Ordering number : ENN8029

SANYO Semiconductors
DATA SHEET

2SC5999 — NPN Epitaxial Planar Silicon Transistors
High-Current Switching Applications

Applications

- Relay drivers, lamp drivers, motor drivers, inverters.

Features

- Adoption of MBIT process.
- Large current capacitance.
- Low collector-to-emitter saturation voltage.
- High-speed switching.
- Surface mount type.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		120	V
Collector-to-Emitter Voltage	V_{CES}		120	V
Collector-to-Emitter Voltage	V_{CEO}		50	V
Emitter-to-Base Voltage	V_{EBO}		6	V
Collector Current	I_C		25	A
Collector Current (Pulse)	I_{CP}		40	A
Base Current	I_B		2	A
Collector Dissipation	P_C		1.65	W
		Tc=25°C	40	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		-55 to +150	°C

Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=100V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=4V, I_C=0			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=2V, I_C=1A	200		560	
	$h_{FE}2$	V_{CE}=2V, I_C=15A	150			

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SANYO Electric Co.,Ltd. Semiconductor Company
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

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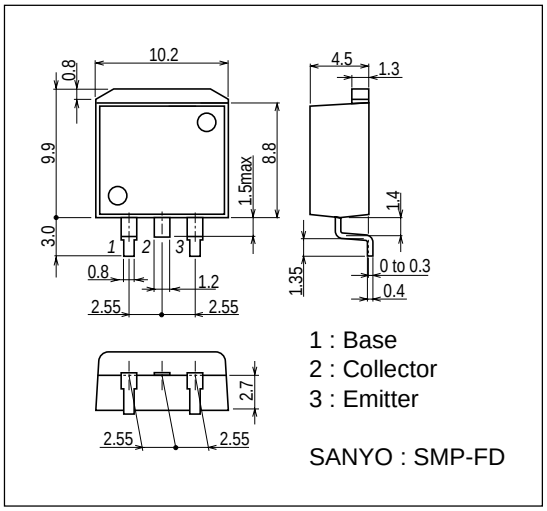
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		170		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=10A, I_B=500mA		150	300	mV
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	I_C=10A, I_B=500mA		0.93	1.4	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=100μA, I_E=0	120			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CES}$	I_C=100μA, R_{BE}=0	120			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=1mA, R_{BE}=∞	50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=100μA, I_C=0	6			V
Turn-ON Time	t_{on}	See specified Test Circuit.		230		ns
Storage Time	t_{stg}	See specified Test Circuit.		1300		ns
Fall Time	t_f	See specified Test Circuit.		40		ns

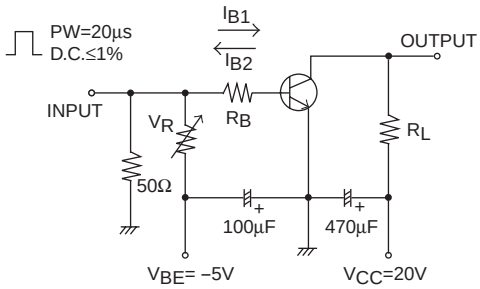
Package Dimensions

unit : mm

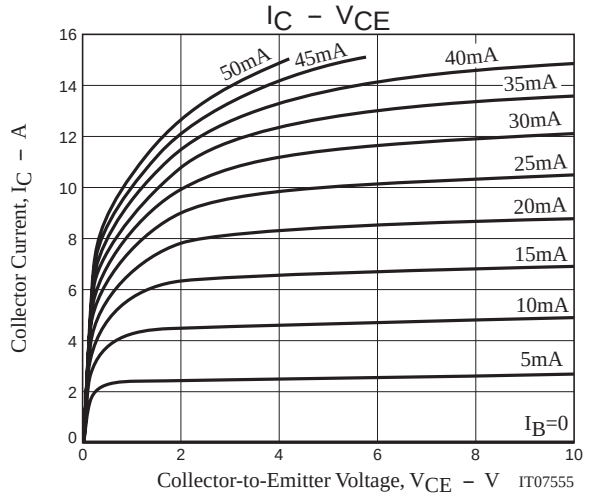
2069C

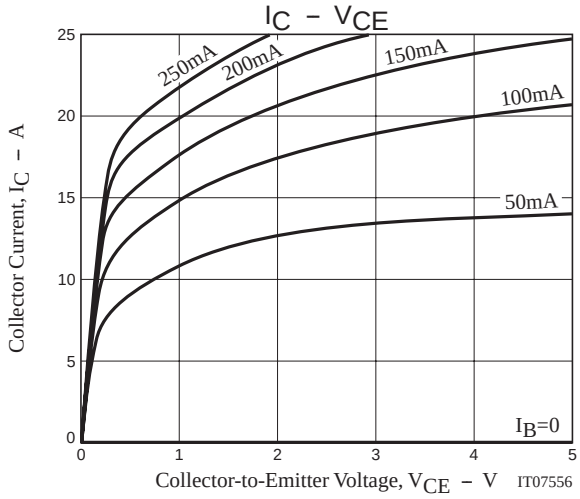


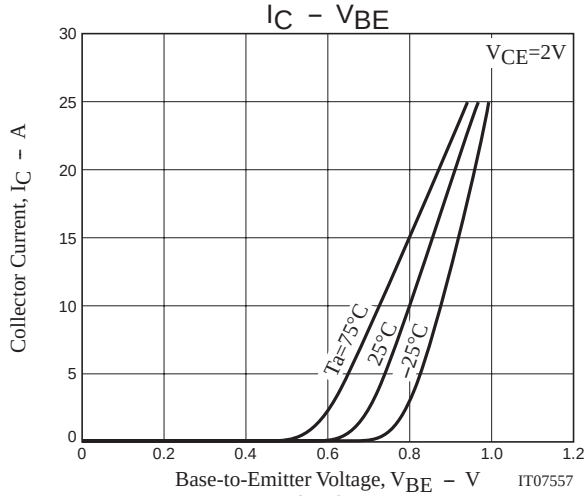
Switching Time Test Circuit

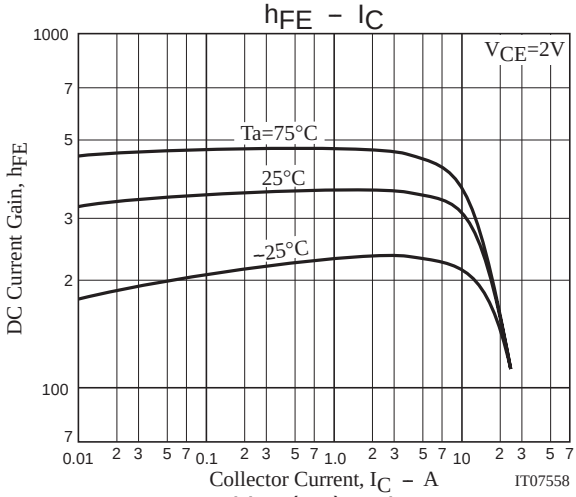


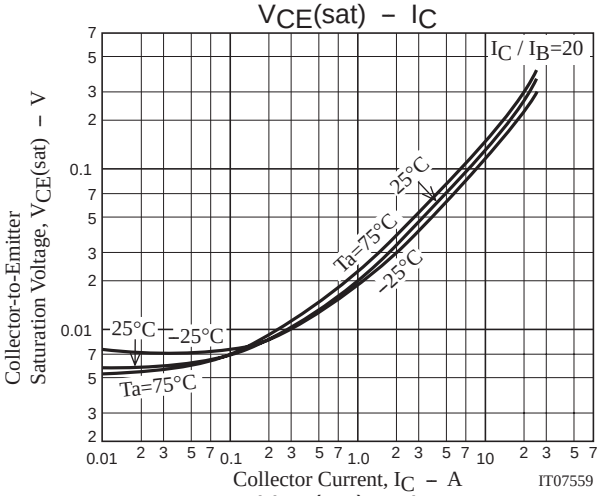
I_C=20I_{B1}= −20I_{B2}=4A

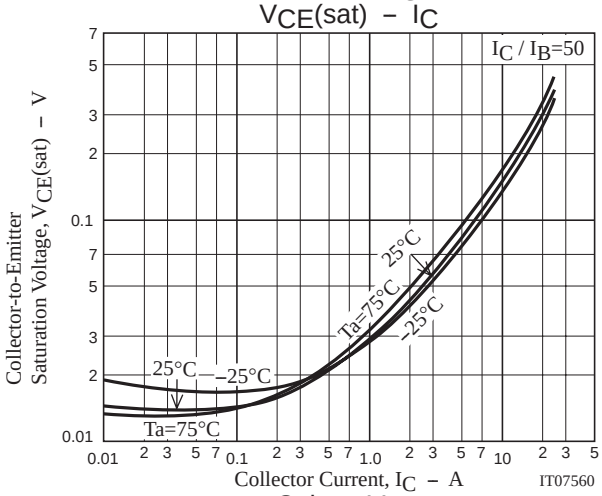


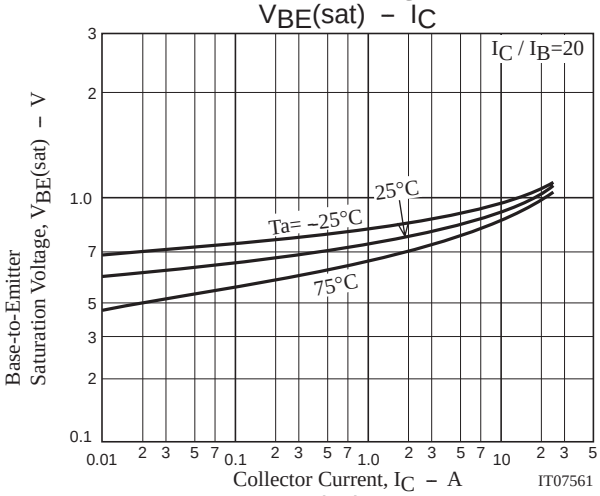


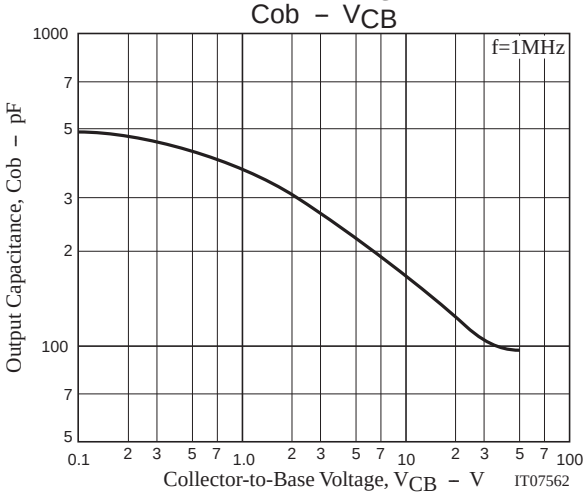

I_C – V_{BE}
V_{CE}=2V
Ta=75°C
25°C
–25°C
Collector Current, I_C – A
Base-to-Emitter Voltage, V_{BE} – V
IT07557

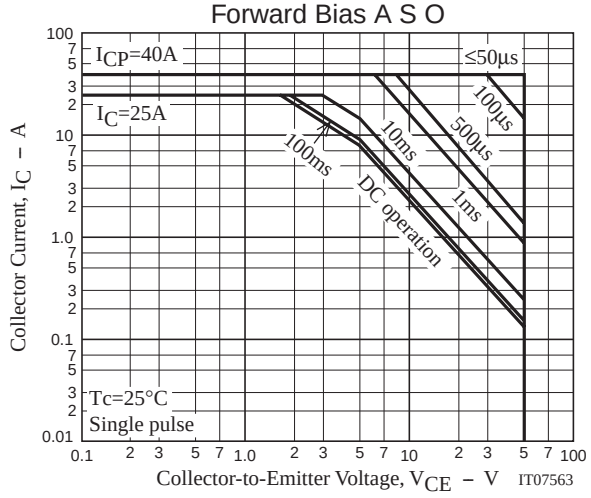

h_{FE} – I_C
V_{CE}=2V
Ta=75°C
25°C
–25°C
DC Current Gain, h_{FE}
Collector Current, I_C – A
IT07558

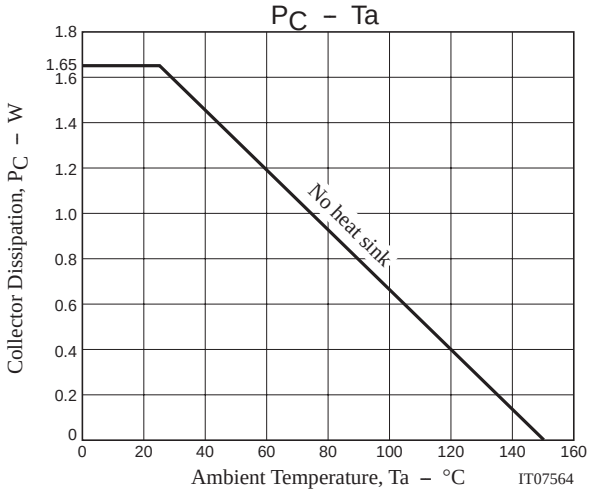

V_{CE}(sat) – I_C
I_C / I_B=20
25°C
–25°C
Ta=75°C
Collector-to-Emitter Saturation Voltage, V_{CE}(sat) – V
Collector Current, I_C – A
IT07559


V_{CE}(sat) – I_C
I_C / I_B=50
25°C
–25°C
Ta=75°C
Collector-to-Emitter Saturation Voltage, V_{CE}(sat) – V
Collector Current, I_C – A
IT07560


V_{BE}(sat) – I_C
I_C / I_B=20
25°C
Ta= –25°C
75°C
Base-to-Emitter Saturation Voltage, V_{BE}(sat) – V
Collector Current, I_C – A
IT07561


Cob – V_{CB}
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, V_{CB} – V
IT07562


Forward Bias A S O
I_{CP}=40A
I_C=25A
≤50µs
100µs
500µs
10ms
100ms
DC operation
1ms
Tc=25°C
Single pulse
Collector Current, I_C – A
Collector-to-Emitter Voltage, V_{CE} – V
IT07563


P_C – Ta
No heat sink
Collector Dissipation, P_C – W
Ambient Temperature, Ta – °C
IT07564