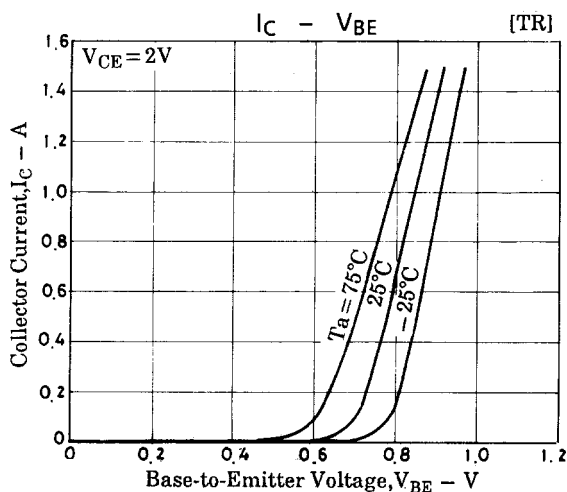
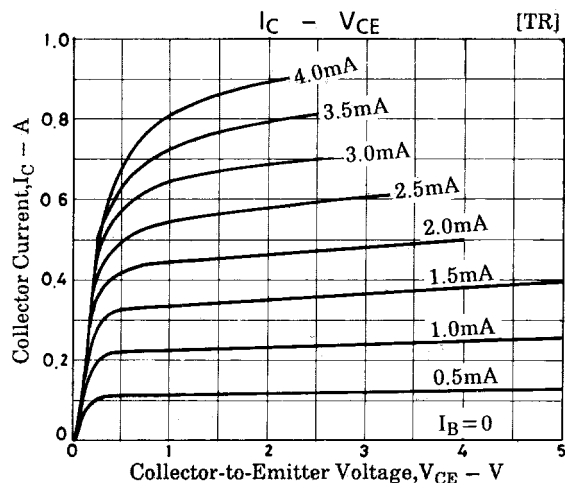
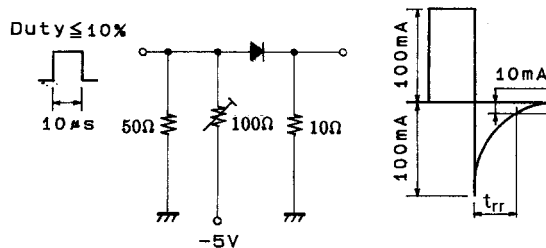
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[TR]						
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=45V, I_E=0$			1.0	$\mu A$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=3V, I_C=0$			1.0	$\mu A$
DC Current Gain	$h_{FE1}$	$V_{CE}=2V, I_C=100mA$	100		400	
	$h_{FE2}$	$V_{CE}=2V, I_C=1.5A$	40			
Gain-Bandwidth Product	$f_T$	$V_{CE}=2V, I_C=100mA$		300		MHz
Output Capacitance	$C_{ob}$	$V_{CB}=10V, f=1MHz$		13		pF
C-E Saturation Voltage	$V_{CE(sat)}$	$I_C=800mA, I_B=40mA$		0.25	0.7	V
B-E Saturation Voltage	$V_{BE(sat)}$	$I_C=800mA, I_B=40mA$		0.9	1.3	V
C-B Breakdown Voltage	$V_{(BR)CBO}$	$I_C=10\mu A, I_E=0$	60			V
C-E Breakdown Voltage	$V_{(BR)CEO}$	$I_C=1mA, R_{BE}=\infty$	45			V
E-B Breakdown Voltage	$V_{(BR)EBO}$	$I_E=10\mu A, I_C=0$	5			V
Turn-ON Time	$t_{on}$	See specified Test Circuit		50		ns
Storage Time	$t_{stg}$	See specified Test Circuit		150		ns
Turn-OFF Time	$t_{off}$	See specified Test Circuit		180		ns
[SBD]						
Reverse Voltage	$V_R$	$I_R=200\mu A$	50			V
Forward Voltage	$V_F$	$I_F=500mA$			0.55	V
Reverse Current	$I_R$	$V_R=25V$			50	$\mu A$
Interterminal Capacitance	$C$	$V_R=10V, f=1MHz$ cycle		22		pF
Reverse Recovery Time	$t_{rr}$	$I_F=I_R=100mA$ , See specified Test Circuit.			10	ns
Thermal Resistance	$R_{th-a}$	Mounted on ceramic board (250mm <sup>2</sup> ×0.8mm)		170		°C/W

### Switching Time Test Circuit

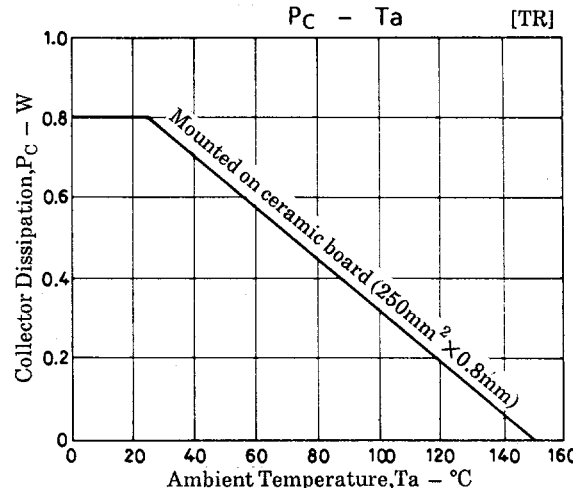
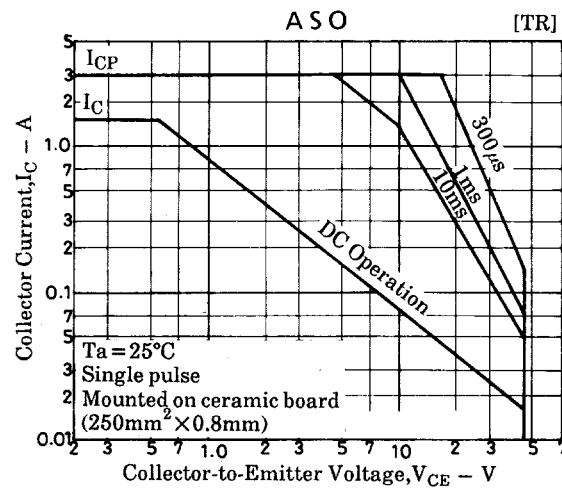
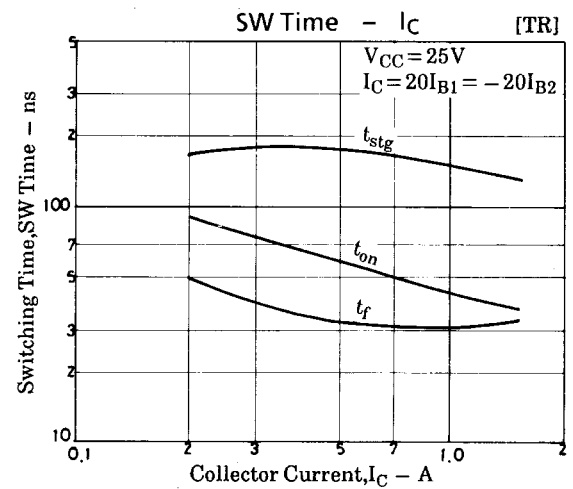
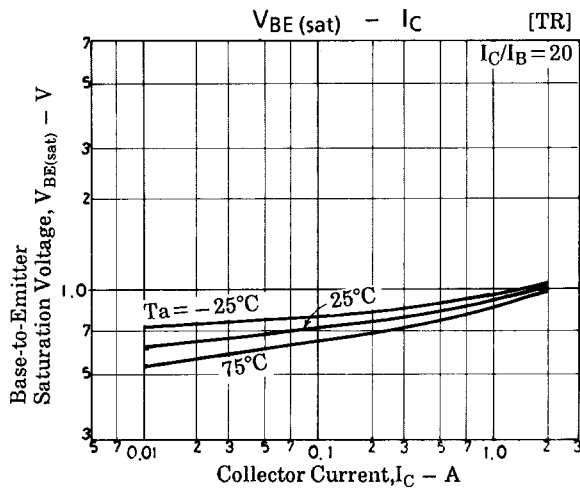
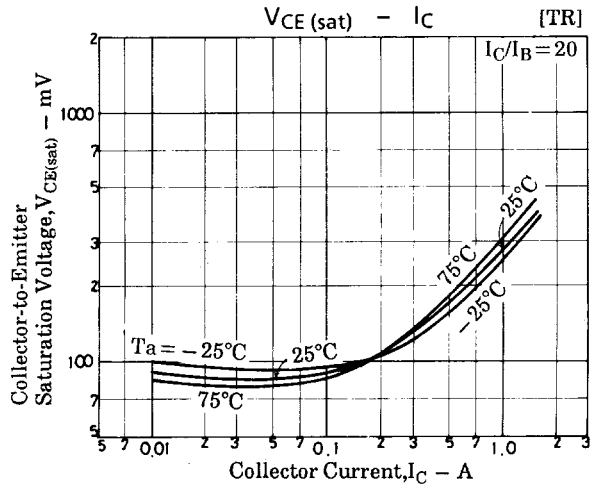
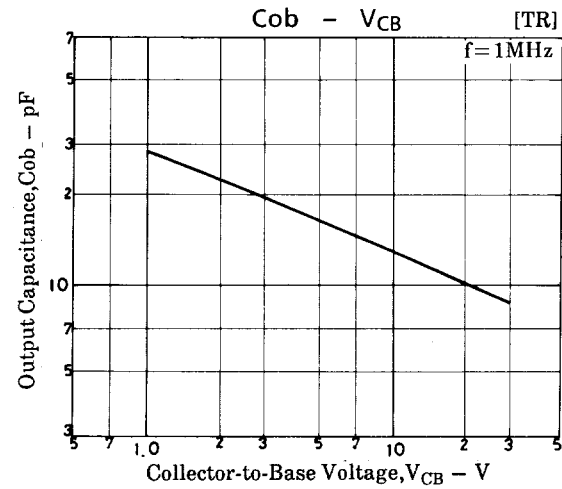
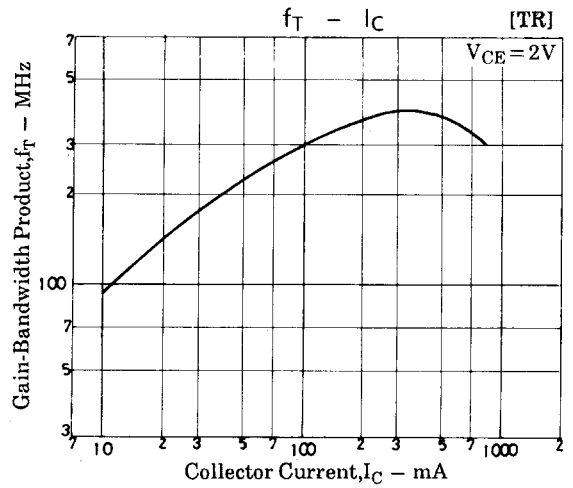
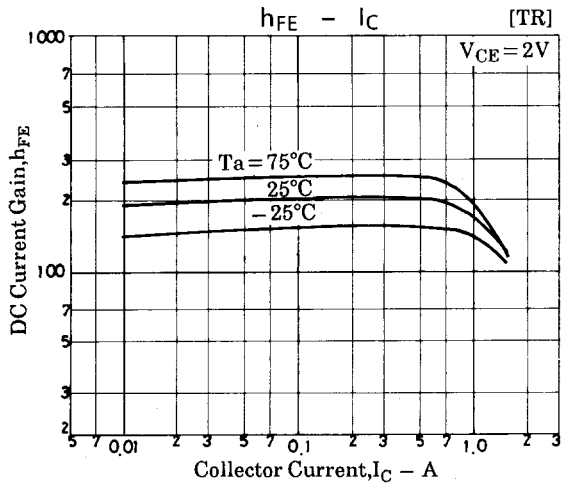
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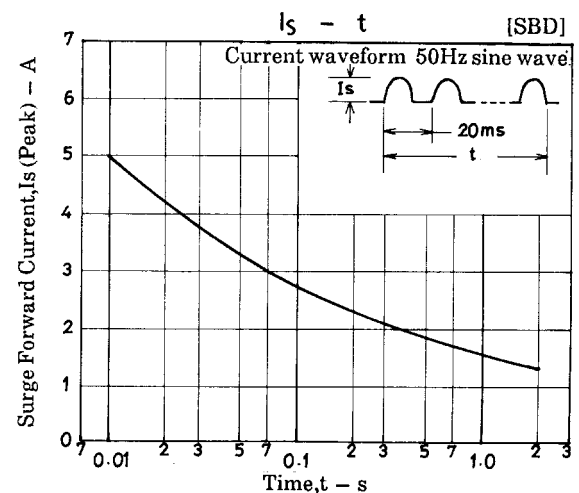
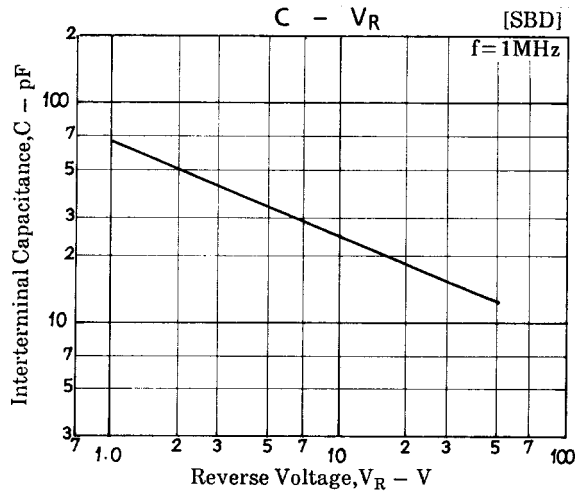
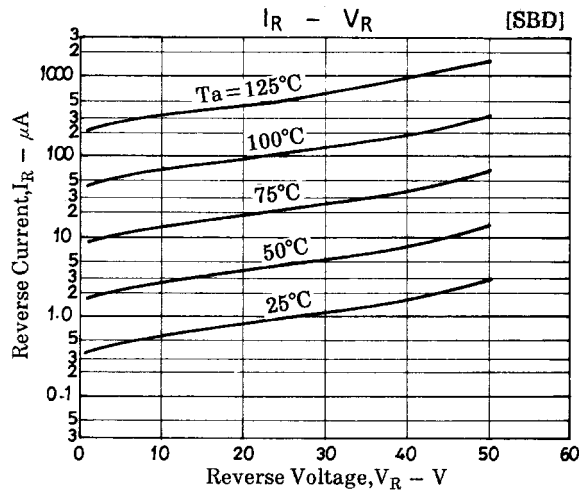
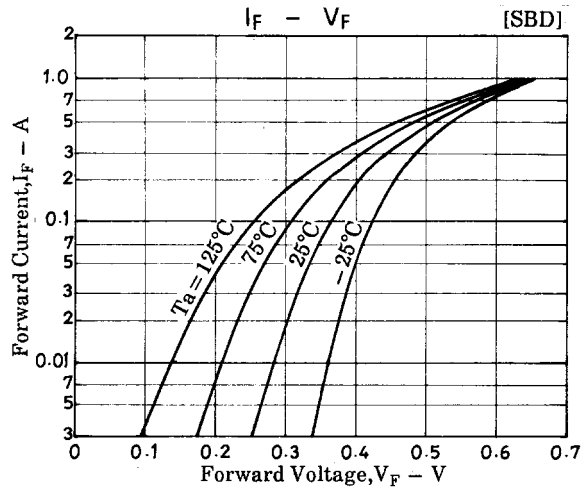


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