



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## 2SD1685 — NPN Epitaxial Planar Silicon Transistor 20V/5A Switching Applications

### Applications

- Strobe, voltage regulators, relay drivers, lamp drivers

### Features

- Low saturation voltage
- Large current capacity
- Fast switching time
- No insulator required when mounting because the leadframe of the chip is covered with plastic

### Specifications

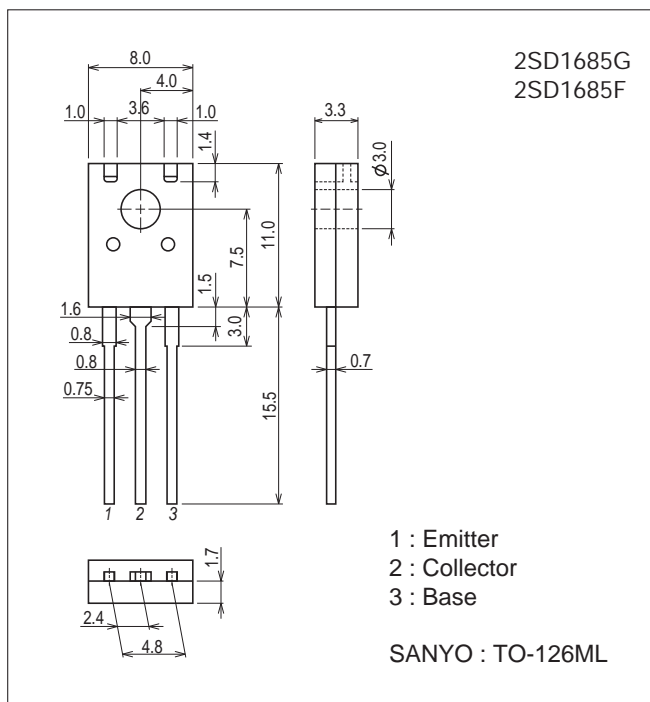
#### Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V <sub>CB0</sub>		60	V
Collector-to-Emitter Voltage	V <sub>CEO</sub>		20	V
Emitter-to-Base Voltage	V <sub>EBO</sub>		6	V
Collector Current	I <sub>C</sub>		5	A
Collector Current (Pulse)	I <sub>CP</sub>		8	A
Collector Dissipation	P <sub>C</sub>		1.5	W
		T <sub>C</sub> =25°C	10	W
Junction Temperature	T <sub>J</sub>		150	°C
Storage Temperature	T <sub>stg</sub>		-55 to +150	°C

### Package Dimensions

unit : mm (typ)

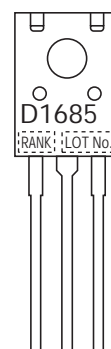
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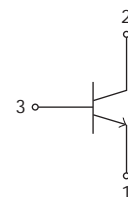
### Product & Package Information

- Package : TO-126ML
- JEITA, JEDEC : TO-126
- Minimum Packing Quantity : 200 pcs./bag

### Marking



### Electrical Connection



# 2SD1685

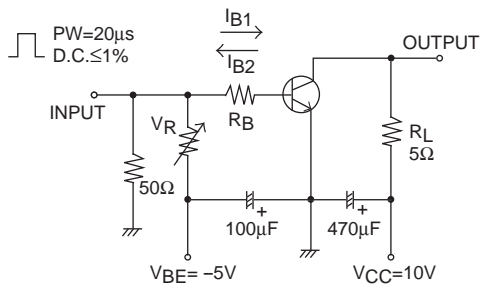
## Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=50V, I_E=0A$			100	nA
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=5V, I_C=0A$			100	nA
DC Current Gain	$h_{FE1}$	$V_{CE}=2V, I_C=500mA$	120*		560*	
	$h_{FE2}$	$V_{CE}=2V, I_C=3A$	95			
Gain-Bandwidth Product	$f_T$	$V_{CE}=10V, I_C=50mA$		120		MHz
Output Capacitance	$C_{ob}$	$V_{CB}=10V, f=1MHz$		45		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=3A, I_B=60mA$		220	500	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=3A, I_B=60mA$			1.5	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=10\mu A, I_E=0A$	60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=1mA, R_{BE}=\infty$	20			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=10\mu A, I_C=0A$	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

\* : The 2SD1685 is classified by 500mA  $h_{FE}$  as follows :

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

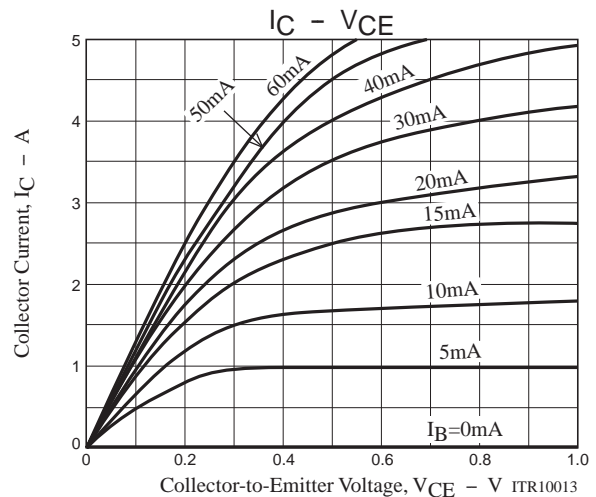
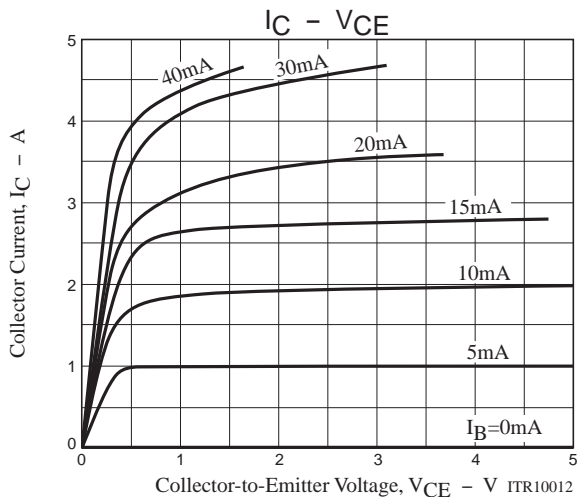
## Switching Time Test Circuit

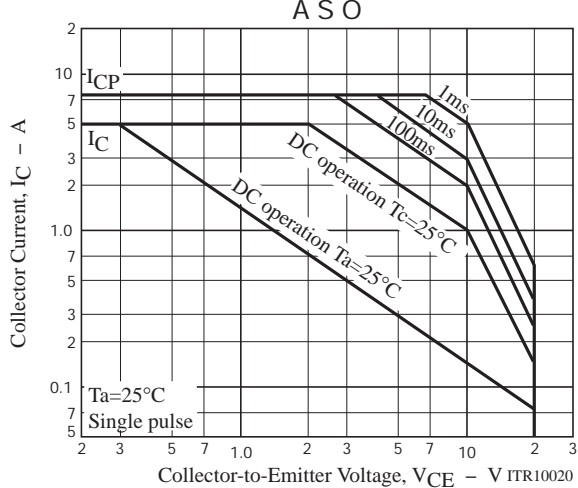
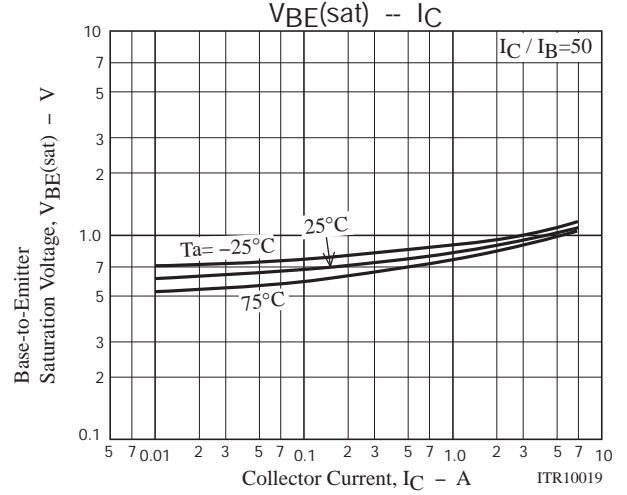
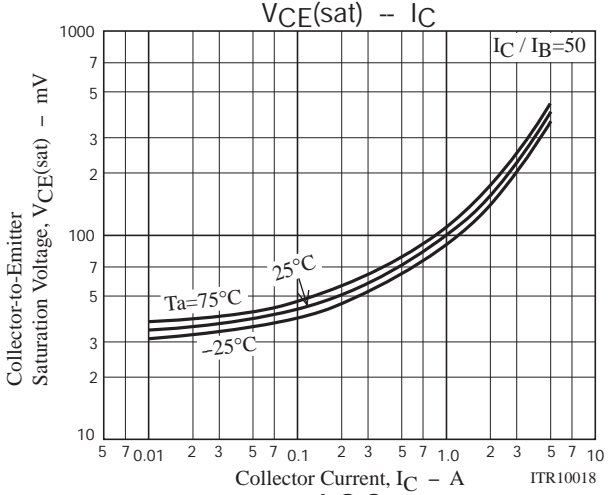
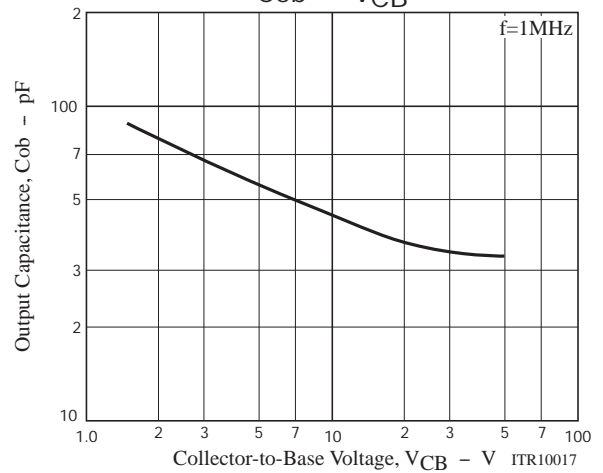
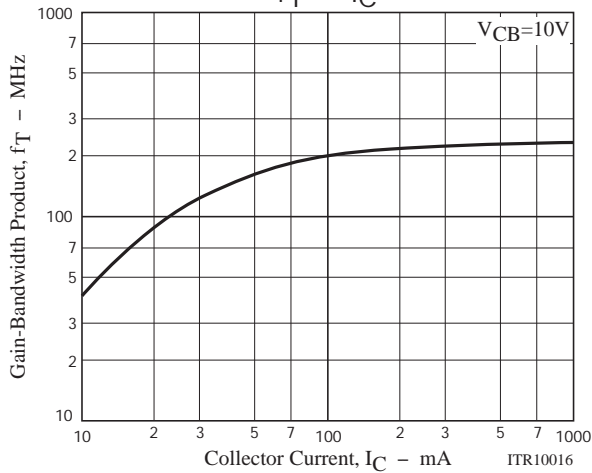
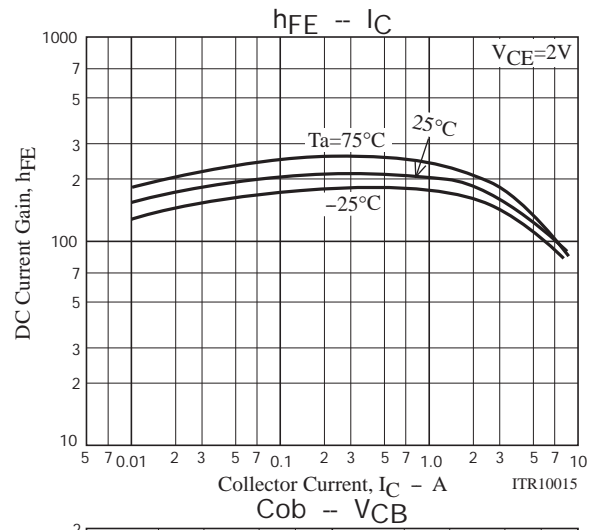
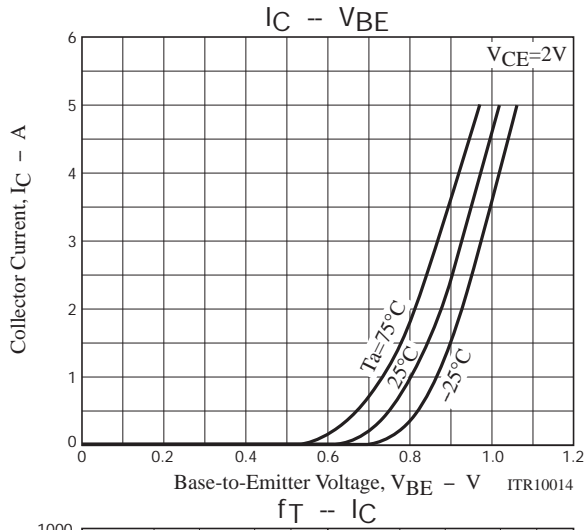


$$I_C = 10I_{B1} = -10I_{B2} = 2A$$

## Ordering Information

Device	Package	Shipping	memo
2SD1685G	TO-126ML	200pcs./bag	Pb Free
2SD1685F	TO-126ML	200pcs./bag	





Bag Packing Specification

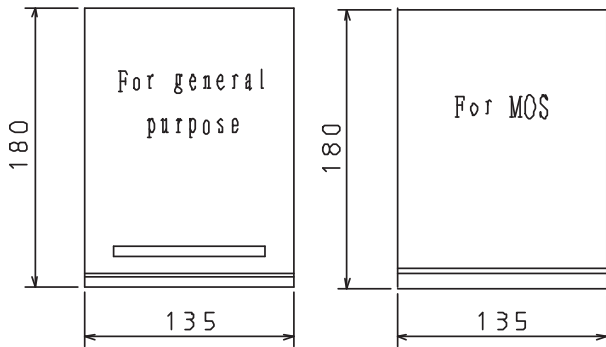
2SD1685G, 2SD1685F

1. Packing Format

Package Name	Maximum Number of devices contained (pcs)			Packing format	
	Bag	Inner box	Outer box	Inner BOX	Outer BOX
TO-126ML	200	4,000	12,000	B-1 20 bags contained Dimensions:mm (external) 445×225×55	A-2 3 inner boxes contained Dimensions:mm (external) 470×250×190

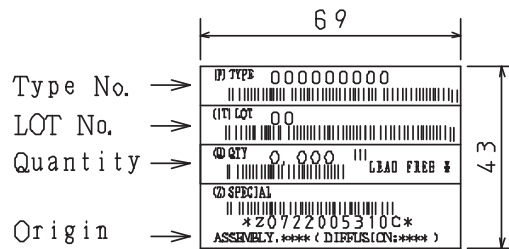
2. Bag dimensions

(unit:mm)



3. Bag label, Inner box label

(unit:mm)



NOTE (1)

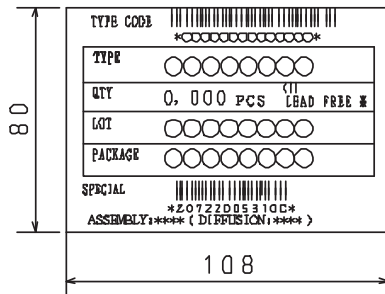
The LEAD FREE \* description shows that the surface treatment of the terminal is lead free.

Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

4. Outer box label

(unit:mm)

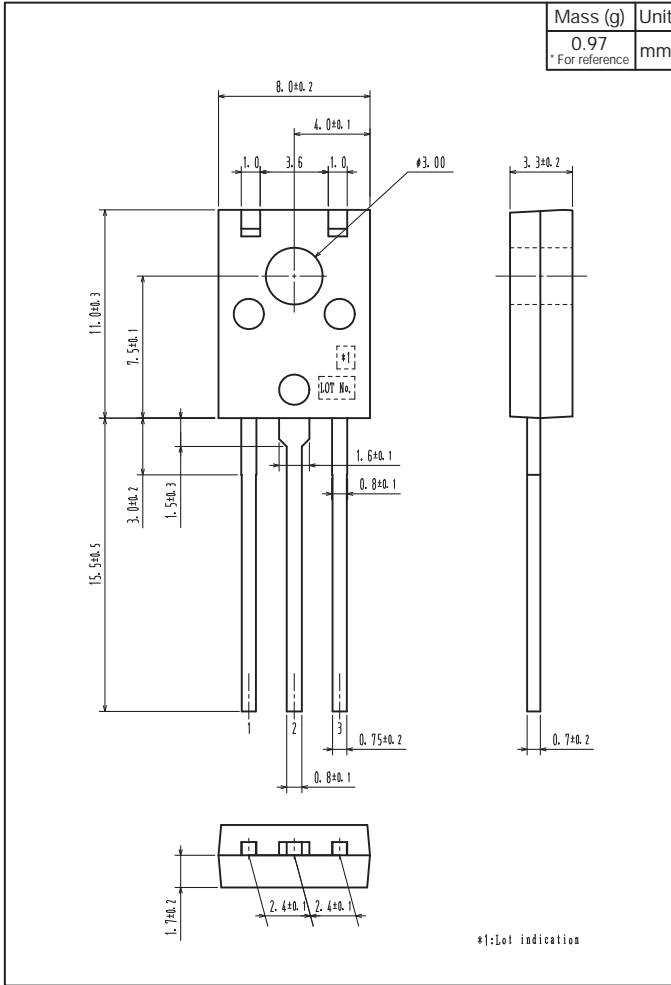
It is a label at the time of factory shipments.  
The form of a label may change in physical distribution process.



# 2SD1685

## Outline Drawing

2SD1685G, 2SD1685F



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