



ON Semiconductor®

**ON Semiconductor**  
**DATA SHEET****2SA1415 / 2SC3645** — PNP / NPN Epitaxial Planar Silicon Transistors  
**High-Voltage Switching,  
Predriver Applications****Features**

- Adoption of FBET process.
- High breakdown voltage ( $V_{CEO}=160V$ ).
- Excellent linearity of  $h_{FE}$  and small  $C_{ob}$ .
- Fast switching speed.
- Ultrasmall size marking it easy to provide high-density, small-sized hybrid ICs.

**Specifications** ( ) : 2SA1415**Absolute Maximum Ratings** at  $T_a=25^{\circ}C$ 

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CBO}$		(-)180	V
Collector-to-Emitter Voltage	$V_{CEO}$		(-)160	V
Emitter-to-Base Voltage	$V_{EBO}$		(-)5	V
Collector Current	IC		(-)140	mA
Collector Current (Pulse)	ICP		(-)200	mA
Collector Dissipation	PC		500	mW
		Moutned on ceramic board (250mm <sup>2</sup> ×0.8mm)	1.3	W
Junction Temperature	TJ		150	°C
Storage Temperature	Tstg		-55 to +150	°C

Marking : 2SA1415 : AA, 2SC3645: CA

# 2SA1415 / 2SC3645

## Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = (-)80V, I_E = 0A$			(-)100	nA
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = (-)4V, I_C = 0A$			(-)100	nA
DC Current Gain	$h_{FE}$	$V_{CE} = (-)5V, I_C = (-)10mA$	140*		400*	
Gain-Bandwidth Product	$f_T$	$V_{CE} = (-)10V, I_C = (-)10mA$		150		MHz
Output Capacitance	$C_{ob}$	$V_{CB} = (-)10V, f = 1MHz$		(4.0)3.0		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = (-)50mA, I_B = (-)5mA$		(-0.14)0.07	(-0.4)0.3	V
Turn-ON Time	$t_{on}$	See sepcified Test Circuit.		0.1		$\mu s$
Strage Time	$t_{stg}$	See sepcified Test Circuit.		1.5		$\mu s$
Fall Time	$t_f$	See sepcified Test Circuit.		0.1		$\mu s$

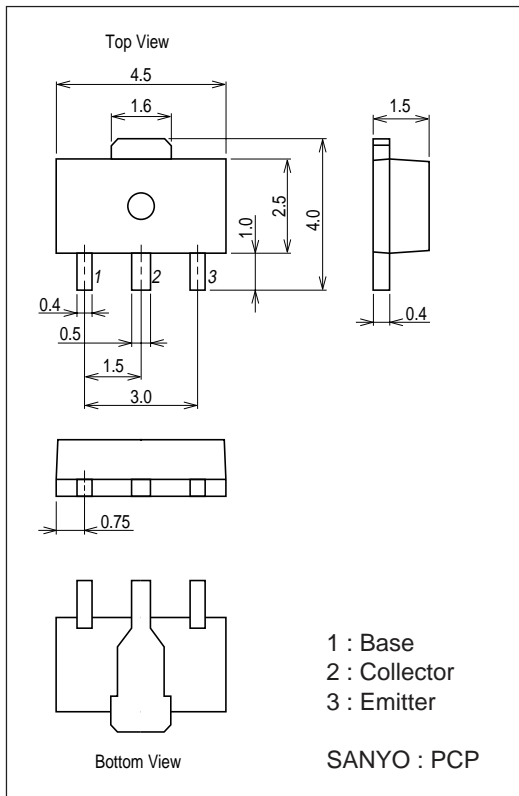
\* : The 2SA1415/2SC3645 are classified by 10mA  $h_{FE}$  as follows :

Rank	S	T
$h_{FE}$	140 to 280	200 to 400

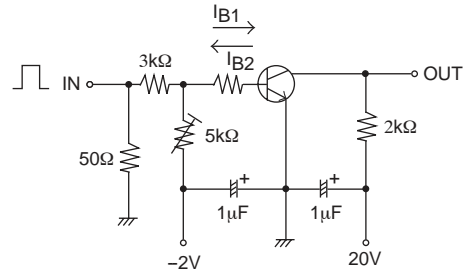
## Package Dimensions

unit : mm (typ)

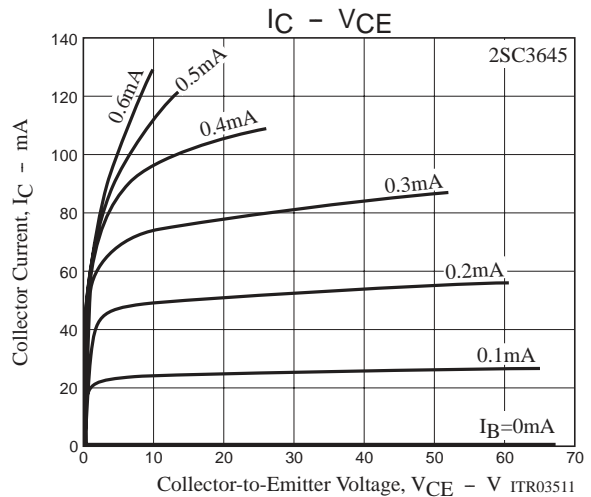
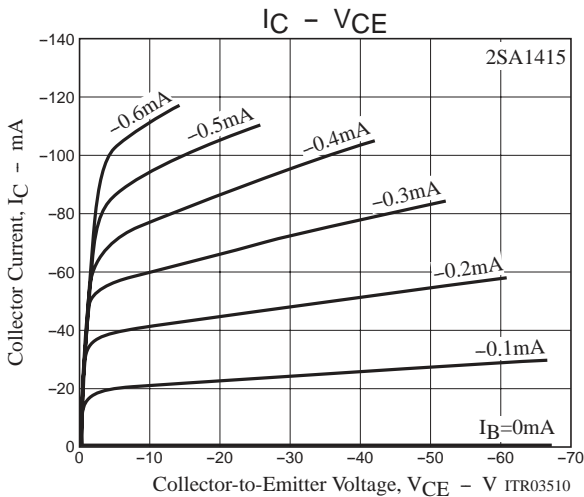
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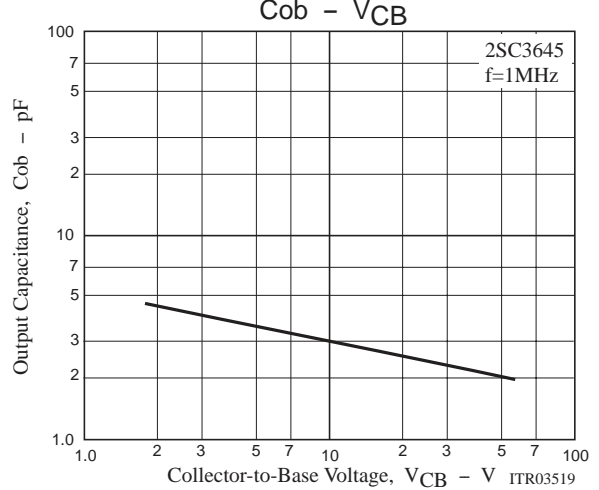
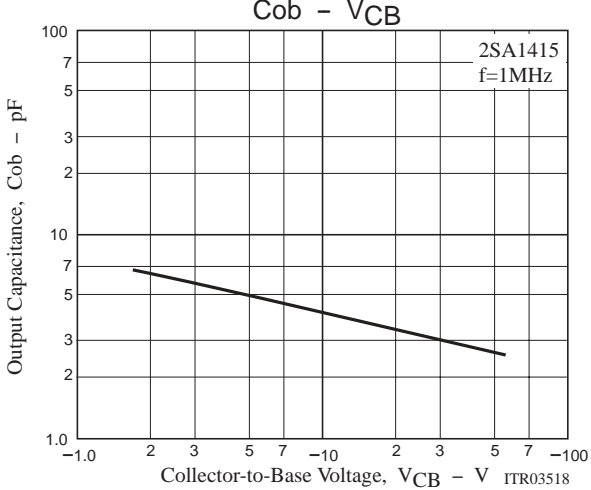
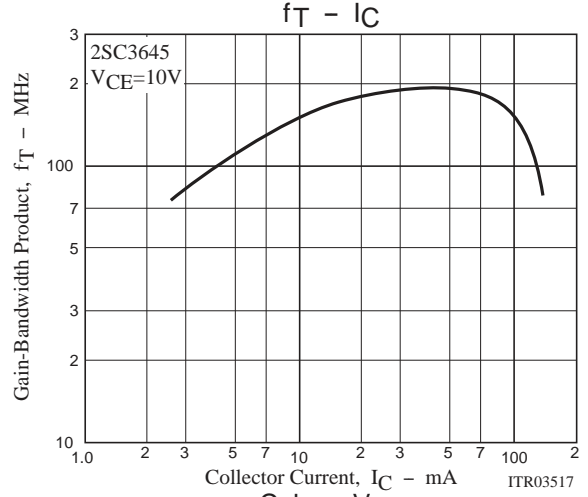
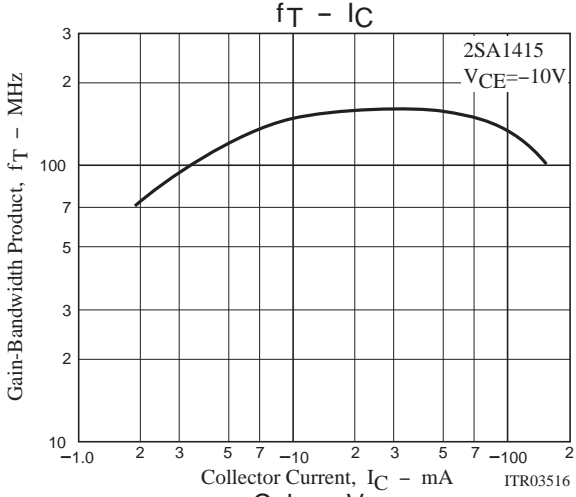
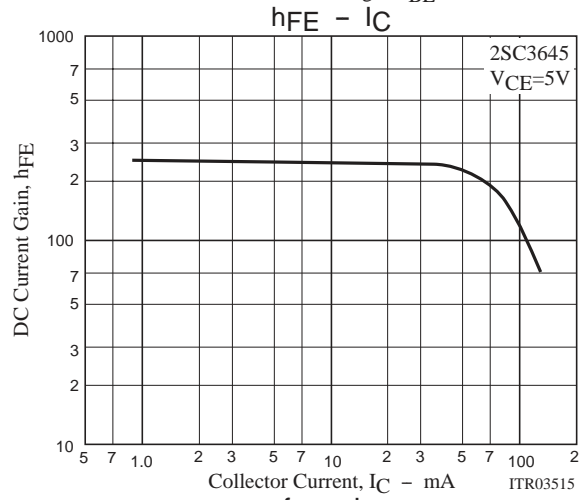
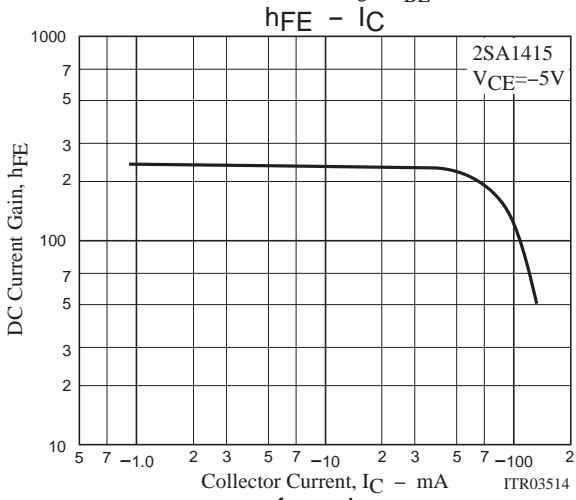
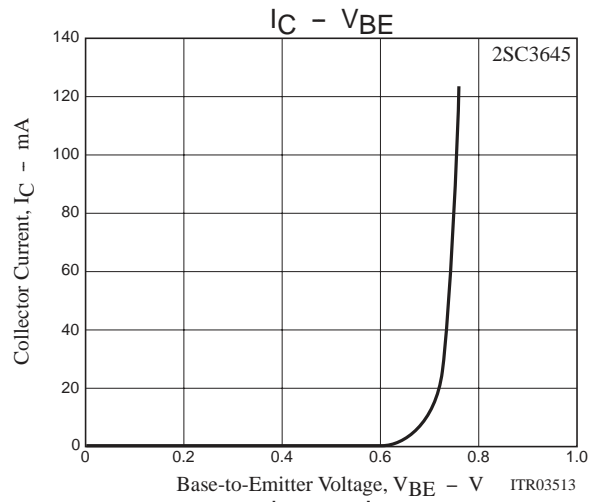
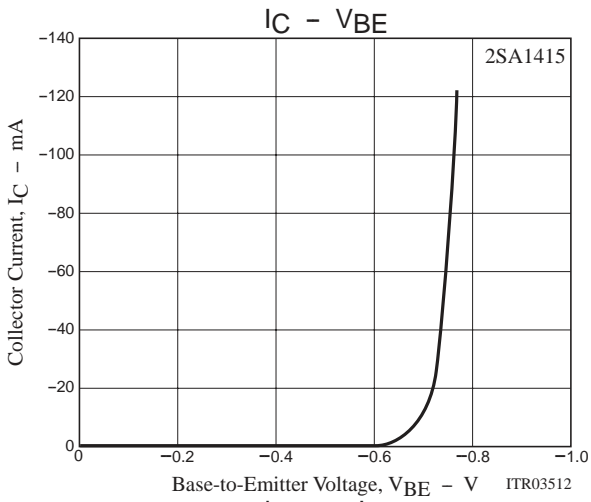
## Switching Time Test Circuit



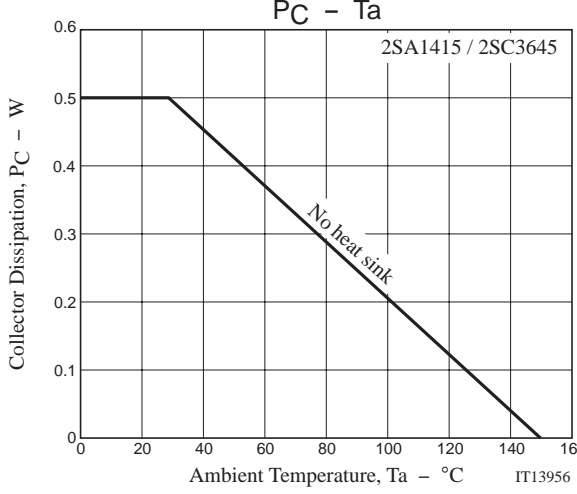
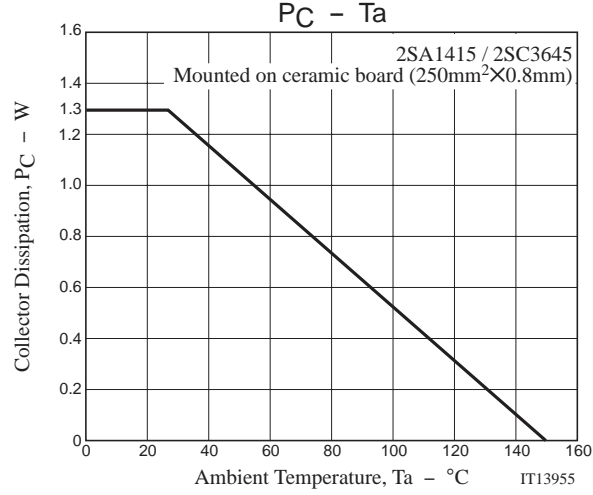
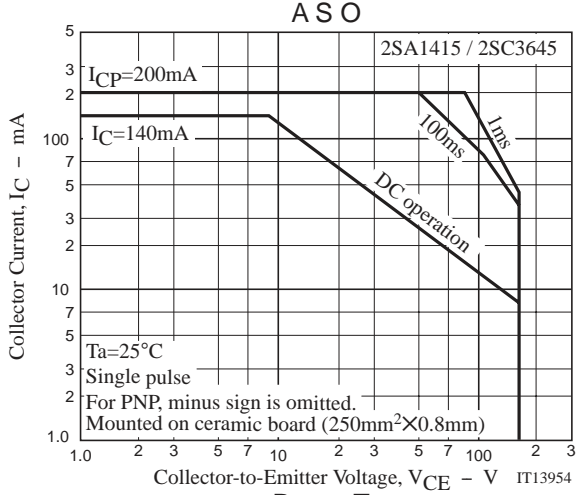
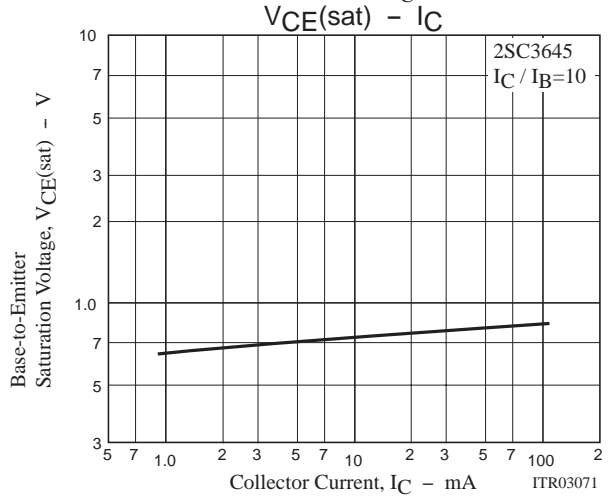
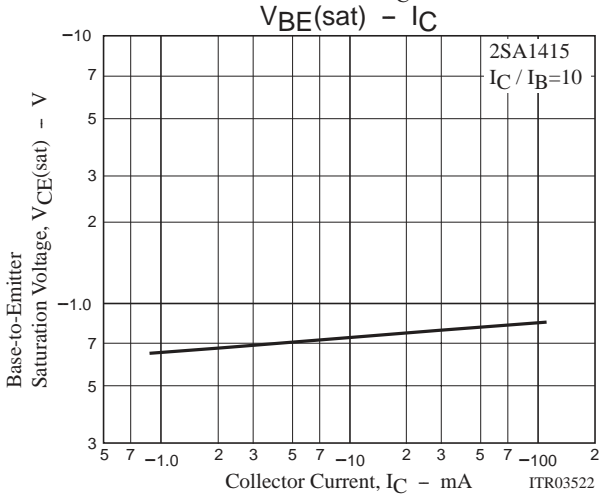
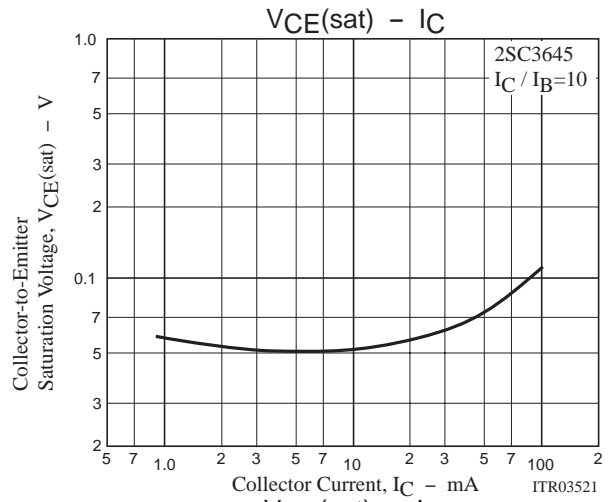
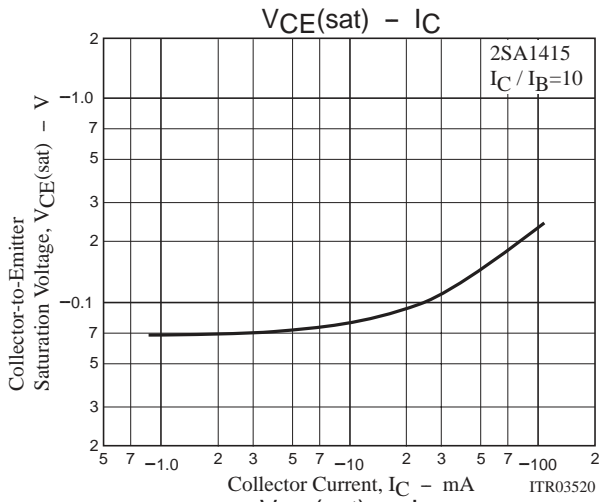
$I_C = 10I_{B1} = -10I_{B2} = 10mA$   
For PNP, the polarity is reversed.



2SA1415 / 2SC3645



# 2SA1415 / 2SC3645



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