Bipolar Transistor

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

2SD1805

DPAK / TP−FA
CASE 369AH

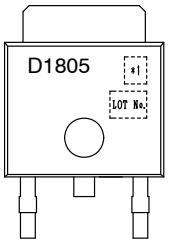
Features

- 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

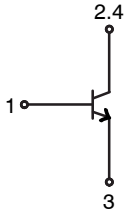
Applications

- Strobes
- Voltage Regulators
- Relay Drivers
- Lamp Drivers

MARKING DIAGRAM



ELECTRICAL CONNECTION



ORDERING INFORMATION

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

Specifications

ABSOLUTE MAXIMUM RATINGS (Ta = 25°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°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.

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

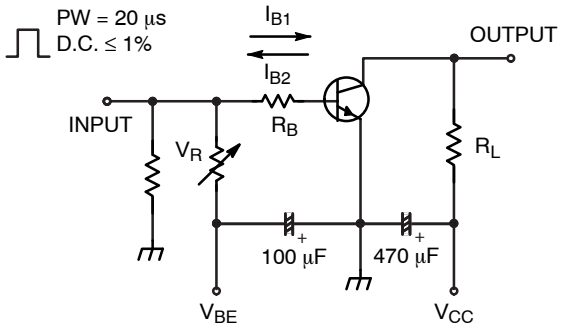
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector Cutoff Current	I_{CBO}	V_{CB} = 50 V, I_E = 0 A	–	–	100	nA
Emitter Cutoff Current	I_{EBO}	V_{EB} = 5 V, I_C = 0 A	–	–	100	nA
DC Current Gain	$h_{FE}1$	V_{CE} = 2 V, I_C = 500 mA	120*	–	560*	
	$h_{FE}2$	V_{CE} = 2 V, I_C = 3 A	95	–	–	
Gain−Bandwidth Product	f_T	V_{CE} = 10 V, I_C = 50 mA	–	120	–	MHz
Output Capacitance	Cob	V_{CB} = 10 V, f = 1 MHz	–	45	–	pF
Collector−to−Emitter Saturation Voltage	V_{CE}(sat)	I_C = 3 A, I_B = 60 mA	–	220	500	mV
Base−to−Emitter Saturation Voltage	V_{BE}(sat)	I_C = 3 A, I_B = 60 mA	–	–	1.5	V
Collector−to−Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = 10 μA, I_E = 0 A	60	–	–	V
Collector−to−Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 1 mA, R_{BE} = ∞	20	–	–	V
Emitter−to−Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = 10 μA, I_C = 0 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 A, V_{CC} = 10 V

Figure 1. Test Circuit

TYPICAL CHARACTERISTICS

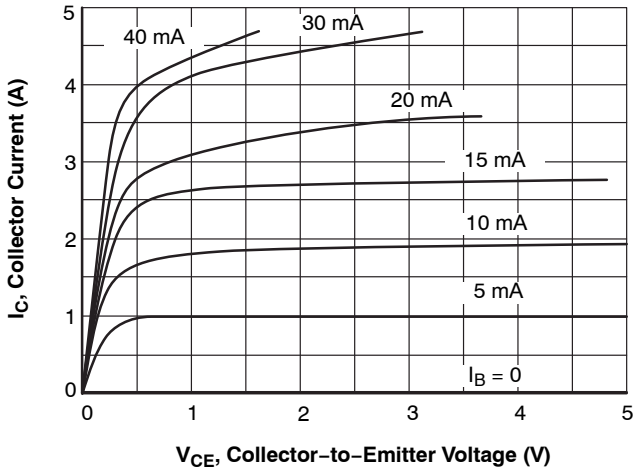


Figure 2. $I_C - V_{CE}$

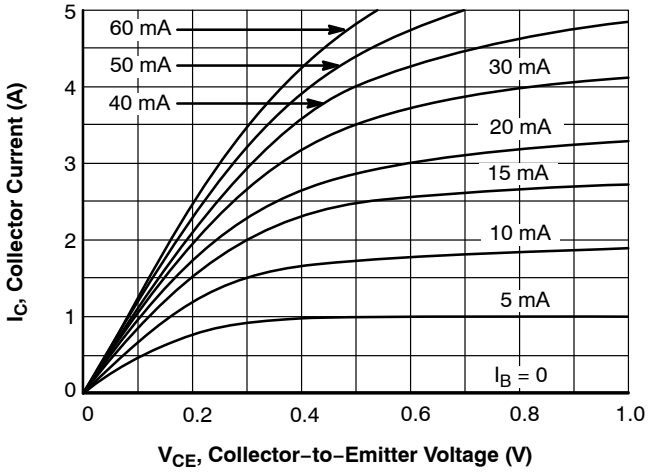


Figure 3. $I_C - V_{CE}$

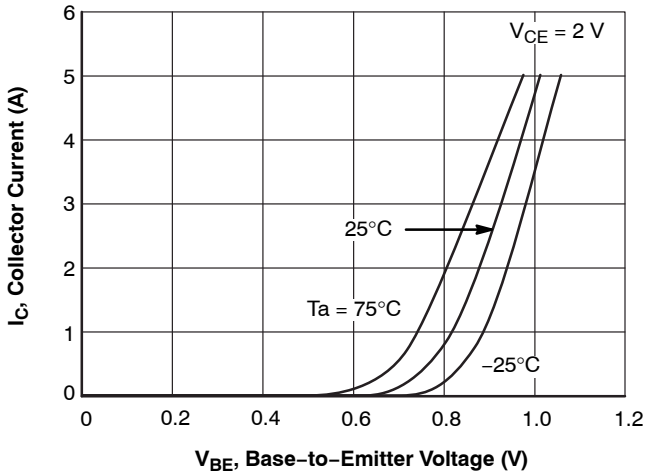


Figure 4. $I_C - V_{BE}$

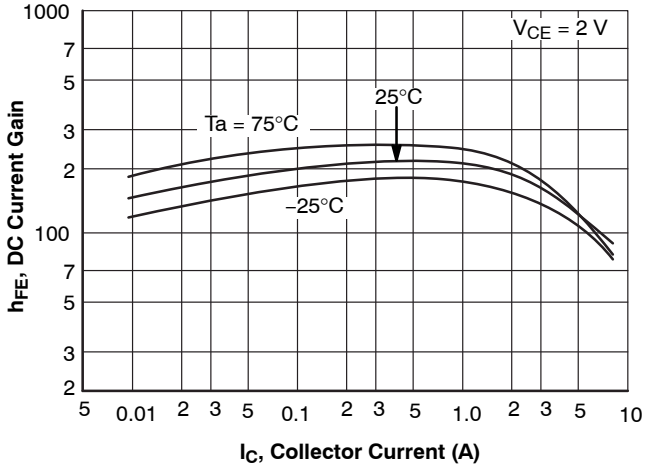


Figure 5. $h_{FE} - I_C$

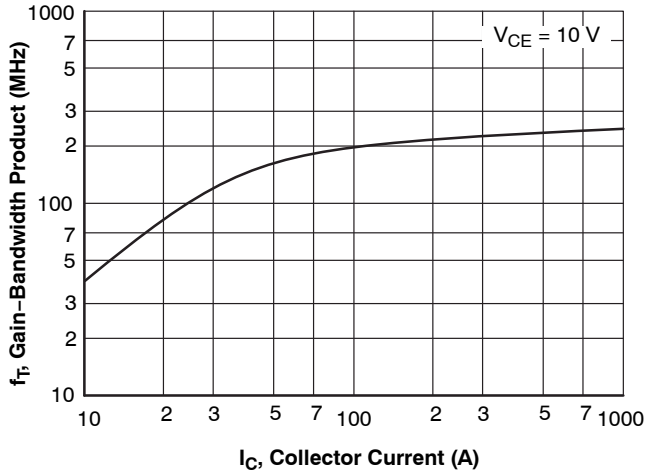


Figure 6. $f_T - I_C$

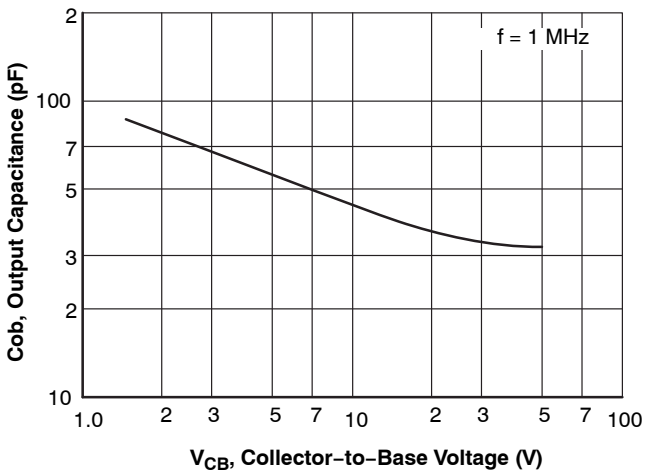


Figure 7. Cob − V_{CB}

TYPICAL CHARACTERISTICS (continued)

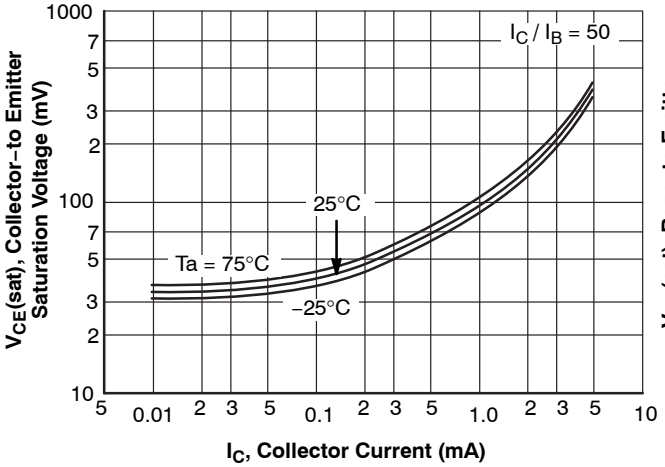


Figure 8. V_{CE}(sat) − I_C

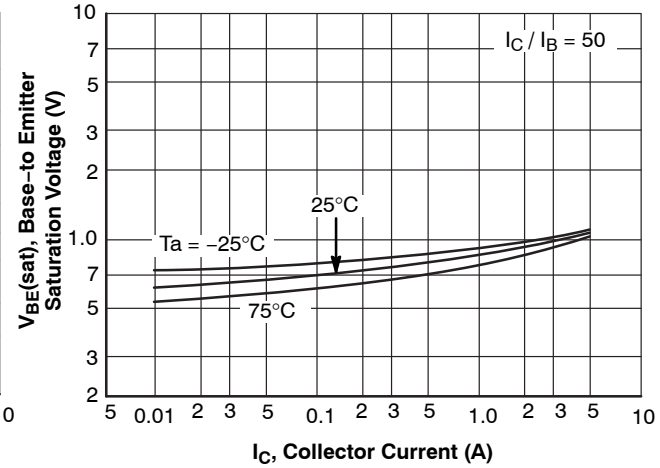


Figure 9. V_{BE}(sat) − I_C

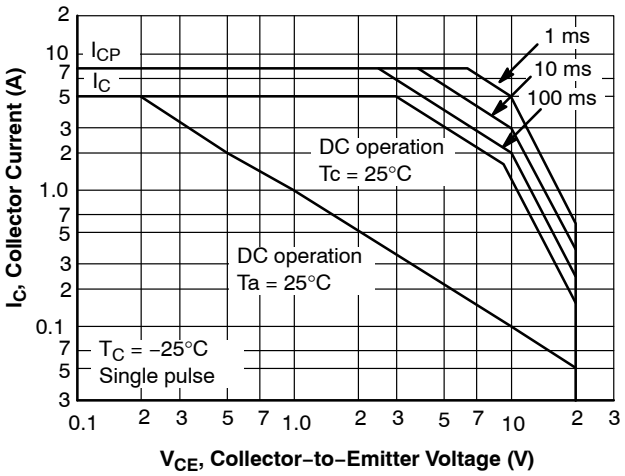


Figure 10. ASO

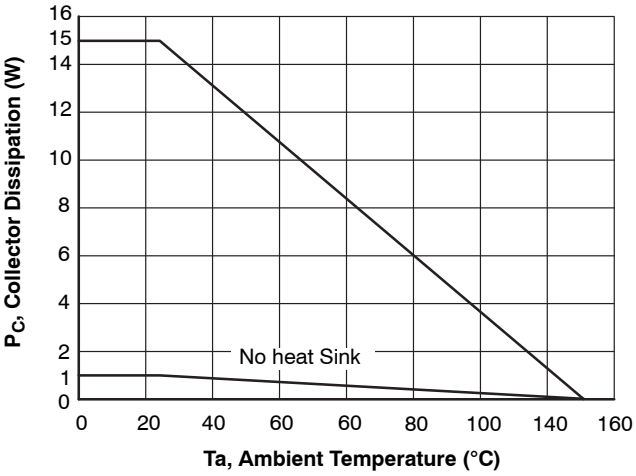


Figure 11. P_C − Ta

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
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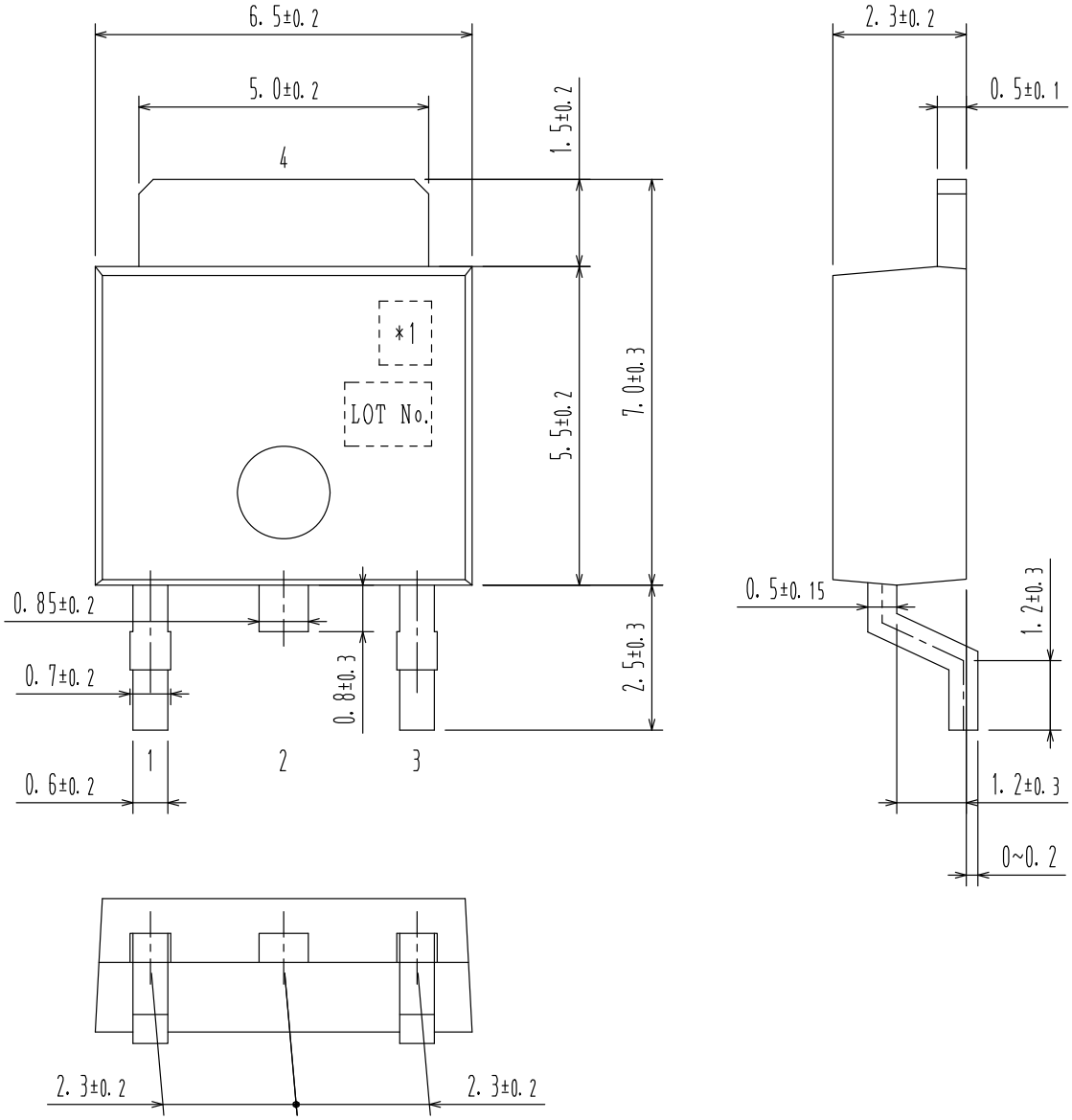
ISSUE O

DATE 30 JAN 2012



Pin 2 is idle pin with electrical designation only carried.

*1:Lot indication

1:
2:
3:
4:

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DESCRIPTION:	**DPAK / TP−FA**		**PAGE 1 OF 1**

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