



# 2SB1683 / 2SD2639

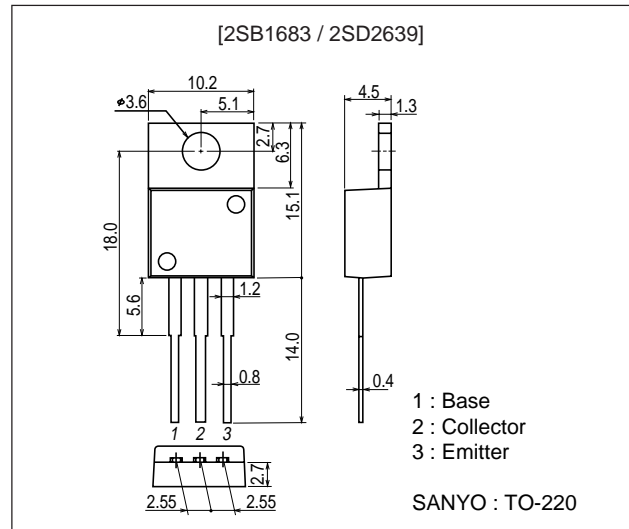
## 140V / 12A, AF 60W Output Applications

### Features

- Wide ASO because of on-chip ballast resistance.
- Good dependence of  $f_T$  on current and good HF characteristic.

### Package Dimensions

unit : mm  
 2010C



### Specifications

( ) : 2SB1683

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CB0}$		(-)160	V
Collector-to-Emitter Voltage	$V_{CEO}$		(-)140	V
Emitter-to-Base Voltage	$V_{EBO}$		(-)6	V
Collector Current	$I_C$		(-)12	A
Collector Current (Pulse)	$I_{CP}$		(-)15	A
Collector Dissipation	$P_C$	$T_c=25^\circ\text{C}$	80	W
Junction Temperature	$T_j$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-40 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	$I_{CBO}$	$V_{CB}=-80\text{V}, I_E=0$			(-)0.1	mA
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=-4\text{V}, I_C=0$			(-)0.1	mA

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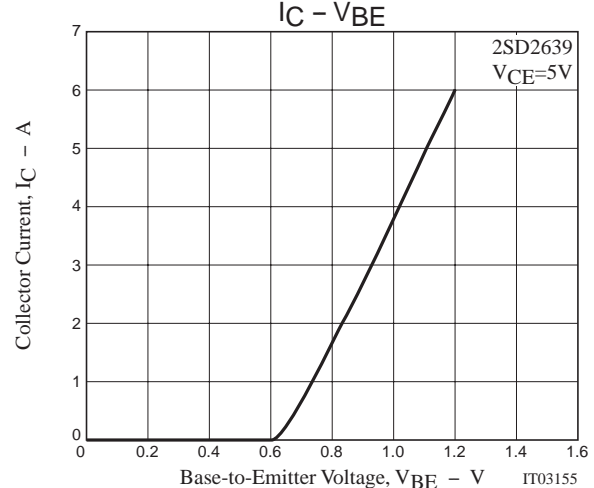
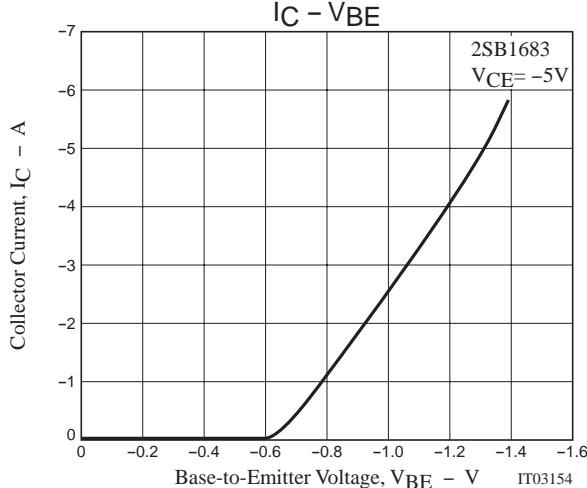
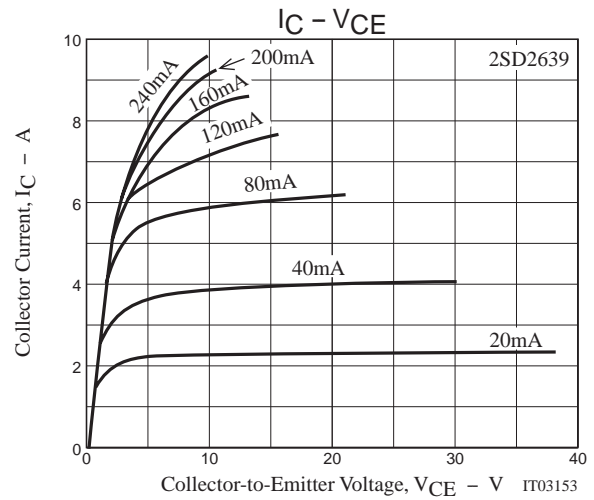
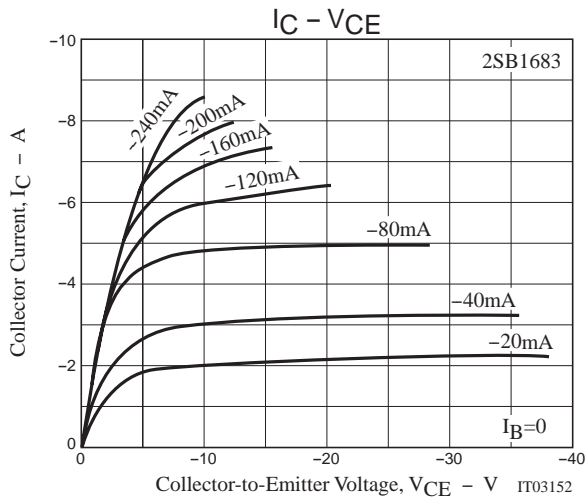
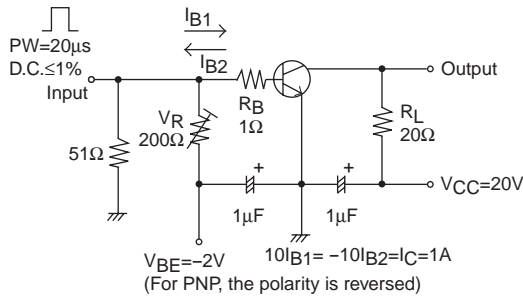
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
DC Current Gain	$h_{FE1}$	$V_{CE} = (-)5V, I_C = (-)1A$	60*		200*	
	$h_{FE2}$	$V_{CE} = (-)5V, I_C = (-)6A$	20			
Gain-Bandwidth Product	$f_T$	$V_{CE} = (-)5V, I_C = (-)1A$		15		MHz
Output Capacitance	$C_{ob}$	$V_{CB} = (-)10V, f = 1MHz$		(300)210		pF
Base-to-Emitter Saturation Voltage	$V_{BE}$	$V_{CE} = (-)5V, I_C = (-)1A$			1.5	V
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = (-)5A, I_B = (-)0.5A$		(1.1)0.6	2.5	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = (-)5mA, I_E = 0$	(-)160			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = (-)5mA, R_{BE} = \infty$	(-)140			V
		$I_C = (-)50mA, R_{BE} = \infty$	(-)140			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = (-)5mA, I_C = 0$	(-)6			V
Turn-ON Time	$t_{on}$	See specified test circuit.		(0.25)0.26		$\mu s$
Fall Time	$t_f$	See specified test circuit.		(0.53)0.68		$\mu s$
Storage Time	$t_{stg}$	See specified test circuit.		(1.61)6.88		$\mu s$

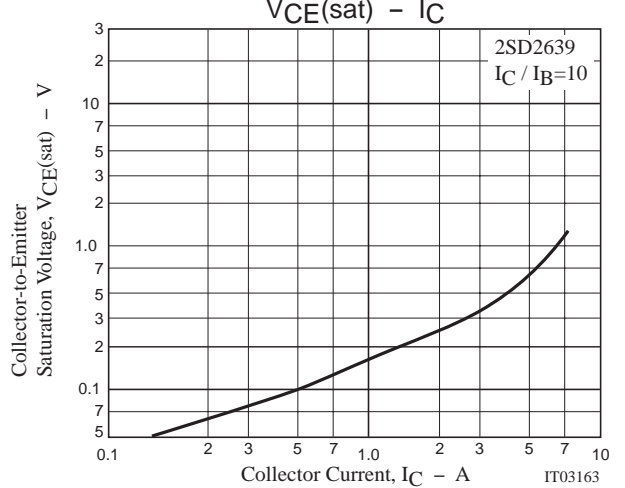
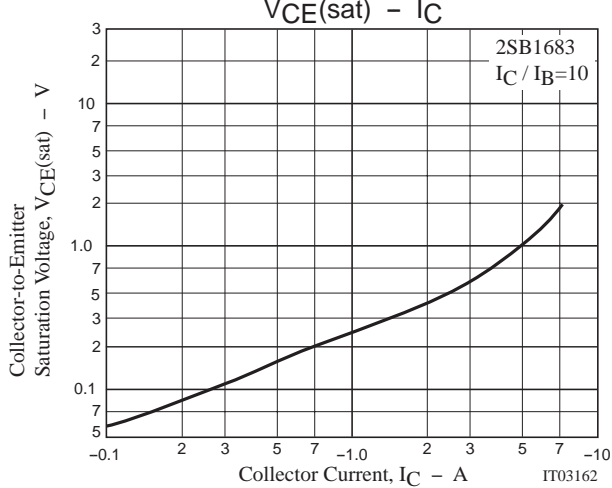
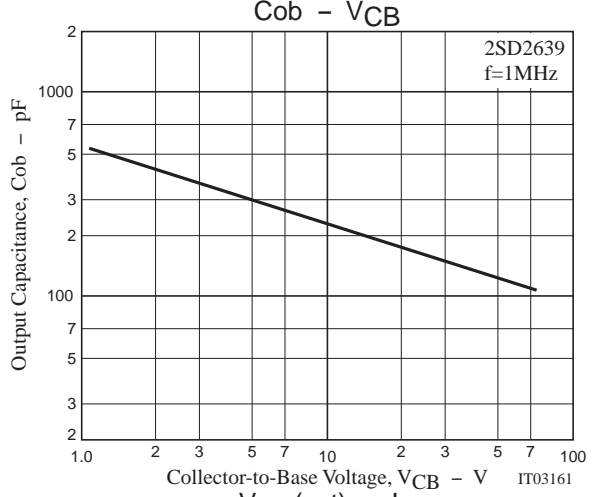
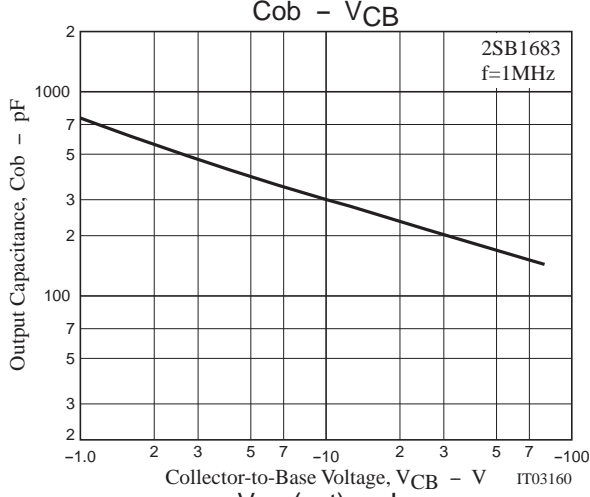
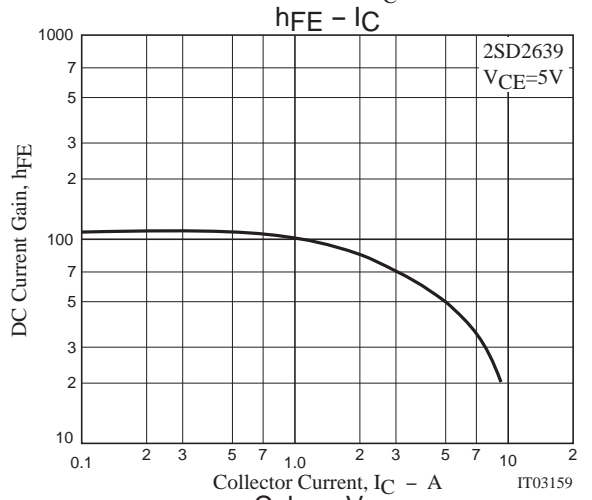
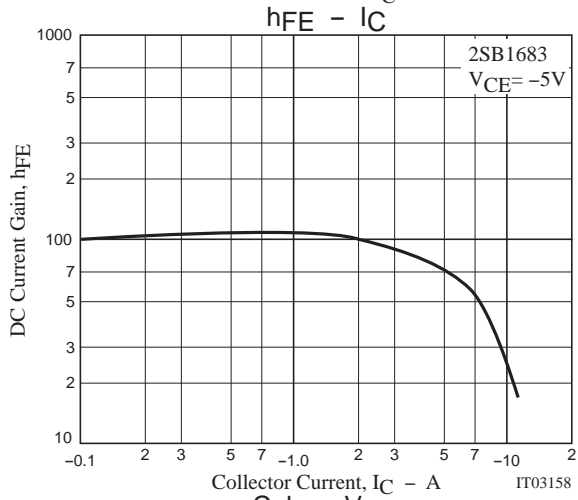
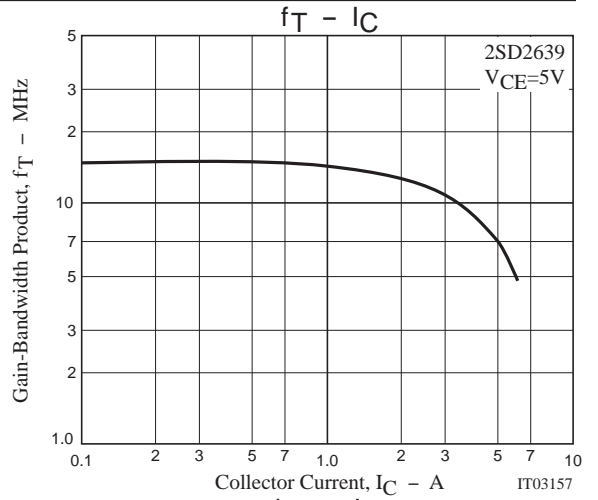
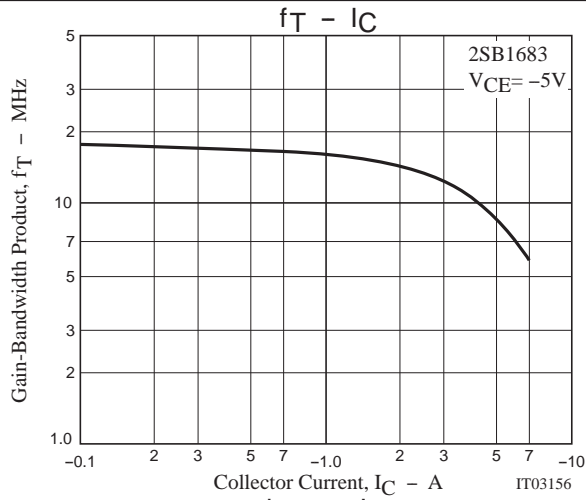
\* : The 2SB1683 / 2SD2639 are classified by 1A  $h_{FE}$  as follows :

Rank	D	E
$h_{FE}$	60 to 120	100 to 200

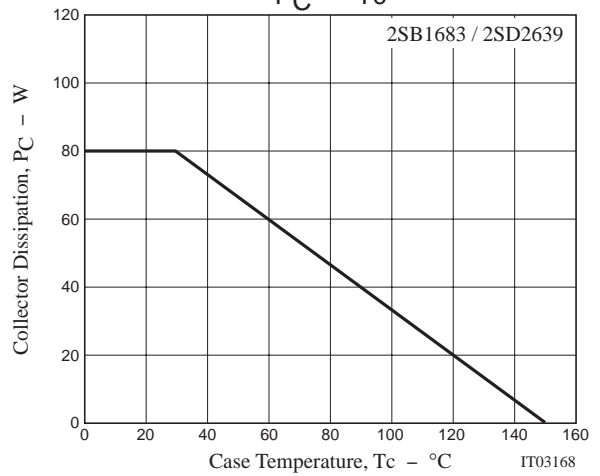
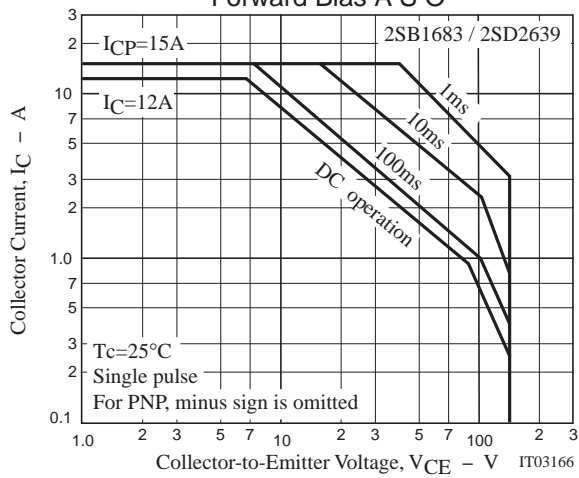
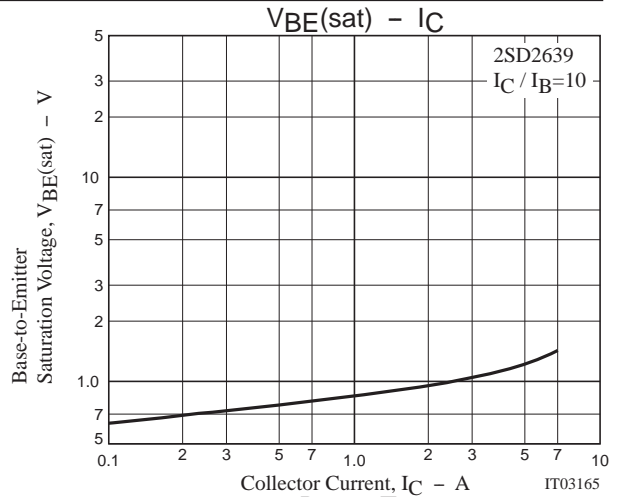
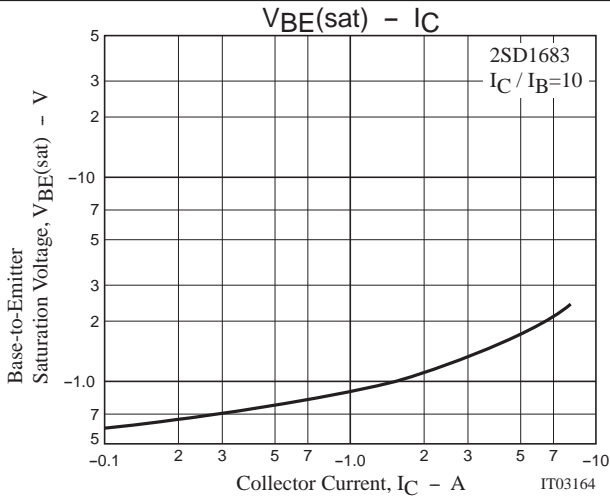
## Switching Time Test Circuit



2SB1683 / 2SD2639



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