



SANYO Semiconductors

## DATA SHEET

# ~~2SB824 / 2SD1060~~ — ~~PNP~~ NPN Epitaxial Planar Silicon Transistors

## 50V / 5A Switching Applications

### Applications

- Suitable for relay drivers, high-speed inverters, converters, and other general large-current switching.

### Features

- Low collector-to-emitter saturation voltage :  $V_{CE(sat)} = (\approx)0.4V \text{ max} / I_C = (\approx)3A, I_B = (\approx)0.3A.$

### Specifications ~~(-) : 2SB824~~

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CBO}$		$(\approx)60$	V
Collector-to-Emitter Voltage	$V_{CEO}$		$(\approx)50$	V
Emitter-to-Base Voltage	$V_{EBO}$		$(\approx)6$	V
Collector Current	$I_C$		$(\approx)5$	A
Collector Current (Pulse)	$I_{CP}$		$(\approx)9$	A
Collector Dissipation	$P_C$	$T_c = 25^\circ\text{C}$	1.75	W
			30	W
Junction Temperature	$T_J$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

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

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

Continued on next page.

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# 2SB824 / 2SD1060

Continued from preceding page.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
DC Current Gain	$h_{FE1}$	$V_{CE} = (\pm)2V, I_C = (\pm)1A$	70*		280*	
	$h_{FE2}$	$V_{CE} = (\pm)2V, I_C = (\pm)3A$	30			
Gain-Bandwidth Product	$f_T$	$V_{CE} = (\pm)5V, I_C = (\pm)1A$		30		MHz
Output Capacitance	$C_{ob}$	$V_{CB} = (\pm)10V, f = 1MHz$		(160)100		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = (\pm)3A, I_B = (\pm)0.3A$			( $\pm$ )0.4	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = (\pm)1mA, I_E = 0A$	( $\pm$ )60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = (\pm)1mA, R_{BE} = \infty$	( $\pm$ )50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = (\pm)1mA, I_C = 0A$	( $\pm$ )6			V
Turn-ON Time	$t_{on}$	See specified Test Circuit.		0.1		$\mu s$
Storage Time	$t_{stg}$	See specified Test Circuit.		(0.7)1.4		$\mu s$
Fall Time	$t_f$	See specified Test Circuit.		0.2		$\mu s$

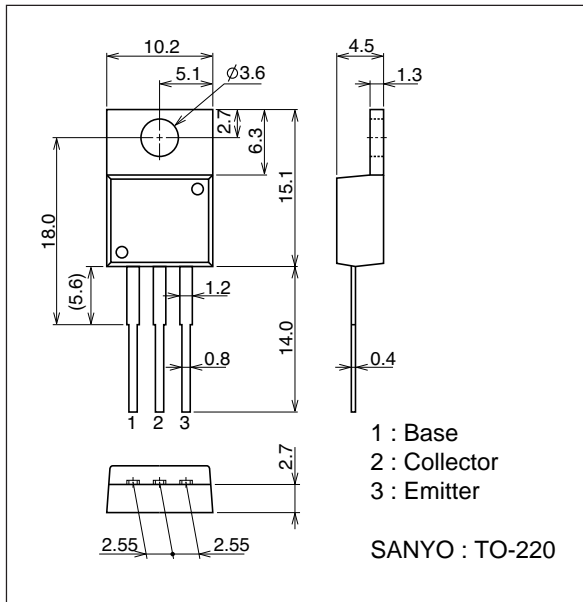
\* : The 2SB824 / 2SD1060 are classified by 1A  $h_{FE}$  as follows :

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

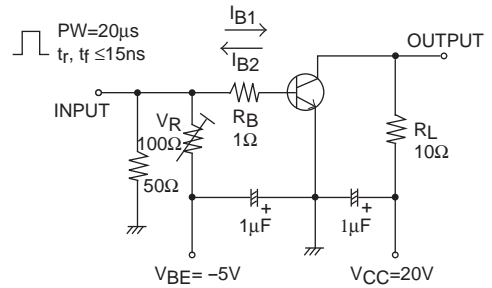
## Package Dimensions

unit : mm (typ)

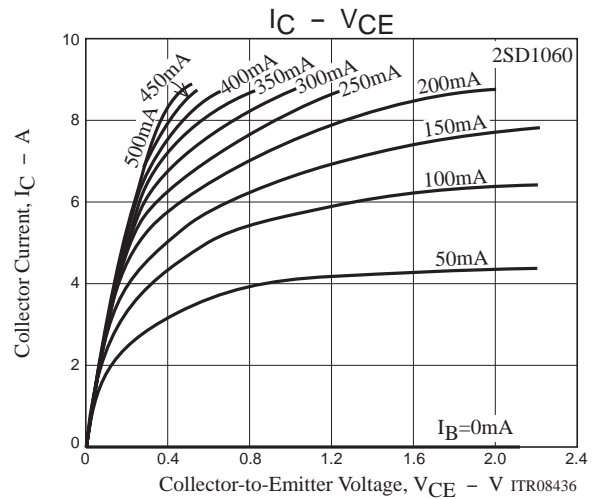
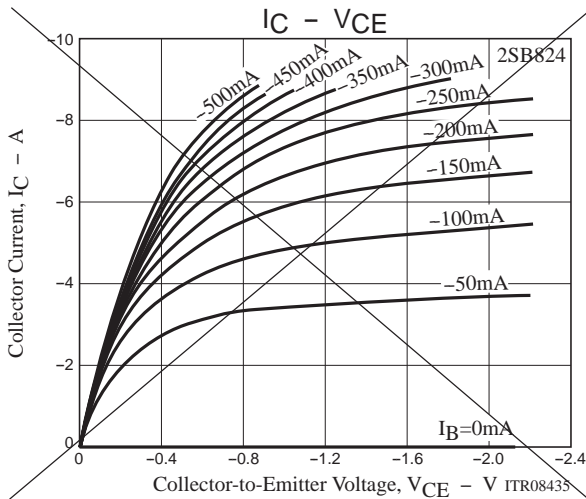
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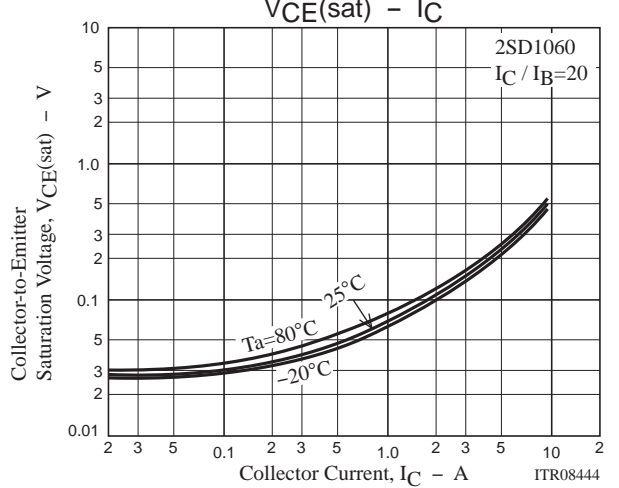
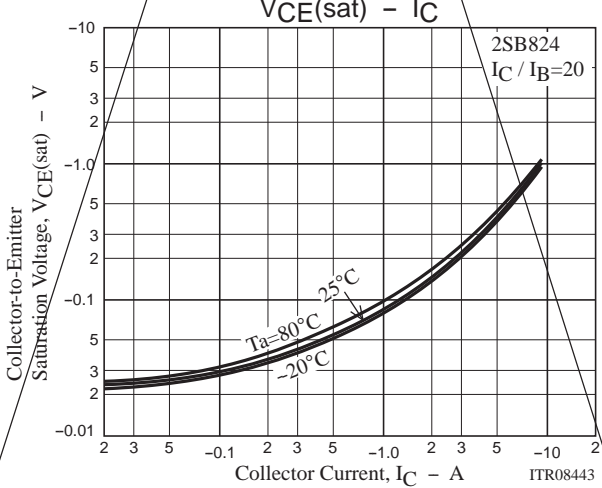
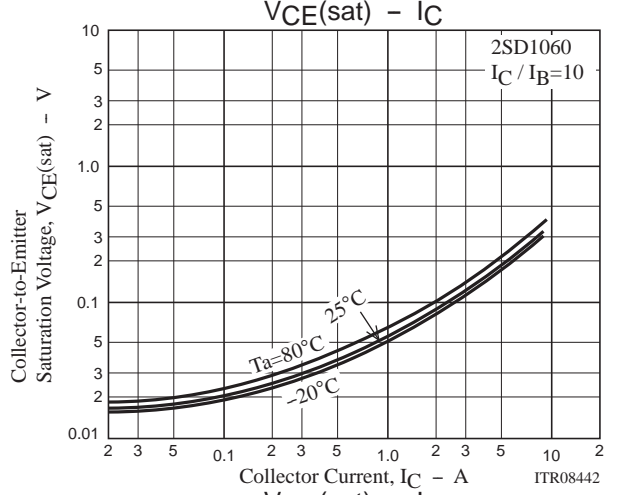
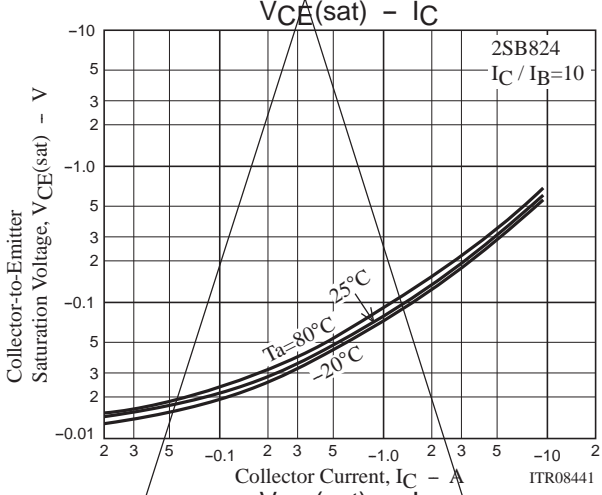
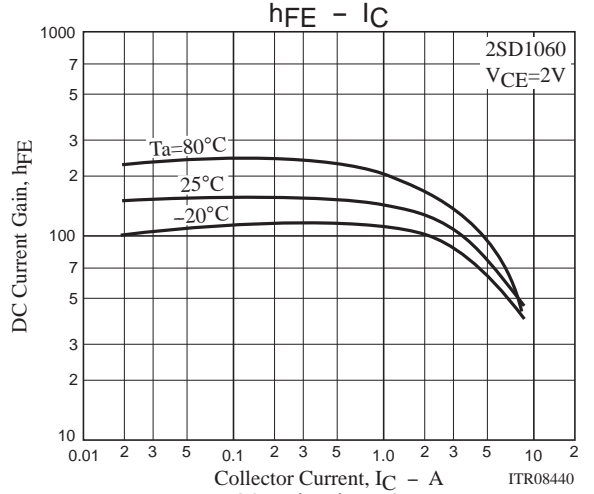
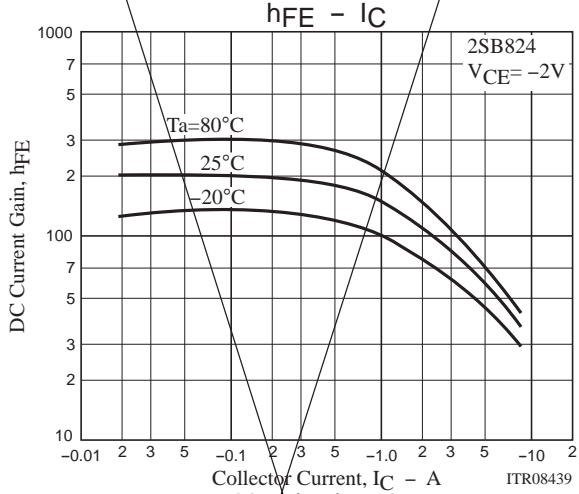
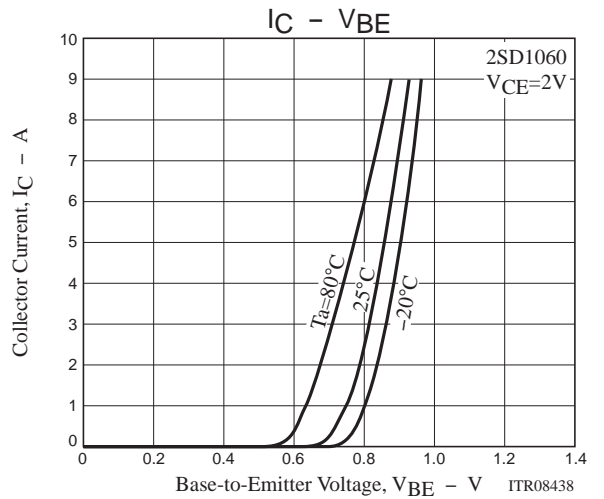
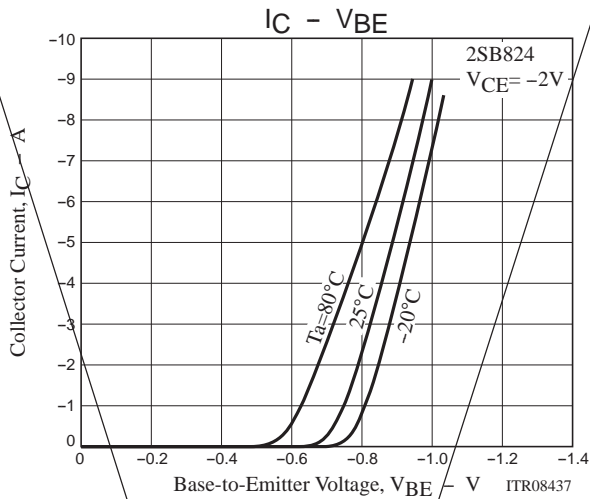
## Switching Time Test Circuit



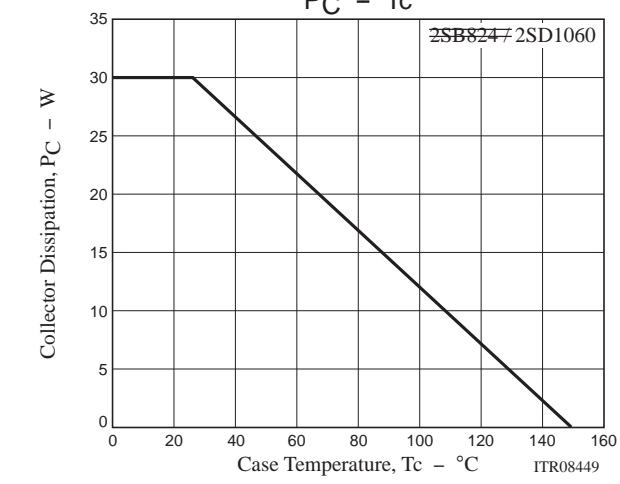
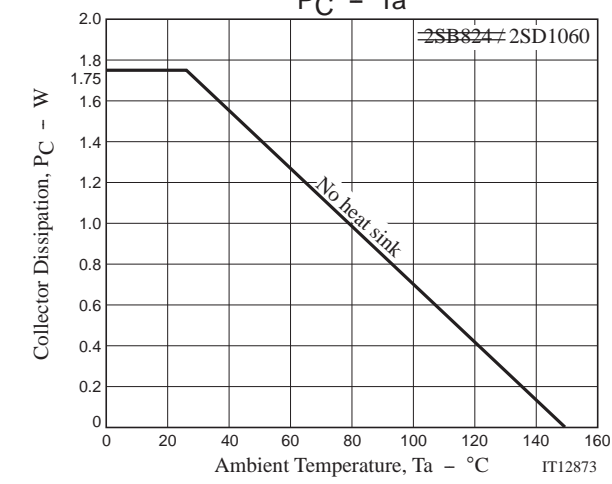
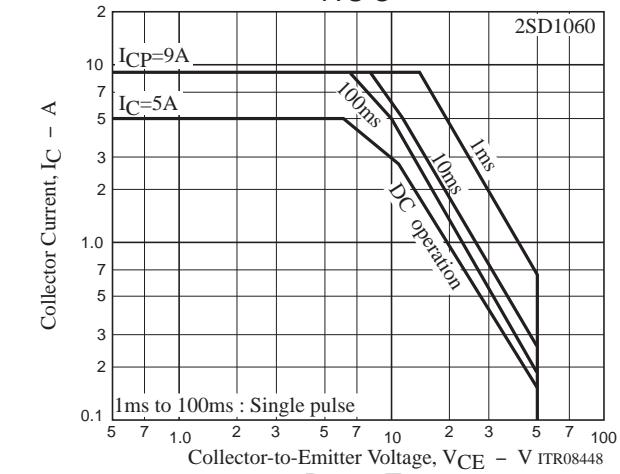
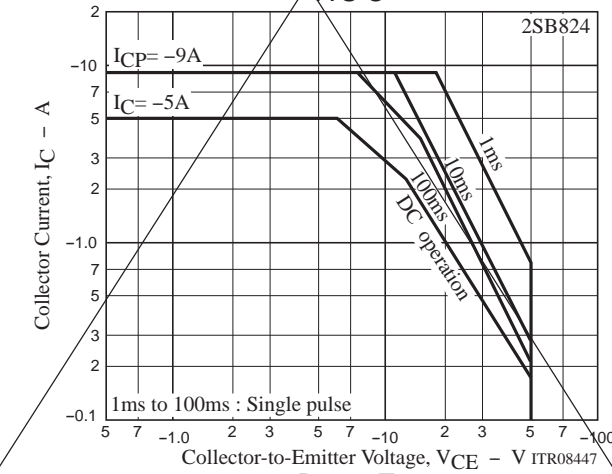
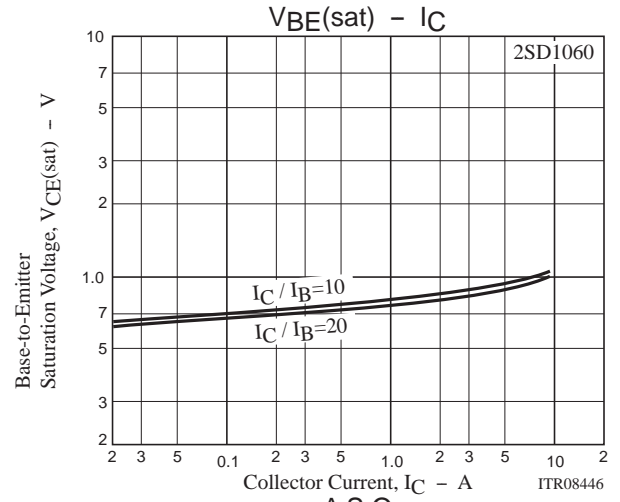
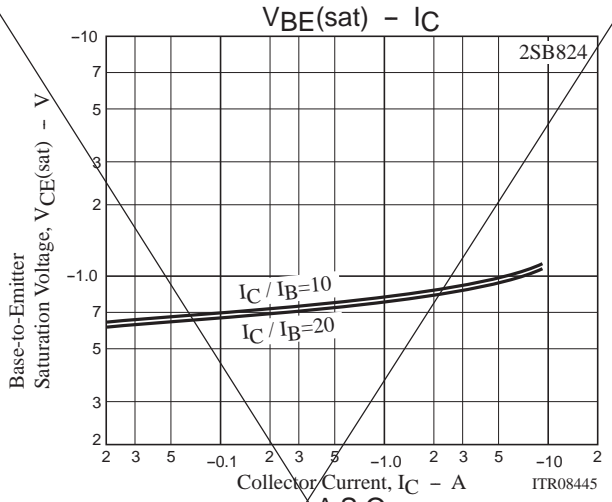
$I_C = 10I_{B1} = -10I_{B2} = 2A$   
For PNP, the polarity is reversed.



2SB824 / 2SD1060



**2SB824 / 2SD1060**



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