



SANYO Semiconductors

## DATA SHEET

# 2SB1136 / 2SD1669

PNP / NPN Epitaxial Planar Silicon Transistors

50V / 12A Switching Applications

## Applications

- Relay drivers, high-speed inverters, converters, and other general high-current switching applications.

## Features

- Low-saturation collector-to-emitter voltage :  $V_{CE(sat)} = -0.5V$  (PNP),  $0.4V$  (PNP) max.
- Wide ASO leading to high resistance to breakdown.
- Micaless package facilitating mounting.

## Specifications ( ) : 2SB1136

### Absolute Maximum Ratings at $T_a = 25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CB0}$		(-)60	V
Collector-to-Emitter Voltage	$V_{CEO}$		(-)50	V
Emitter-to-Base Voltage	$V_{EB0}$		(-)6	V
Collector Current	$I_C$		(-)12	A
Collector Current (Pulse)	$I_{CP}$		(-)15	A
Collector Dissipation	$P_C$		2	W
		$T_c = 25^\circ C$	30	W
Junction Temperature	$T_J$		150	$^\circ C$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ C$

### Electrical Characteristics at $T_a = 25^\circ C$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = (-)40V, I_E = 0A$			(-)0.1	mA
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = (-)4V, I_C = 0A$			(-)0.1	mA

Continued on next page.

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Continued from preceding page.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
DC Current Gain	$h_{FE1}$	$V_{CE}=(-)2V, I_C=(-)1A$	70*		280*	
	$h_{FE2}$	$V_{CE}=(-)2V, I_C=(-)5A$	30			
Gain-Bandwidth Product	$f_T$	$V_{CE}=(-)5V, I_C=(-)1A$		10		MHz
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=(-)6A, I_B=(-)0.6A$			(-)0.4	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=(-)1mA, I_E=0A$	(-)60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=(-)1mA, R_{BE}=\infty$	(-)50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=(-)1mA, I_C=0A$	(-)6			V
Turn-ON Time	$t_{on}$	See specified Test Circuit.		(0.2)0.1		$\mu s$
Storage Time	$t_{stg}$	See specified Test Circuit.		(0.4)1.2		$\mu s$
Fall Time	$t_f$	See specified Test Circuit.		(0.1)0.05		$\mu s$

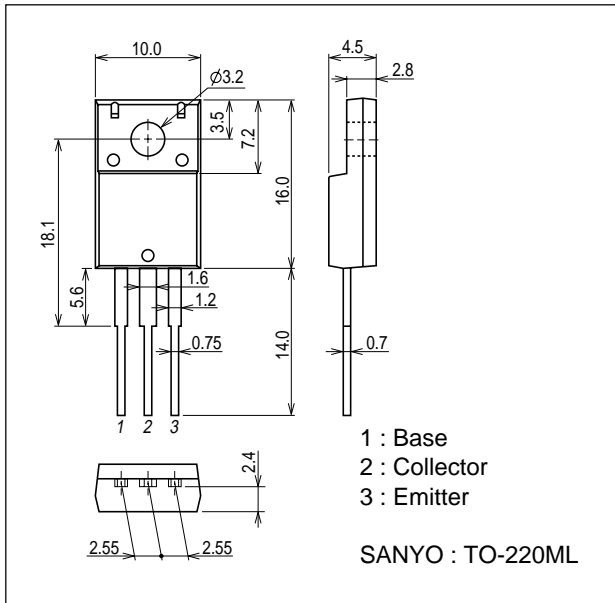
\* : The 2SB1136 / 2SD1669 are classified by 1A  $h_{FE}$  as follows :

Rank	Q	R	S
$h_{FE}$	70 to 140	100 to 200	140 to 280

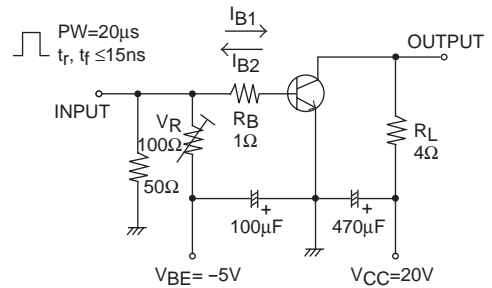
## Package Dimensions

unit : mm (typ)

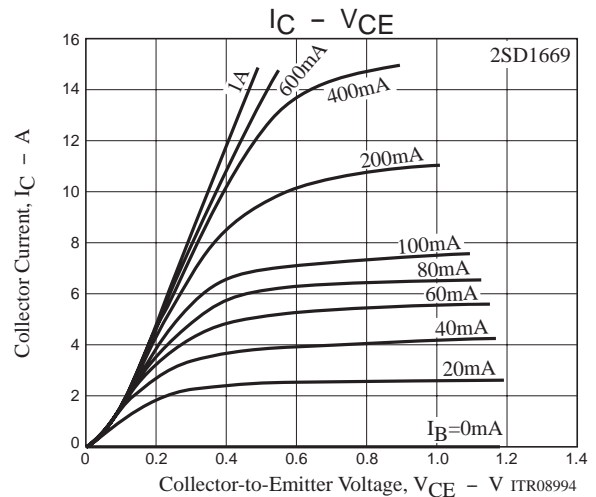
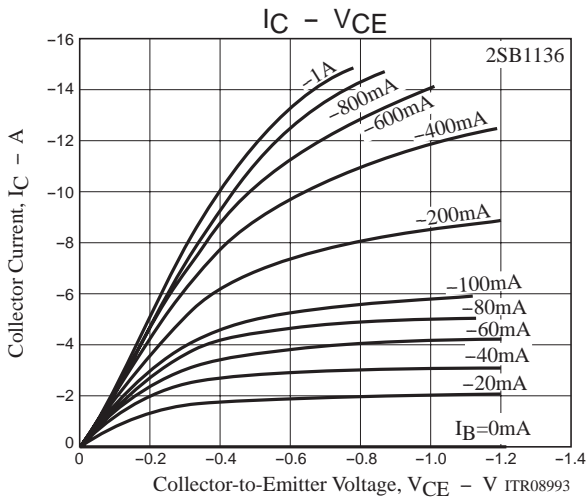
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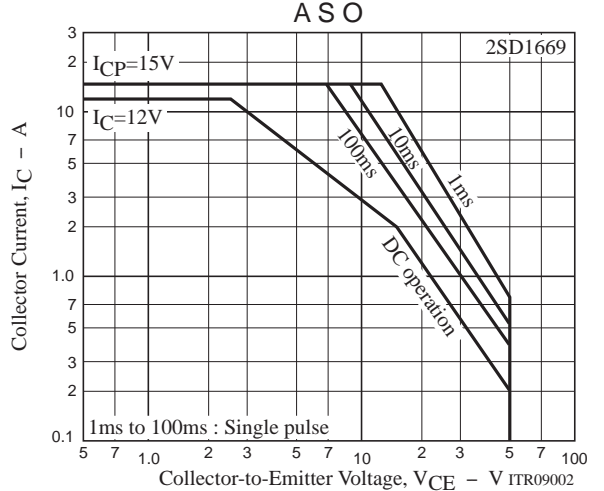
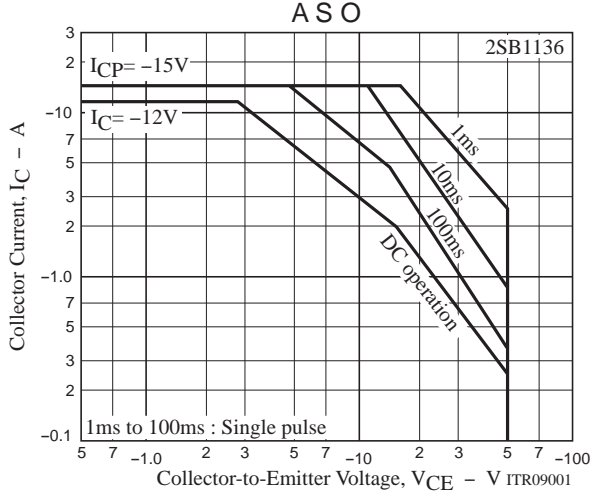
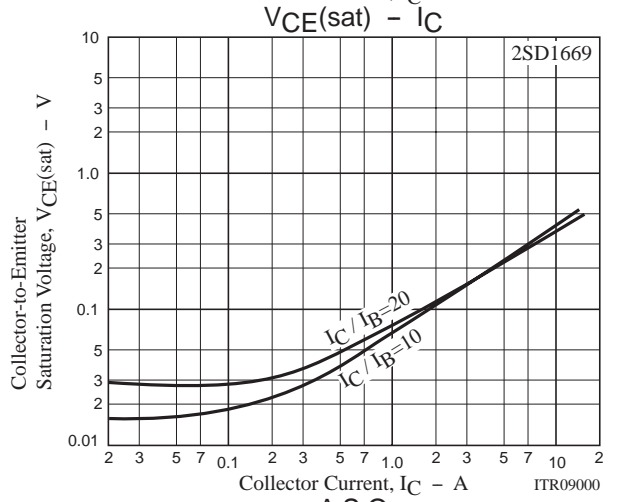
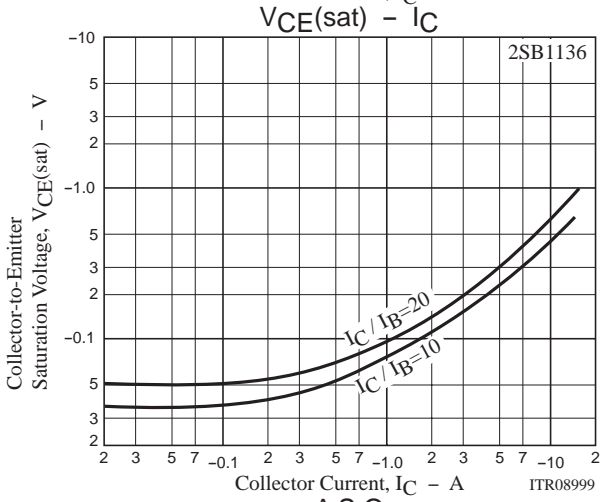
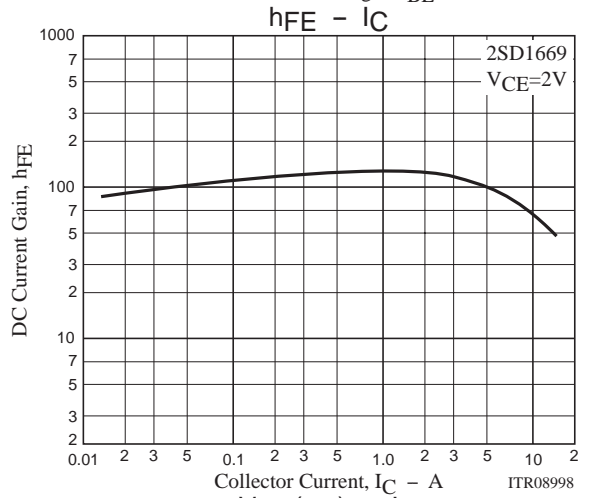
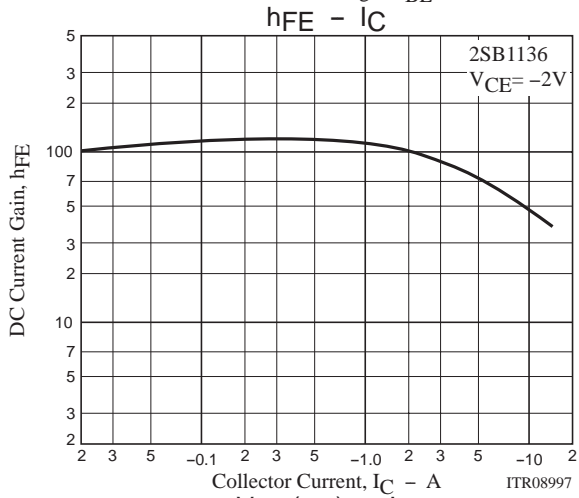
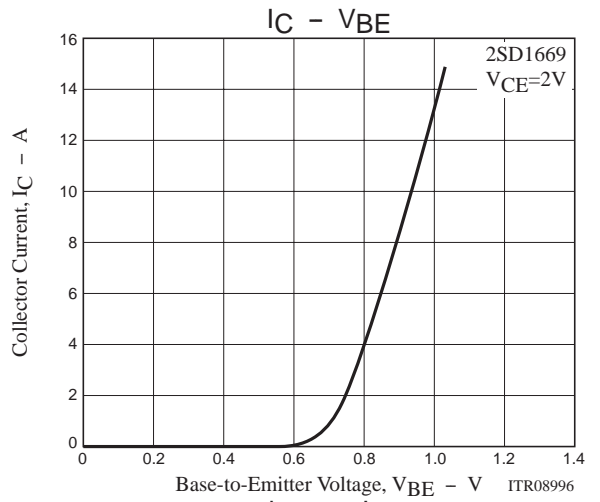
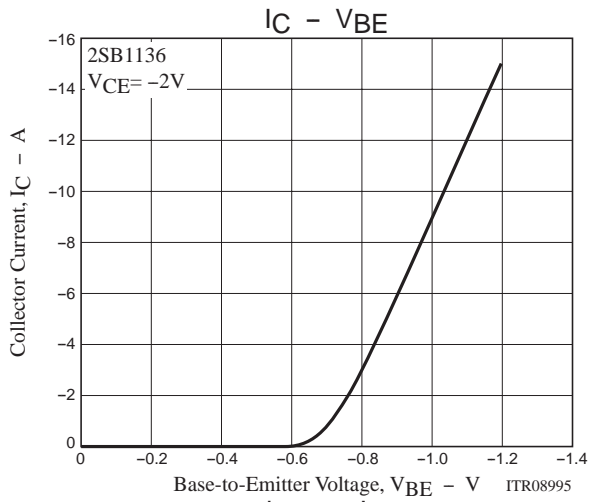
## Switching Time Test Circuit

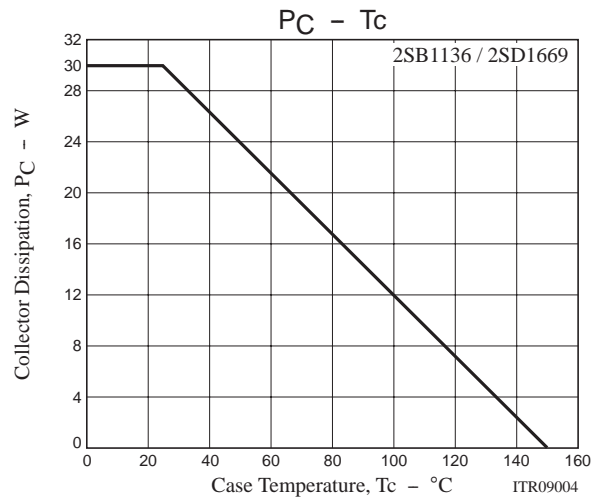
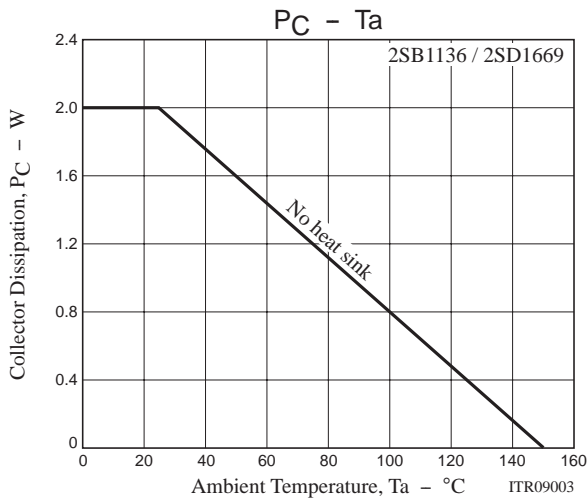


$I_C = 10I_{B1} = -10I_{B2} = 2A$   
 For PNP, the polarity is reversed.



2SB1136 / 2SD1669





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