

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

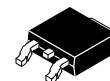
- Strobes
- Voltage Regulators
- Relay Drivers
- Lamp Drivers

Specifications

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

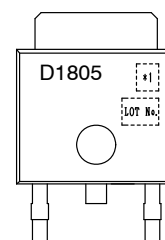
Symbol	Rating	Value	Unit
V_{CBO}	Collector–to–Base Voltage	60	V
V_{CEO}	Collector–to–Emitter Voltage	20	V
V_{EBO}	Emitter–to–Base Voltage	6	V
I_C	Collector Current	5	A
I_{CP}	Collector Current (Pulse)	8	A
P_C	Collector Dissipation	1	W
	Collector Dissipation	$T_C = 25^\circ\text{C}$ 15	W
T_j	Junction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

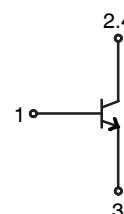


DPAK / TP-FA
CASE 369AH

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)

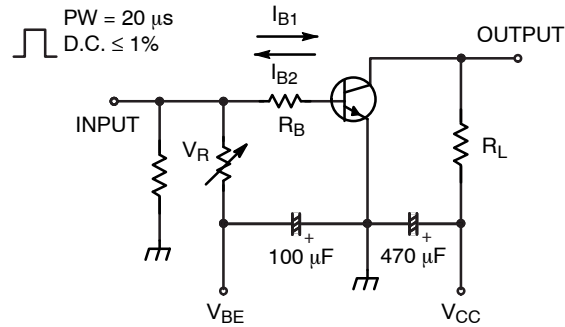
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector Cutoff Current	I_{CBO}	$V_{CB} = 50 \text{ V}, I_E = 0 \text{ A}$	–	–	100	nA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 5 \text{ V}, I_C = 0 \text{ A}$	–	–	100	nA
DC Current Gain	h_{FE1}	$V_{CE} = 2 \text{ V}, I_C = 500 \text{ mA}$	120*	–	560*	
	h_{FE2}	$V_{CE} = 2 \text{ V}, I_C = 3 \text{ A}$	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

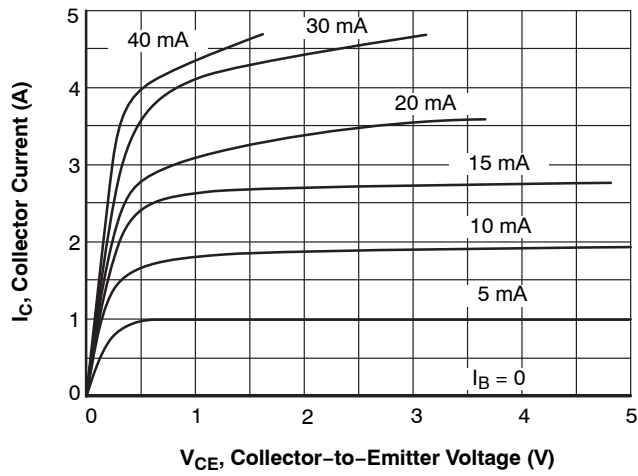
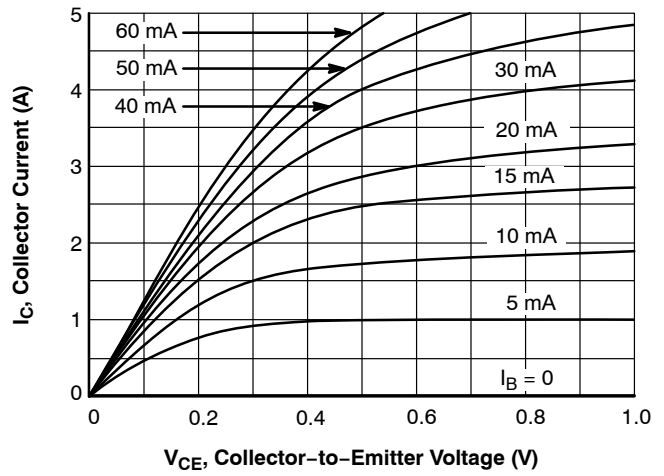
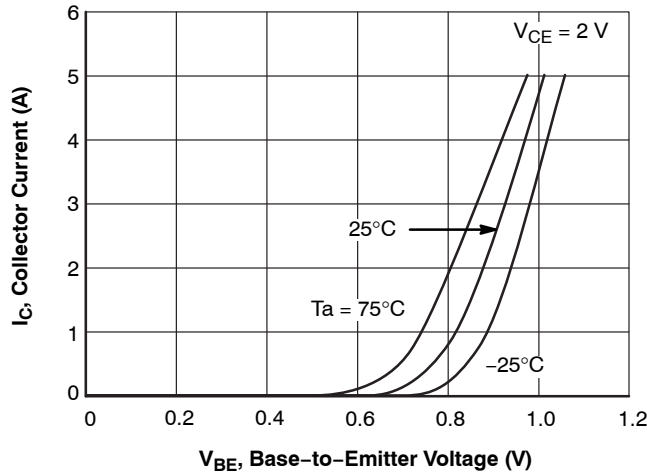
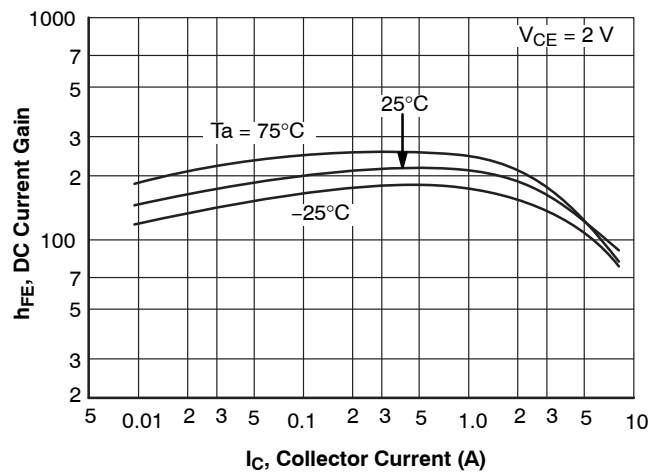
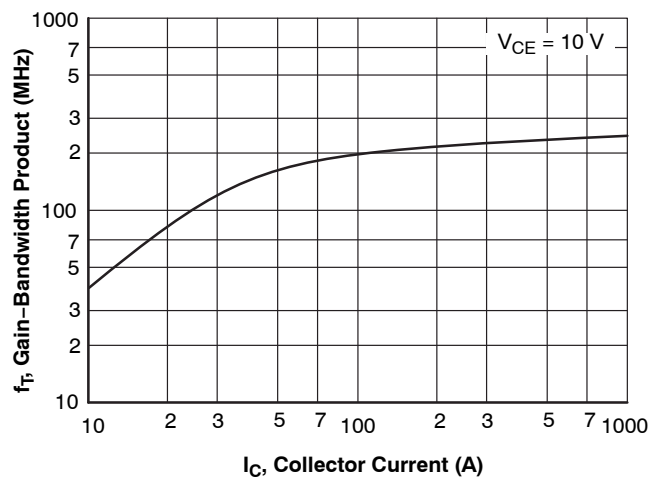
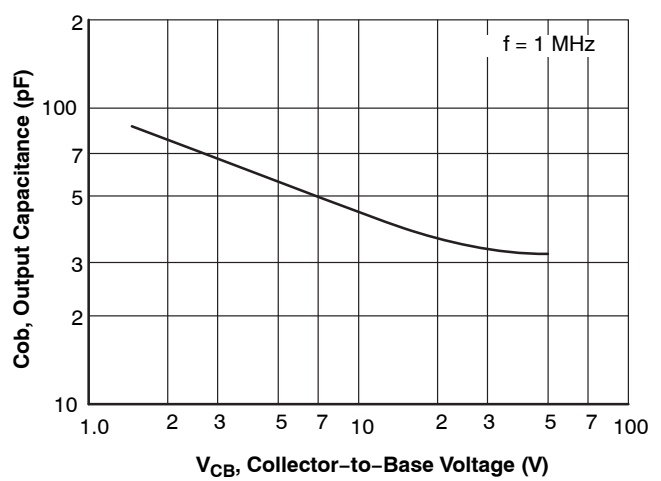
Switching Time Test Circuit



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

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)

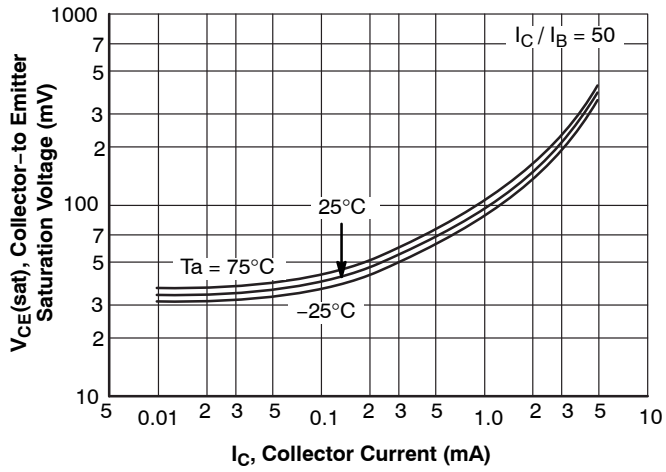


Figure 8. $V_{CE(sat)} - I_C$

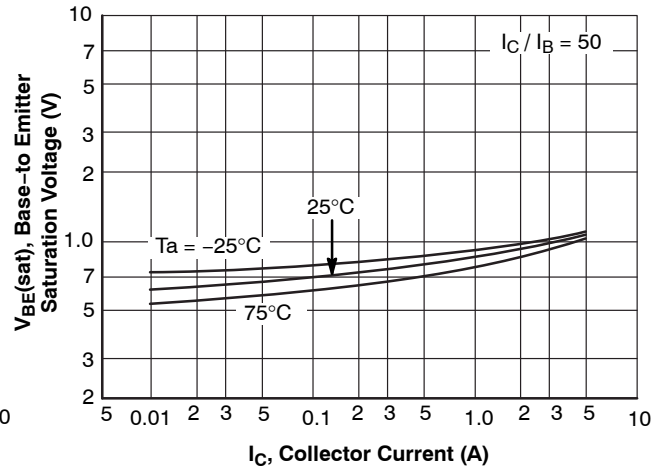


Figure 9. $V_{BE(sat)} - I_C$

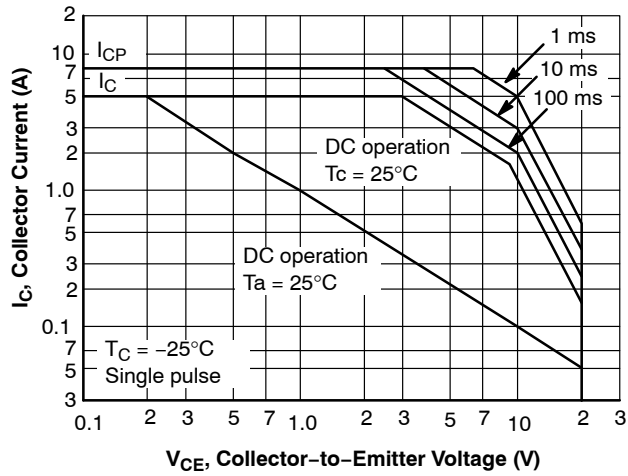


Figure 10. ASO

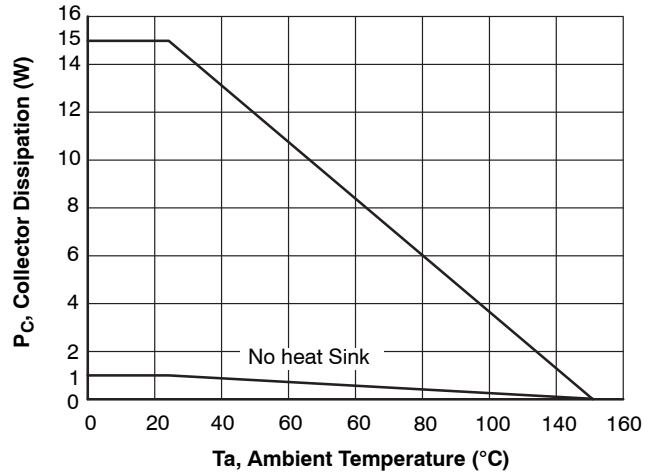


Figure 11. $P_C - T_a$

2SD1805

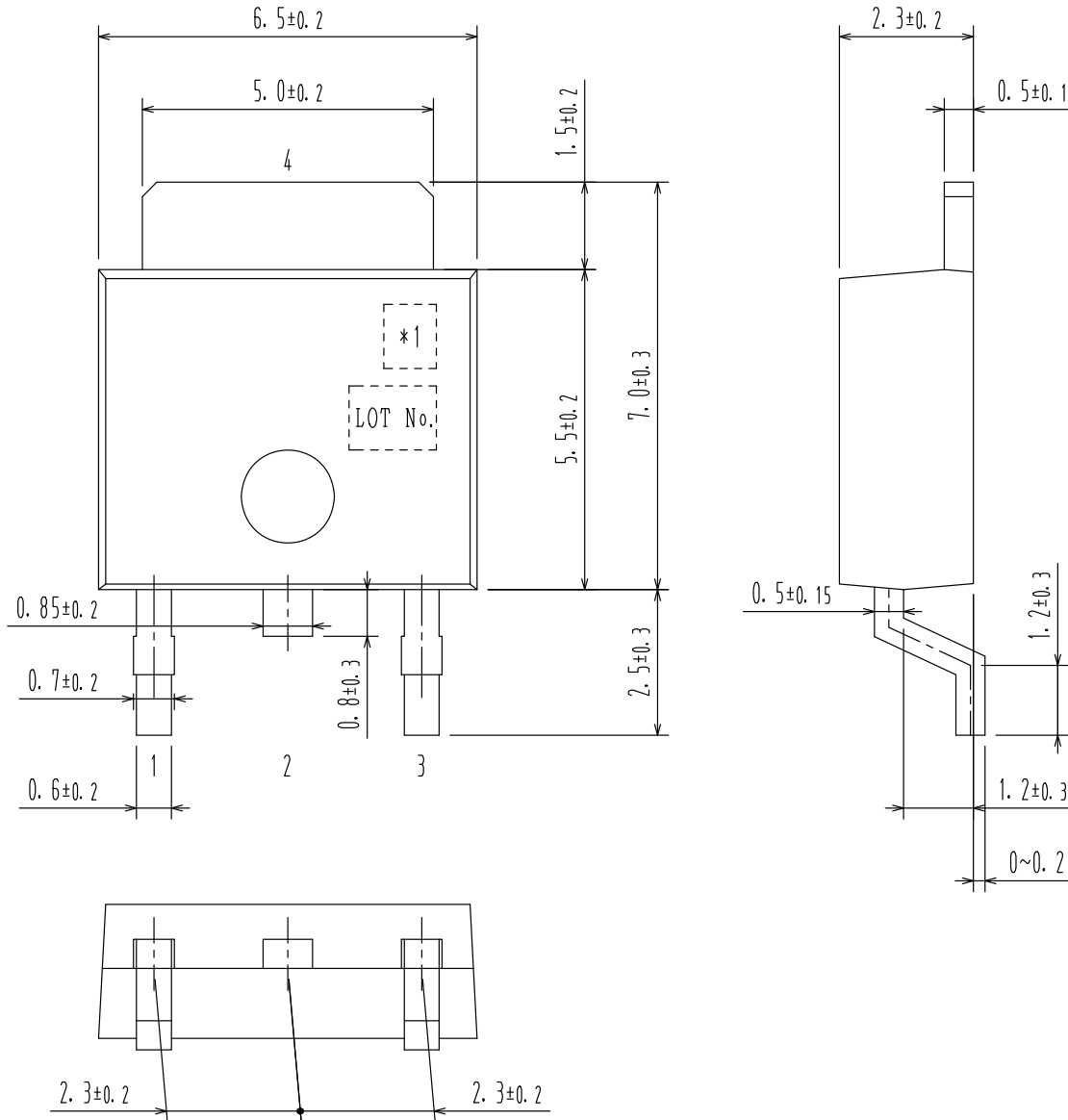
ORDERING INFORMATION

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:

DOCUMENT NUMBER:	98AON66236E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	DPAK / TP-FA	PAGE 1 OF 1

onsemi and Onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales