

Bipolar Transistor

20 V, 5 A, Low $V_{CE(sat)}$,
NPN Single TP/TP-FA

2SD1805

Features

- Low Saturation Voltage
- Large Current Capacity
- Fast Switching Time
- Small and Slim Package Making it Easy to Make 2SD1805-Applied Sets Smaller
- This is a Pb-Free Device

Applications

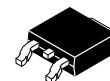
- Strobes
- Voltage Regulators
- Relay Drivers
- Lamp Drivers

Specifications

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

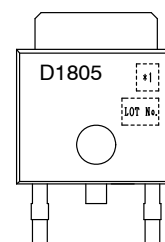
Symbol	Rating	Value	Unit
V_{CBO}	Collector-to-Base Voltage	60	V
V_{CEO}	Collector-to-Emitter Voltage	20	V
V_{EBO}	Emitter-to-Base Voltage	6	V
I_C	Collector Current	5	A
I_{CP}	Collector Current (Pulse)	8	A
P_C	Collector Dissipation	1	W
	Collector Dissipation	$T_C = 25^\circ\text{C}$	15 W
T_j	Junction Temperature	150	$^\circ\text{C}$
T_{stg}	Storage Temperature	-55 to +150	$^\circ\text{C}$

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.

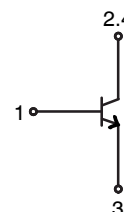


DPAK / TP-FA
CASE 369AH

MARKING DIAGRAM



ELECTRICAL CONNECTION



ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

2SD1805

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

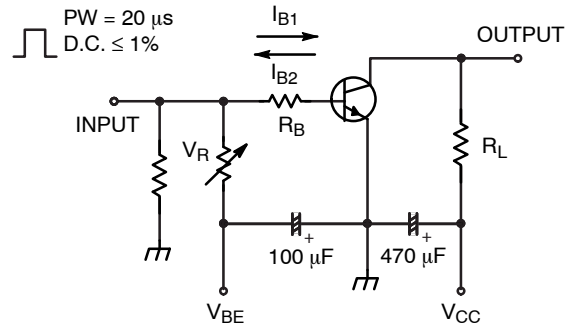
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector Cutoff Current	I_{CBO}	$V_{CB} = 50 \text{ V}, I_E = 0 \text{ A}$	–	–	100	nA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 5 \text{ V}, I_C = 0 \text{ A}$	–	–	100	nA
DC Current Gain	h_{FE1}	$V_{CE} = 2 \text{ V}, I_C = 500 \text{ mA}$	120*	–	560*	
	h_{FE2}	$V_{CE} = 2 \text{ V}, I_C = 3 \text{ A}$	95	–	–	
Gain–Bandwidth Product	f_T	$V_{CE} = 10 \text{ V}, I_C = 50 \text{ mA}$	–	120	–	MHz
Output Capacitance	C_{ob}	$V_{CB} = 10 \text{ V}, f = 1 \text{ MHz}$	–	45	–	pF
Collector–to–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 3 \text{ A}, I_B = 60 \text{ mA}$	–	220	500	mV
Base–to–Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 3 \text{ A}, I_B = 60 \text{ mA}$	–	–	1.5	V
Collector–to–Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 10 \mu\text{A}, I_E = 0 \text{ A}$	60	–	–	V
Collector–to–Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1 \text{ mA}, R_{BE} = \infty$	20	–	–	V
Emitter–to–Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10 \mu\text{A}, I_C = 0 \text{ A}$	6	–	–	V
Turn–On Time	t_{on}	See specified Test Circuit		30	–	ns
Storage Time	t_{stg}			300	–	ns
Fall Time	t_f			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.

* The 2SD1805 is classified by 500 mA h_{FE} as follows.

Rank	E	F	G
h_{FE}	120 to 200	160 to 320	280 to 560

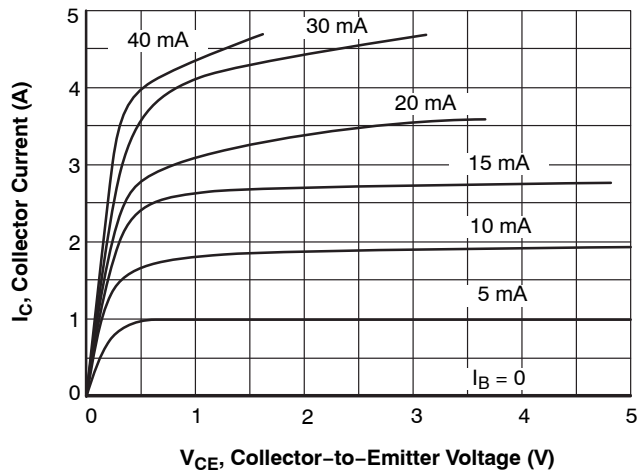
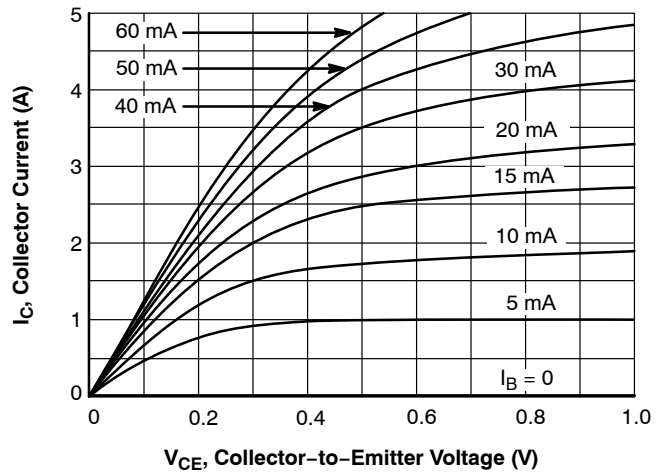
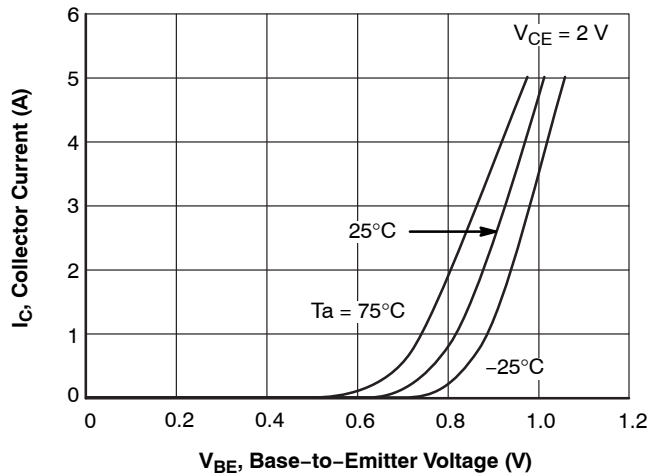
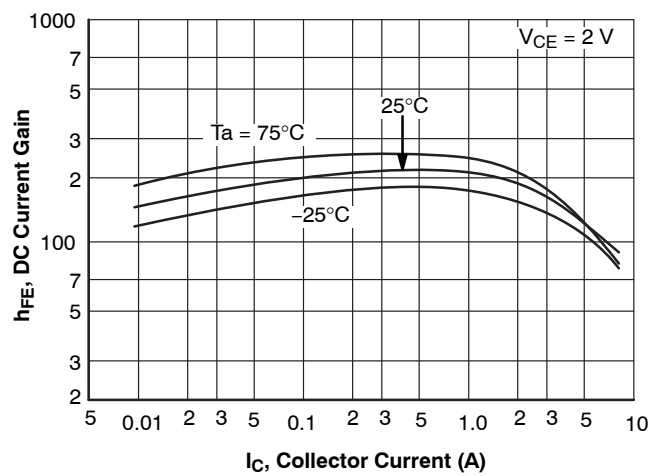
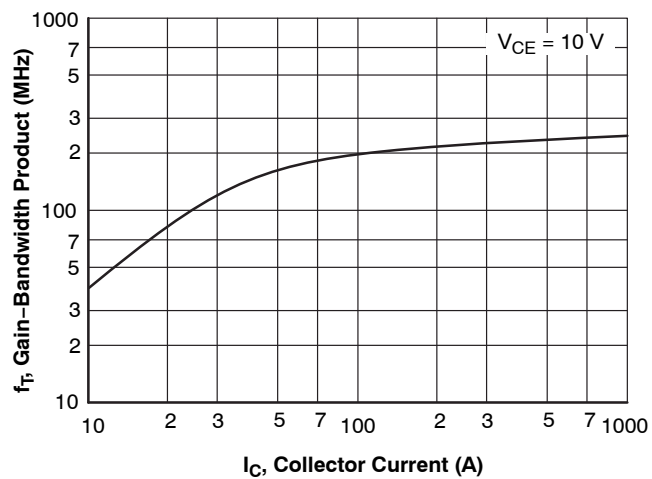
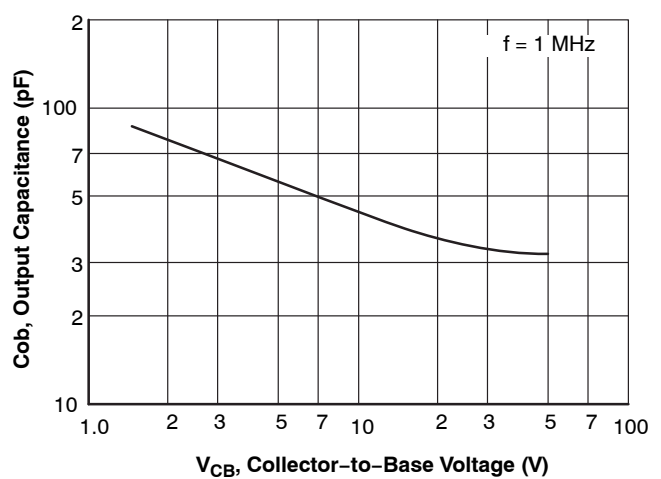
Switching Time Test Circuit



$$I_C = 10I_{B1} = -10I_{B2} = 2 \text{ A}, V_{CC} = 10 \text{ V}$$

Figure 1. Test Circuit

TYPICAL CHARACTERISTICS

Figure 2. $I_C - V_{CE}$ Figure 3. $I_C - V_{CE}$ Figure 4. $I_C - V_{BE}$ Figure 5. $h_{FE} - I_C$ Figure 6. $f_T - I_C$ Figure 7. $C_{ob} - V_{CB}$

TYPICAL CHARACTERISTICS (continued)

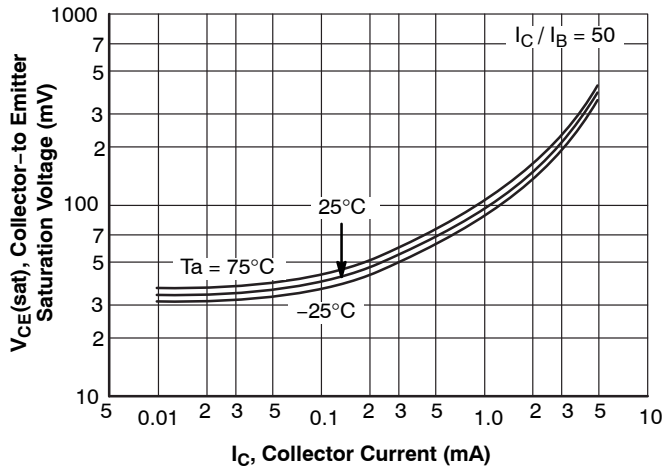


Figure 8. $V_{CE(sat)} - I_C$

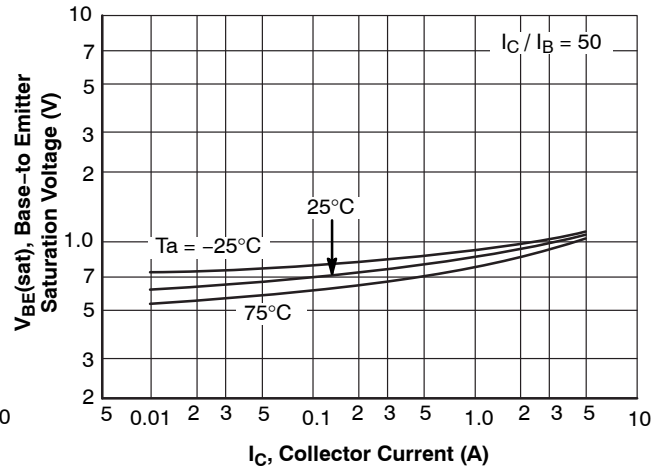


Figure 9. $V_{BE(sat)} - I_C$

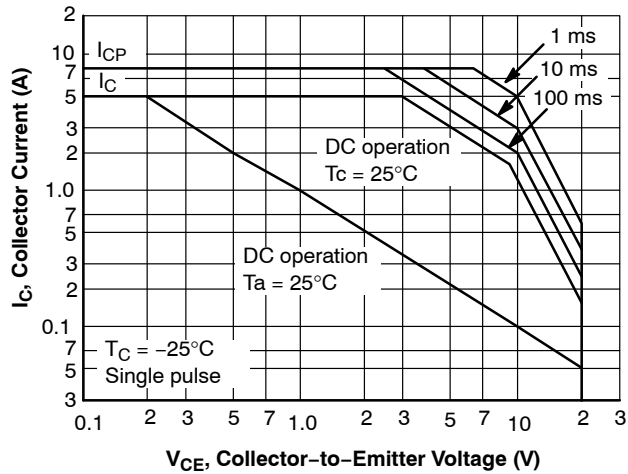


Figure 10. ASO

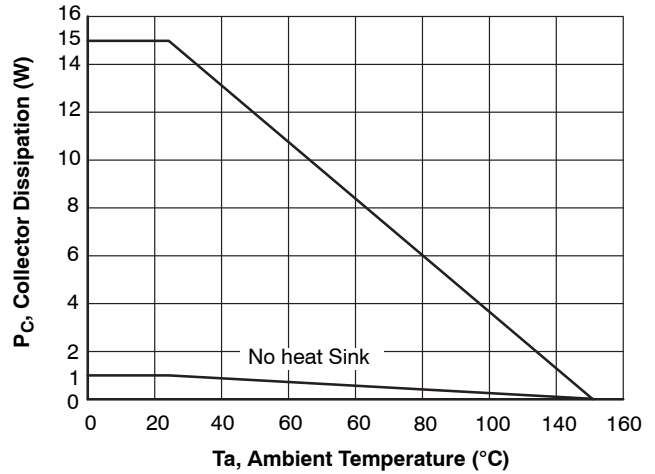


Figure 11. $P_C - T_a$

2SD1805

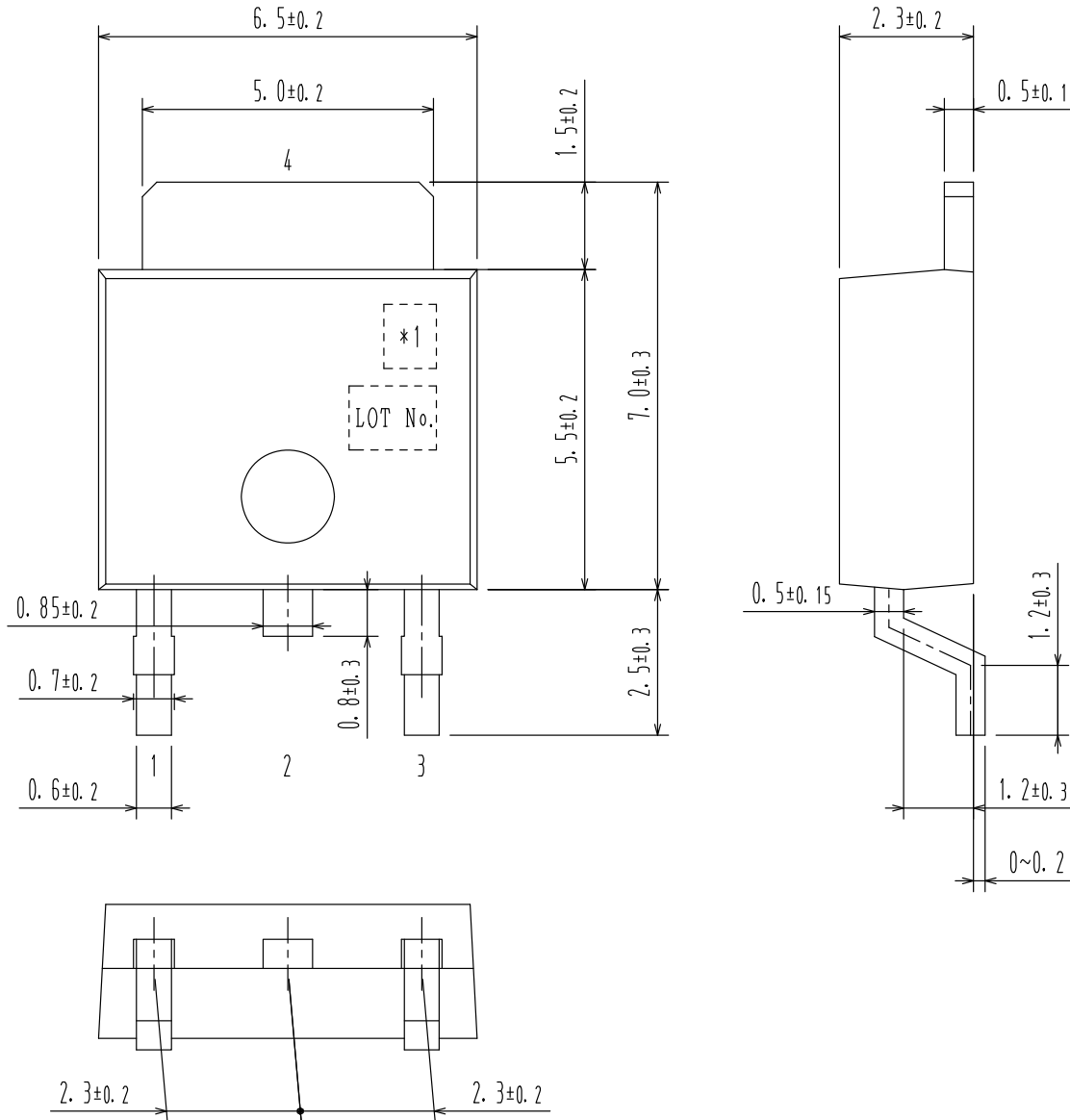
ORDERING INFORMATION

Device Order Number	Package Type	Shipping†
2SD1805F-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](#).

DPAK / TP-FA
CASE 369AH
ISSUE O

DATE 30 JAN 2012



Pin 2 is idle pin with electrical
designation only carried.

1:
2:
3:
*1: Lot indication 4:

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