



## 2SB1136/2SD1669

### 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),  $0.4V$  (NPN) max.
- Wide ASO leading to high resistance to breakdown.
- Micaless package facilitating mounting.

( ) : 2SB1136

#### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CBO}$		(-)60	V
Collector-to-Emitter Voltage	$V_{CEO}$		(-)50	V
Emitter-to-Base Voltage	$V_{EBO}$		(-)6	V
Collector Current	$I_C$		(-)12	A
Collector Current (Pulse)	$I_{CP}$		(-)15	A
Collector Dissipation	$P_C$	$T_c = 25^\circ C$	2	W
			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	$I_{CBO}$	$V_{CB} = (-)40V, I_E = 0$			(-)0.1	mA
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = (-)4V, I_C = 0$			(-)0.1	mA
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

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

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

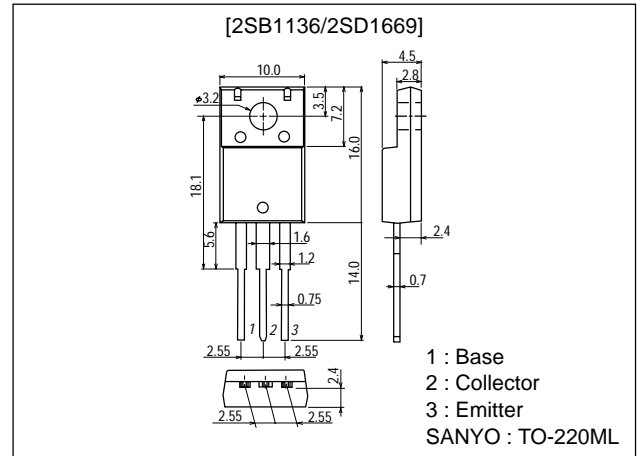
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#### Package Dimensions

unit:mm

2041A

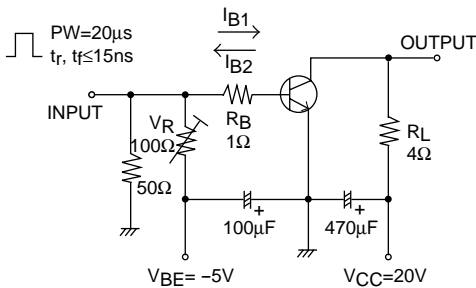


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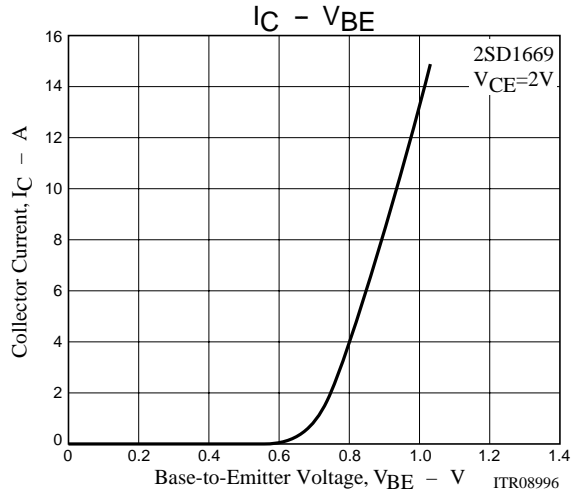
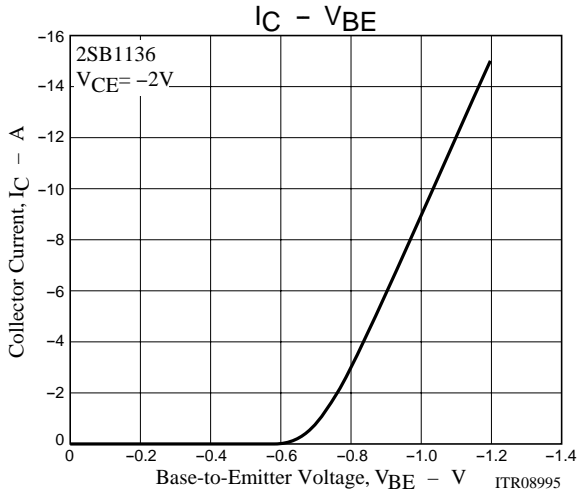
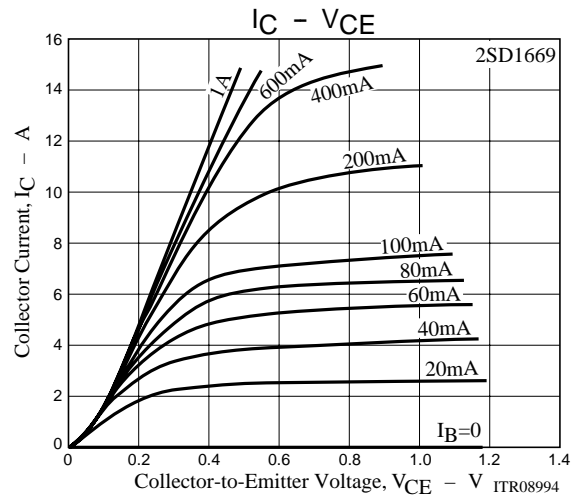
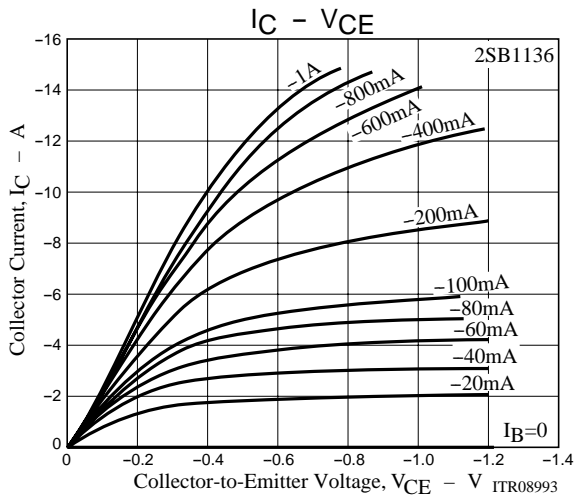
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=(-)6A, I_B=(-)0.6A$			(-)0.4	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=(-)1mA, I_E=0$	(-)60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=(-)1mA, R_{BE}=\infty$	(-)50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=(-)1mA, I_C=0$	(-)6			V
Rise Time	$t_{on}$	See specified Test Circuit.		(0.2)		$\mu s$
Storage Time	$t_{stg}$	See specified Test Circuit.		0.1		$\mu s$
				(0.4)		$\mu s$
Fall Time	$t_f$	See specified Test Circuit.		1.2		$\mu s$
				(0.1)		$\mu s$
				0.05		$\mu s$

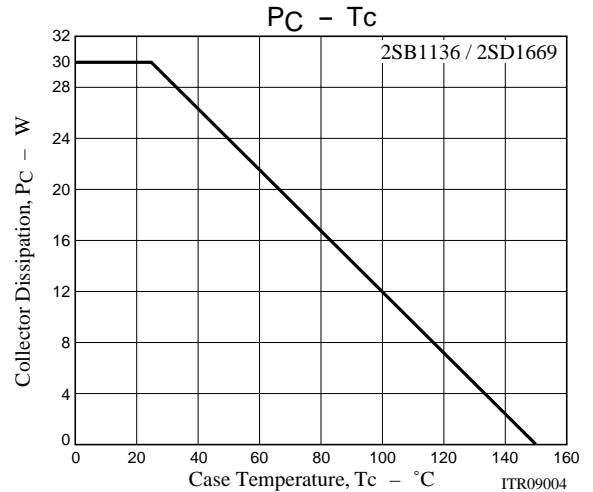
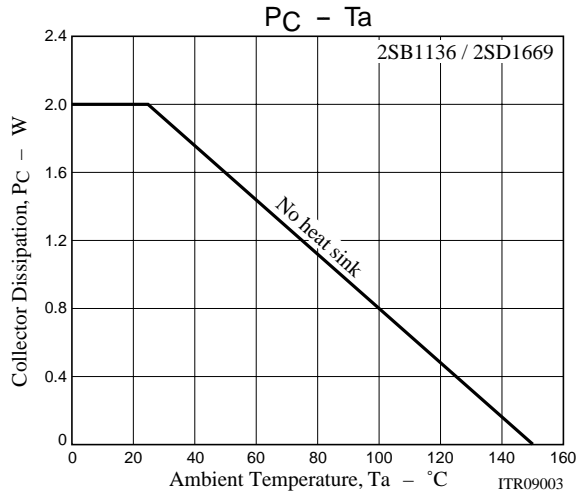
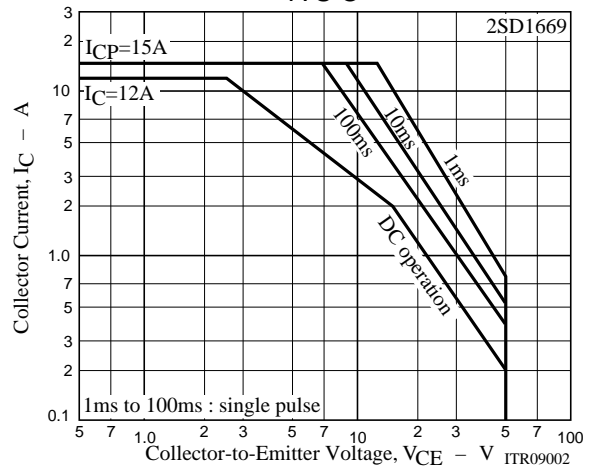
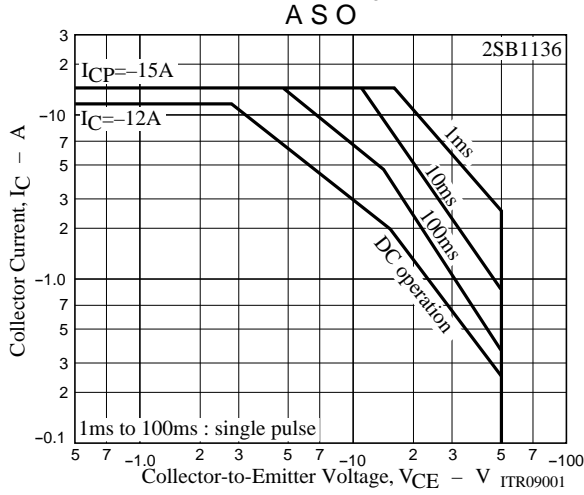
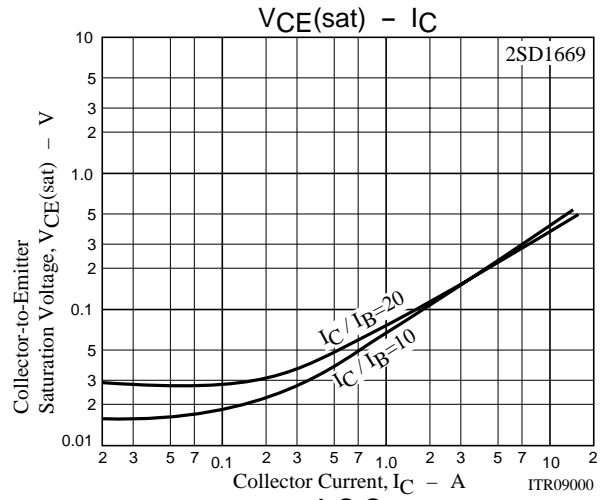
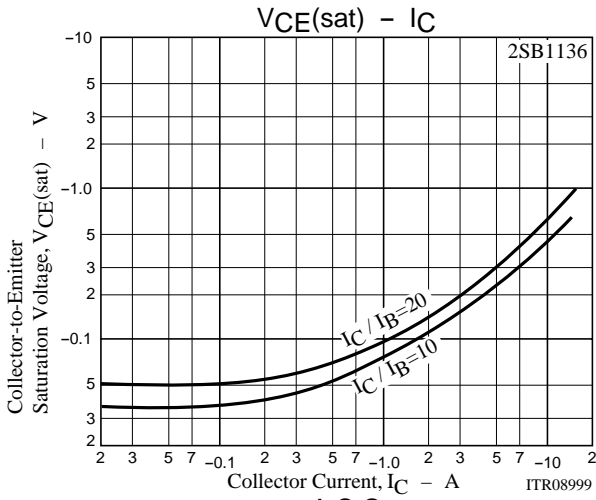
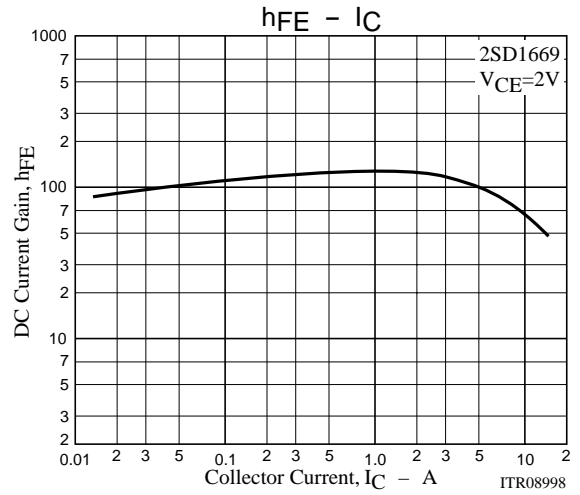
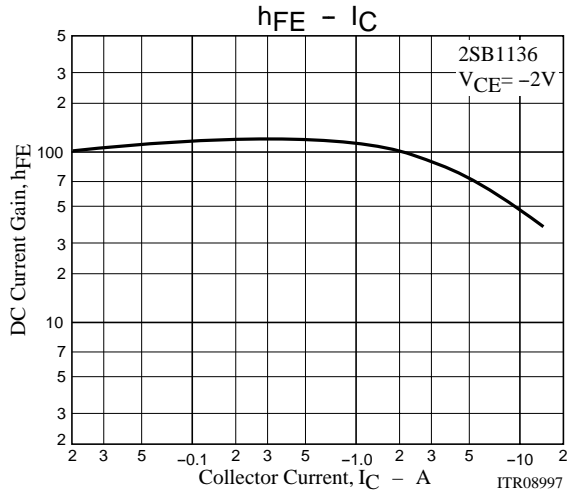
## Switching Time Test Circuit



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



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