

# High-speed Switching Transistor(—60V / —5A)

## 2SA1952 / 2SA1906 / 2SA1757

### ●Features

- 1) High switching speed, typically  $t_f=0.15 \mu\text{s}$  at  $I_c=-3A$ .
- 2) Low saturation voltage, typically  $V_{CE(sat)}=-0.2V$  at  $I_c/I_B=-3A/-0.15A$ .
- 3) Wide SOA. (safe operating area)
- 4) Complements the 2SC5103 / 2SC4596.

### ●Packaging specifications and hFE

Type	2SA1952	2SA1906	2SA1757
Package	CPT3	PSD3	TO-220FP
hFE	Q	DEF	F
Code	TL	TL	—
Basic ordering unit (pieces)	3000	1000	500

### ●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-base voltage	$V_{CBO}$	-100	V
Collector-emitter voltage	$V_{CEO}$	-60	V
Emitter-base voltage	$V_{EBO}$	-5	V
Collector current	$I_c$	-5	A
		-10	A (Pulse)
Collector power dissipation	Pc	1	W
		10	W(Tc=25°C)
		1.5	W
		2.5	W(Tc=25°C)
		2	W
		25	W(Tc=25°C)
Junction temperature	Tj	150	°C
Storage temperature	Tstg	-55~+150	°C

### ●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	-100	—	—	V	$I_c=-50 \mu\text{A}$
Collector-emitter voltage	$BV_{CEO(SUS)}$	-60	—	—	V	$I_c/I_B=-3A/-0.3A, L=1\text{mH}$
Collector-emitter breakdown voltage	$BV_{CEO}$	-60	—	—	V	$I_c=-1\text{mA}$
Emitter-base breakdown voltage	$BV_{EBO}$	-5	—	—	V	$I_E=-50 \mu\text{A}$
Collector cutoff current	$I_{CBO}$	—	—	-10	$\mu\text{A}$	$V_{CE}=-100V$
Emitter cutoff current	$I_{EBO}$	—	—	-10	$\mu\text{A}$	$V_{EB}=-5V$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	-0.3	V	$I_c/I_B=-3A/-0.15A$
		—	—	-0.5	V	$I_c/I_B=-4A/-0.2A$
Base-emitter saturation voltage	$V_{BE(sat)}$	—	—	-1.2	V	$I_c/I_B=-3A/-0.15A$
		—	—	-1.5	V	$I_c/I_B=-4A/-0.2A$
DC current transfer ratio	2SA1952	hFE	120	—	270	$V_{CE}=-2V, I_c=-1A$
	2SA1906		60	—	320	
	2SA1757		160	—	320	
Transition frequency	$f_T$	—	80	—	MHz	$V_{CE}=-10V, I_E=0.5A, f=30\text{MHz}$
Output capacitance	$C_{ob}$	—	130	—	pF	$V_{CE}=-10V, I_E=0A, f=1\text{MHz}$
Turn-on time	$t_{on}$	—	—	0.3	$\mu\text{s}$	$I_c=-3A, R_L=10\Omega$
Storage time	$t_{stg}$	—	—	1.5	$\mu\text{s}$	$I_{B1}=-I_{B2}=-0.15A$
Fall time	$t_f$	—	—	0.3	$\mu\text{s}$	$V_{CC}\sim-30V$

(96-603-A314)

# High-speed Switching Transistor(60V / 5A)

## 2SC5103 / 2SC4596

### ●Features

- 1) Low saturation voltage, typically  $V_{CE(sat)}=0.15V$  at  $I_c/I_B=3A/0.15A$
- 2) High switching speed, typically  $t_f=0.1 \mu\text{s}$  at  $I_c=3A$ .
- 3) Wide SOA. (safe operating area)
- 4) Complements the 2SA1952 / 2SA1757.

### ●Packaging specifications and hFE

Type	2SC5103	2SC4596
Package	CPT3	TO-220FP
hFE	PQ	EF
Code	TL	—
Basic ordering unit (pieces)	2500	500

### ●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-base voltage	$V_{CBO}$	100	V
Collector-emitter voltage	$V_{CEO}$	60	V
Emitter-base voltage	$V_{EBO}$	5	V
Collector current	$I_c$	5	A (DC)
		10	A (Pulse) *
Collector power dissipation	Pc	1	W
		10	W(Tc=25°C)
		2	W
		25	W(Tc=25°C)
Junction temperature	Tj	150	°C
Storage temperature	Tstg	-55~+150	°C

\* Single pulse  $P_w=100\text{ms}$ 

### ●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	100	—	—	V	$I_c=50 \mu\text{A}$
Collector-emitter voltage	$BV_{CEO(SUS)}$	60	—	—	V	$I_c/I_B=3A/0.3A, L=1\text{mH}$
Collector-emitter breakdown voltage	$BV_{CEO}$	60	—	—	V	$I_c=1\text{mA}$
Emitter-base breakdown voltage	$BV_{EBO}$	5	—	—	V	$I_E=50 \mu\text{A}$
Collector cutoff current	$I_{CBO}$	—	—	10	$\mu\text{A}$	$V_{CE}=100V$
Emitter cutoff current	$I_{EBO}$	—	—	10	$\mu\text{A}$	$V_{EB}=5V$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	0.15	0.3	V	$I_c/I_B=3A/0.15A$ *
		—	—	0.5	V	$I_c/I_B=4A/0.2A$ *
Base-emitter saturation voltage	$V_{BE(sat)}$	—	—	1.2	V	$I_c/I_B=3A/0.15A$ *
		—	—	1.5	V	$I_c/I_B=4A/0.2A$ *
DC current transfer ratio	2SC5103	hFE	82	—	270	$V_{CE}/I_c=2V/1A$
	2SC4596		100	—	320	
Transition frequency	$f_T$	—	120	—	MHz	$V_{CE}=10V, I_E=0.5A, f=30\text{MHz}$ *
Output capacitance	$C_{ob}$	—	80	—	pF	$V_{CE}=10V, I_E=0A, f=1\text{MHz}$
Turn-on time	$t_{on}$	—	—	0.3	$\mu\text{s}$	$I_c=3A, R_L=10\Omega$
Storage time	$t_{stg}$	—	—	1.5	$\mu\text{s}$	$I_{B1}=-I_{B2}=0.15A$
Fall time	$t_f$	—	0.1	0.3	$\mu\text{s}$	$V_{CC}\sim 30V$

\* Measured using pulse current.

(96-199-C314)