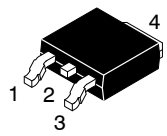
Bipolar Transistor, Low $V_{CE(sat)}$, NPN Single TP-FA

100 V, 2 A

2SC6099



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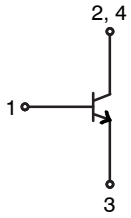
Features

- Adoption of FBET, MBIT Process
- Low Collector−to−Emitter Saturation Voltage
- High Allowable Power Dissipation
- Large Current Capacity
- High−Speed Switching
- This is a Pb−Free Device

Typical Applications

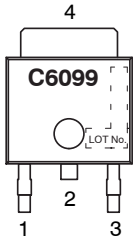
- DC / DC Converter
- Relay Drivers
- Lamp Drivers
- Motor Drivers
- Inverter

ELECTRICAL CONNECTION



1: Base
2: Collector
3: Emitter
4: Collector

MARKING DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Symbol	Rating		Value	Unit
V_{CBO}	Collector−to−Base Voltage		120	V
V_{CES}	Collector−to−Emitter Voltage		120	V
V_{CEO}	Collector−to−Emitter Voltage		100	V
V_{EBO}	Emitter−to−Base Voltage		6.5	V
I_C	Collector Current		2	A
I_{CP}	Collector Current (Pulse)		3	A
I_B	Base Current		400	mA
P_C	Collector Dissipation		0.8	W
	Collector Dissipation	T_C = 25°C	15	W
Tj	Junction Temperature		150	°C
Tstg	Storage Temperature		−55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

ORDERING INFORMATION

Device	Package	Shipping†
2SC6099−TL−E	DPAK / TP−FA (Pb−Free)	700 / Tape & Reel

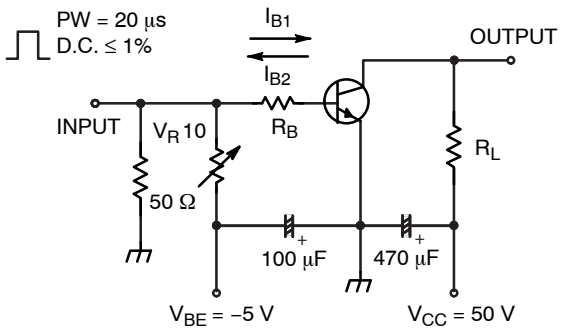
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	Collector Cutoff Current	V_{CB} = 80 V, I_E = 0 A	–	–	1	μA
I_{EBO}	Emitter Cutoff Current	V_{EB} = 4 V, I_C = 0 A	–	–	1	μA
h_{FE}	DC Current Gain	V_{CE} = 5 V, I_C = 100 mA	300	–	600	
f_T	Gain−Bandwidth Product	V_{CE} = 10 V, I_C = 300 mA	–	300	–	MHz
Cob	Output Capacitance	V_{CB} = 10 V, f = 1 MHz	–	13	–	pF
V_{CE}(sat)	Collector−to−Emitter Saturation Voltage	I_C = 1 A, I_B = 100 mA	–	110	165	mV
V_{BE}(sat)	Base−to−Emitter Saturation Voltage	I_C = 1 A, I_B = 100 mA	–	0.9	1.2	V
$V_{(BR)CBO}$	Collector−to−Base Breakdown Voltage	I_C = 10 μA, I_E = 0 A	120	–	–	V
$V_{(BR)CES}$	Collector−to−Emitter Breakdown Voltage	I_C = 100 μA, R_{BE} = 0 Ω	120	–	–	V
$V_{(BR)CEO}$	Collector−to−Emitter Breakdown Voltage	I_C = 1 mA, R_{BE} = ∞	100	–	–	V
$V_{(BR)EBO}$	Emitter−to−Base Breakdown Voltage	I_E = 10 μA, I_C = 0 A	6.5	–	–	V
t_{on}	Turn−On Time	See specified Test Circuit		40	–	ns
t_{stg}	Storage Time			1100	–	ns
t_f	Fall Time			40	–	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

Switching Time Test Circuit



$I_C = 10I_{B1} = -10I_{B2} = 0.5$ A

Figure 1. Switching Time Test Circuit

TYPICAL CHARACTERISTICS

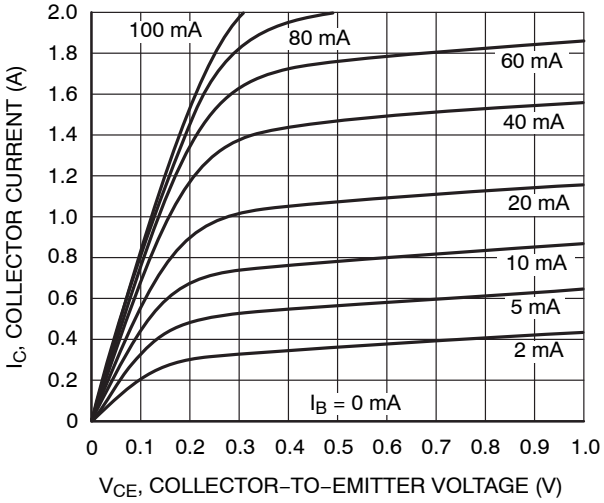


Figure 2. I_C – V_{CE}

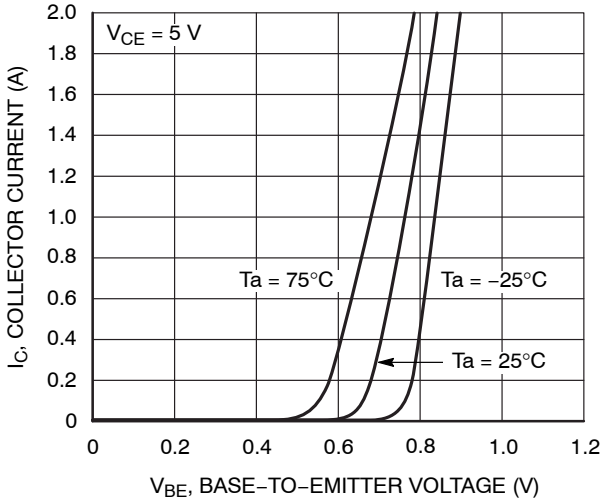


Figure 3. I_C – V_{BE}

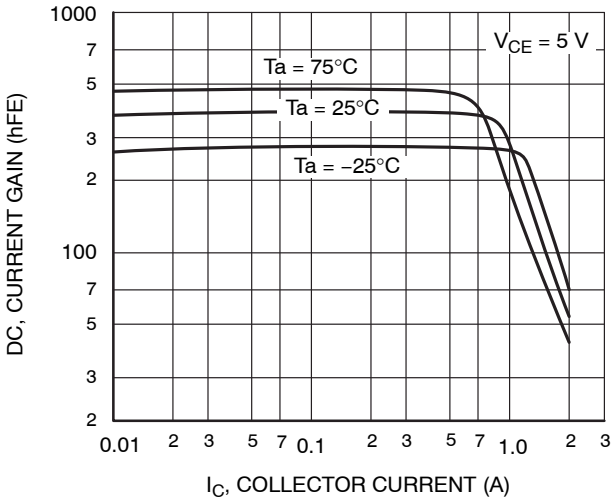


Figure 4. h_{FE} – I_C

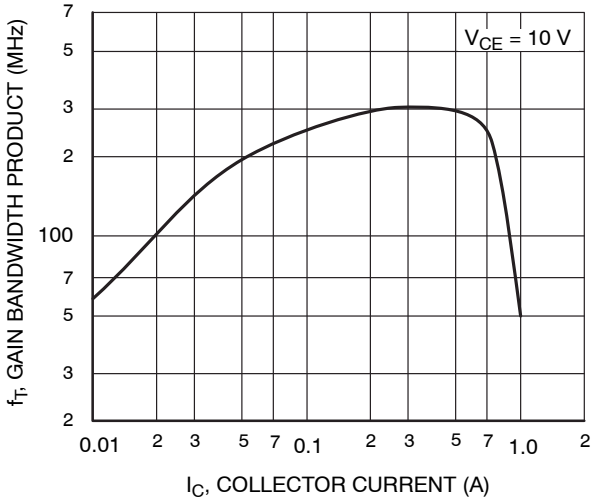


Figure 5. f_T – I_C

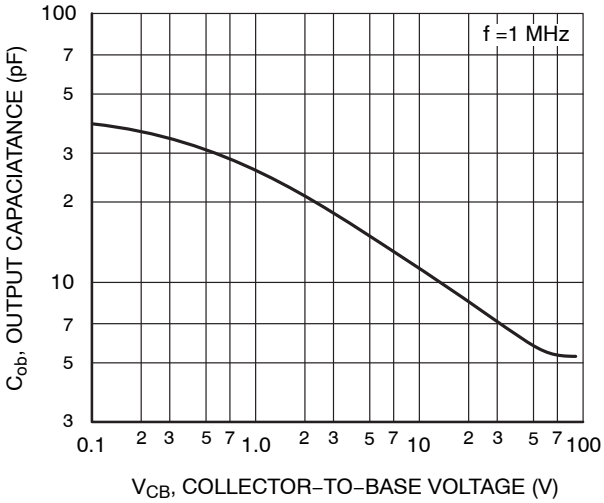


Figure 6. C_{ob} – V_{CB}

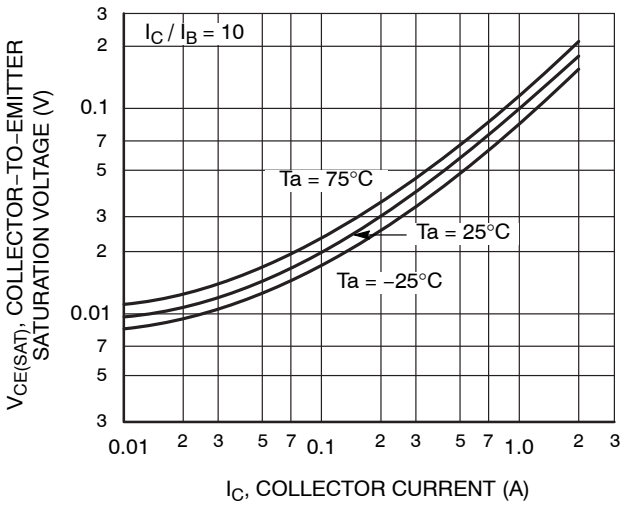


Figure 7. V_{CE}(sat) – I_C

TYPICAL CHARACTERISTICS (continued)

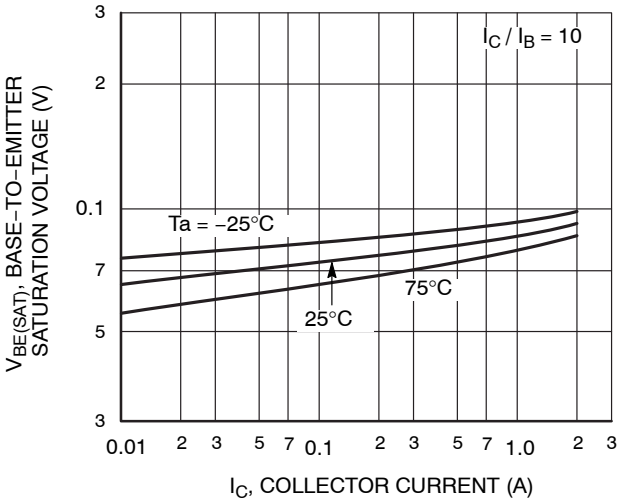


Figure 10. $V_{BE}(sat) - I_C$

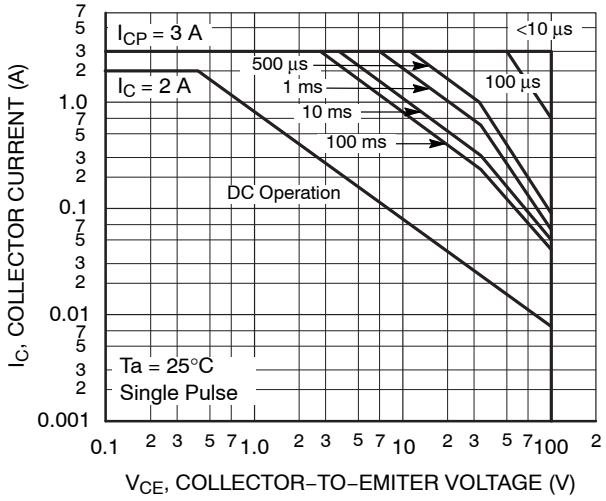


Figure 11. ASO

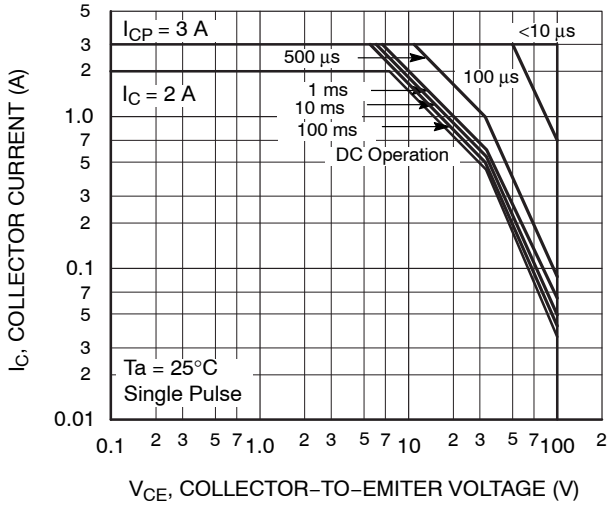


Figure 9. ASO

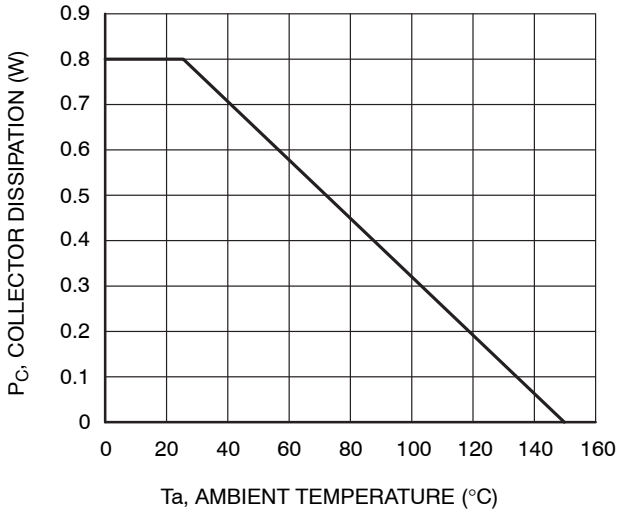


Figure 12. P_C – Ta

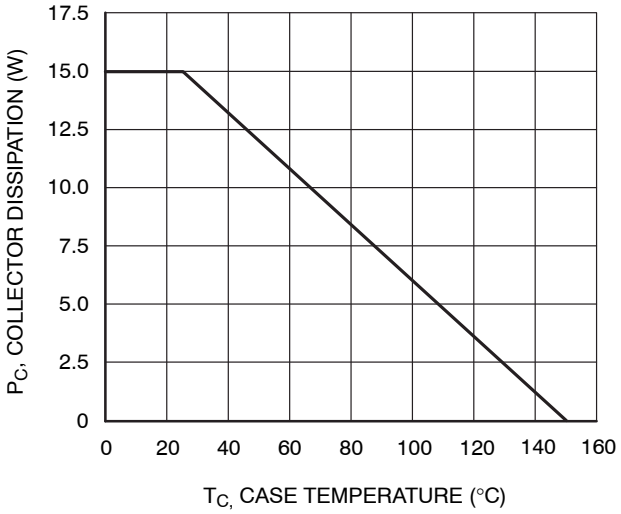


Figure 8. P_C – T_C

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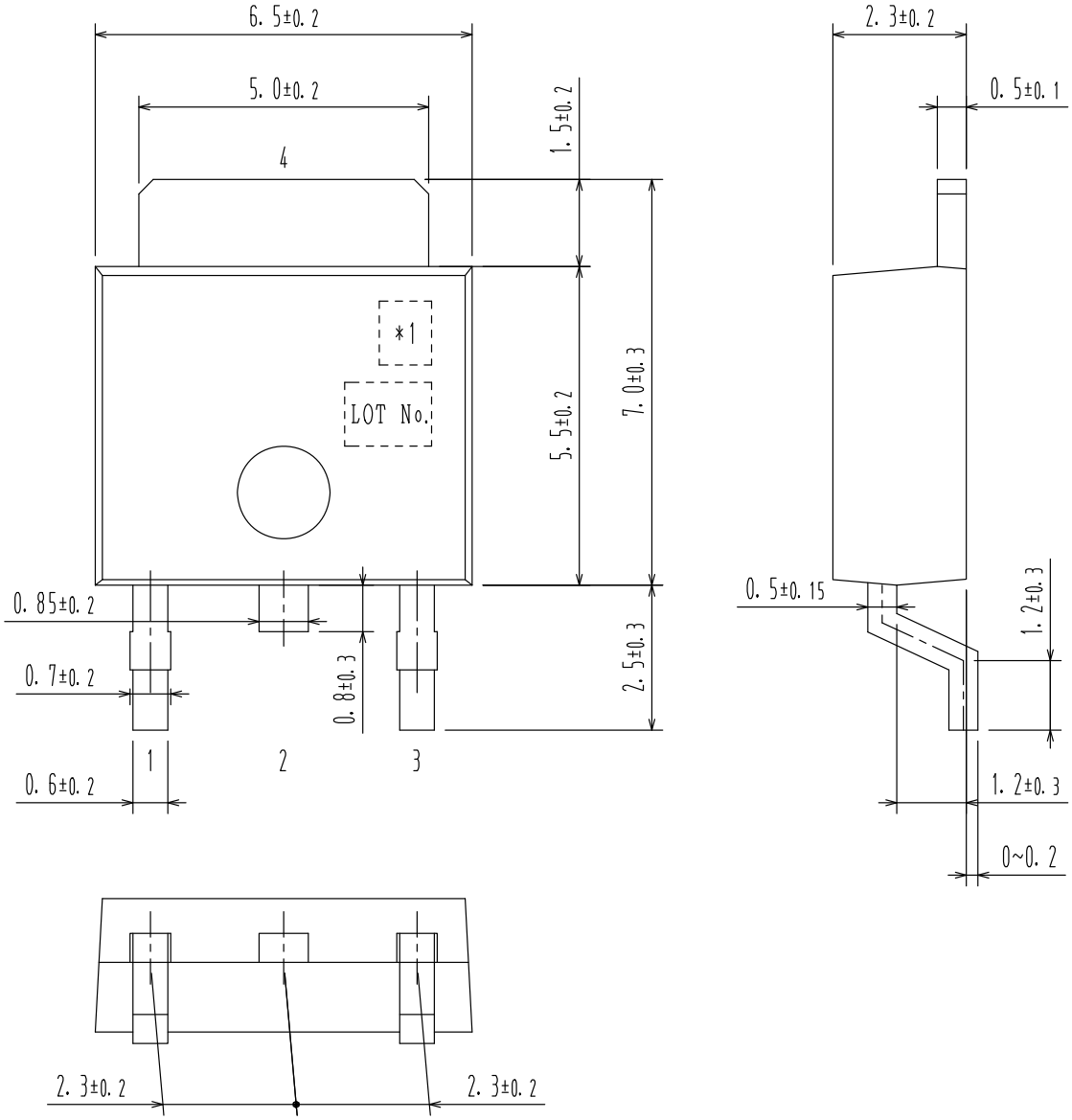

Pin 2 is idle pin with electrical designation only carried.

*1:Lot indication

1:
2:
3:
4:

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