Ordering number:EN3512B

2SA1786 : PNP Epitaxial Planar Silicon Transistor
2SC4646 : NPN Triple Diffused Planar Silicon Transistor

2SA1786/2SC4646

High Voltage Driver Applications

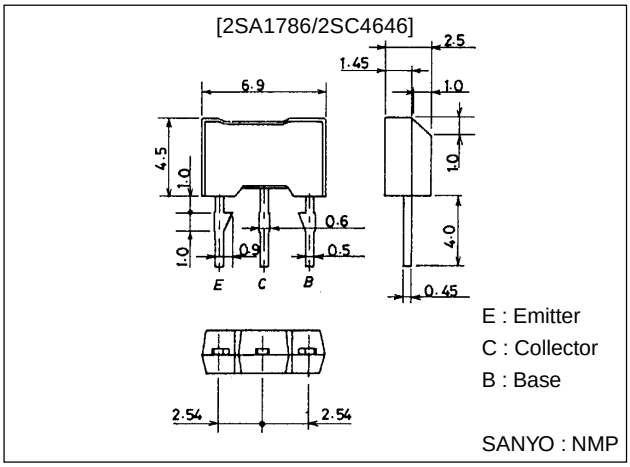
Features

- Large current capacity (I_C=2A).
- High breakdown voltage (V_{CEO}≥400V).

Package Dimensions

unit:mm

2064



( ) : 2SA1786

Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(–)400	V
Collector-to-Emitter Voltage	V_{CEO}		(–)400	V
Emitter-to-Base Voltage	V_{EBO}		(–)5	V
Collector Current	I_C		(–)2	A
Colletor Current (Pulse)	I_{CP}		(–)4	A
Collector Dissipation	P_C		1	W
Junction Temperature	Tj		150	˚C
Storage Temperature	Tstg		–55 to +150	˚C

Electrical Characteristics at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=(–)300V, I_E=0			(–)1.0	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(–)4V, I_C=0			(–)1.0	μA
DC Current Gain	h_{FE}	V_{CE}=(–)10V, I_C=(–)100mA	40*		200*	
Gain-Bandwidth Product	f_T	V_{CE}=(–)10V, I_C=(–)100mA		(40)60		MHz
Output Capacitance	C_{ob}	V_{CB}=(–)30V, f=1MHz		(25)15		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=(–)500mA, I_B=(–)50mA			(–)1.0	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=(–)500mA, I_B=(–)50mA			(–)1.0	V

* : The 2SA1786/2SC4646 are classified by 100mA h_{FE} as follows :

40 C 80	60 D 120	100 E 200

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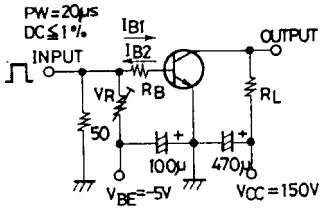
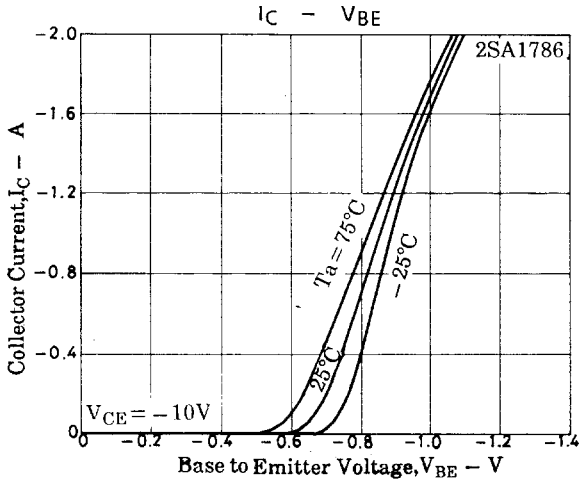
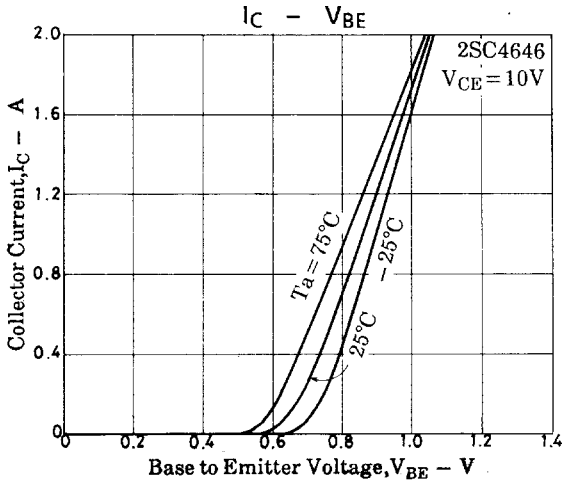
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=(–)10μA, I_E=0	(–)400			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=(–)1mA, R_{BE}=∞	(–)400			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=(–)10μA, I_C=0	(–)5			V
Turn-ON Time	t_{on}	See specified Test Circuit.		(0.12)		μs
				0.085		μs
Storage Time	t_{stg}	See specified Test Circuit.		(3.0)		μs
				4.0		μs
Turn-OFF Time	t_{off}	See specified Test Circuit.		(0.3)		μs
				0.6		μs

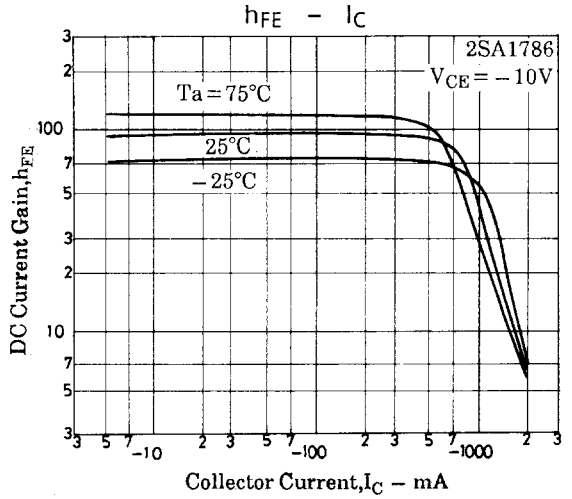
Switching Time Test Circuit

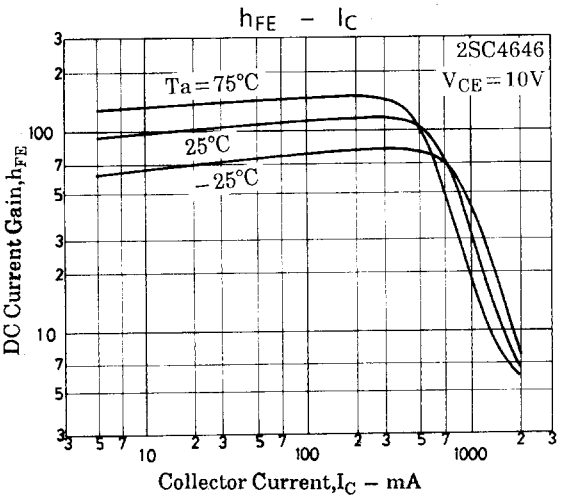


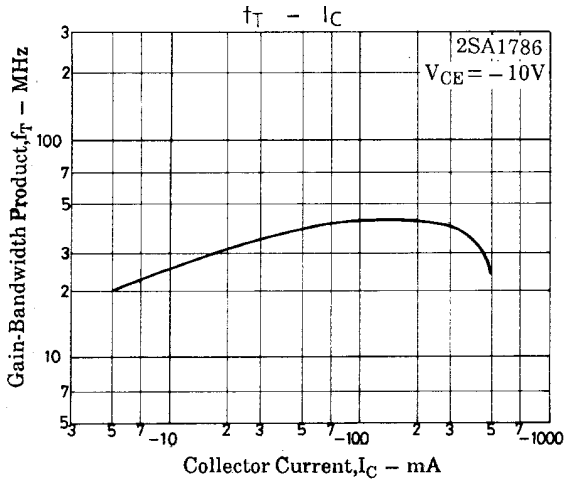
$10I_{B1} = -10I_{B2} = I_C = 500mA$
$R_L = 300\Omega$, $R_B = 20\Omega$, at $I_C = 500mA$
(For PNP, the polarity is reversed.)
Unit (resistance : Ω, capacitance : F)

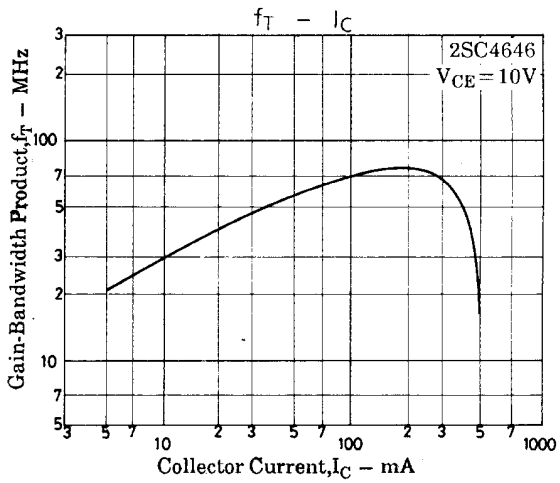


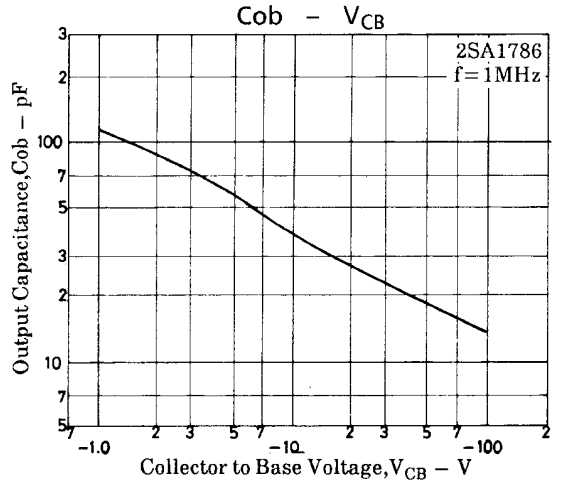


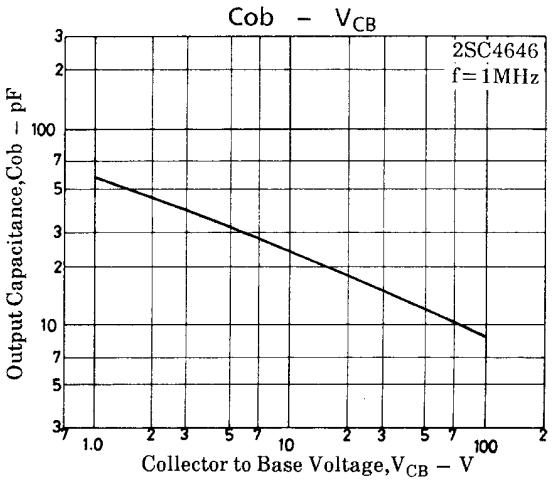


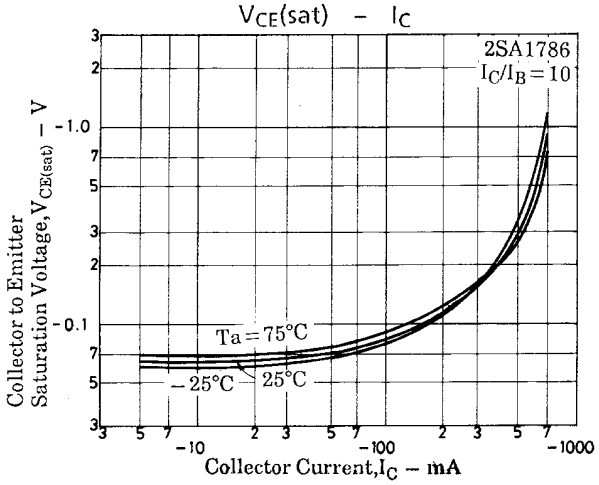


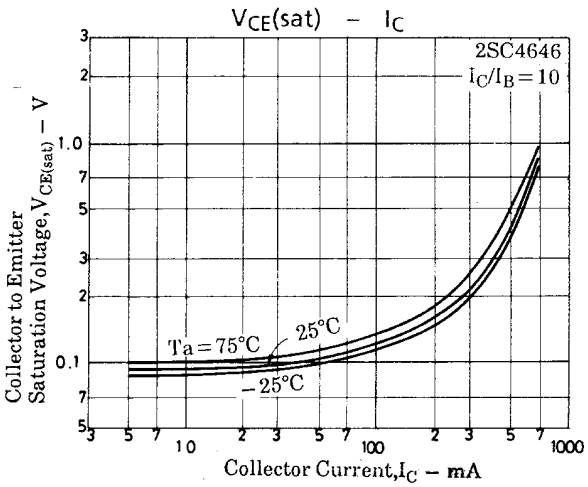

fT – IC
2SA1786
VCE = –10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA

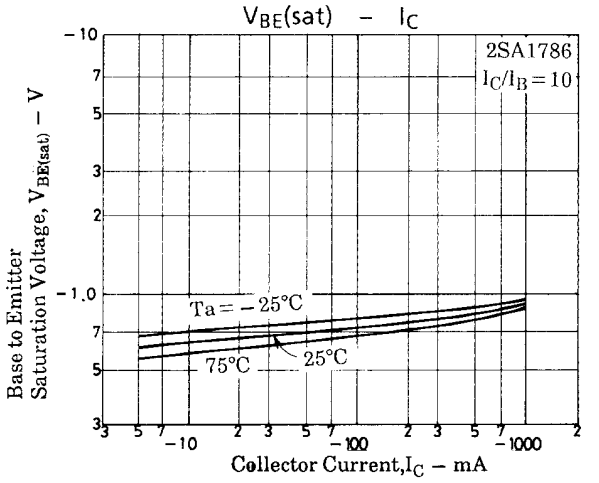

fT – IC
2SC4646
VCE = 10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA

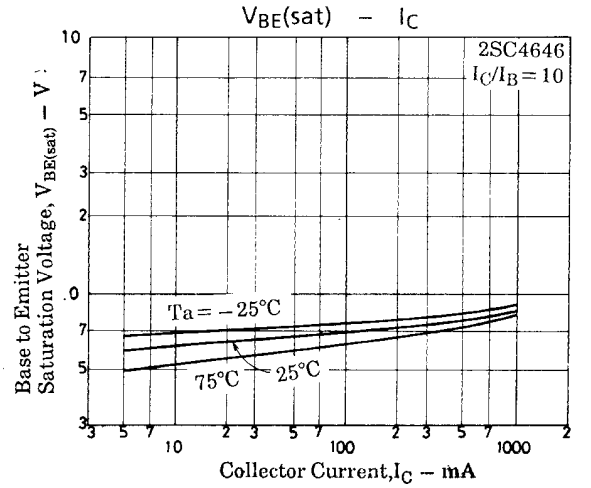

Cob – VCB
2SA1786
f = 1MHz
Output Capacitance, Cob – pF
Collector to Base Voltage, VCB – V

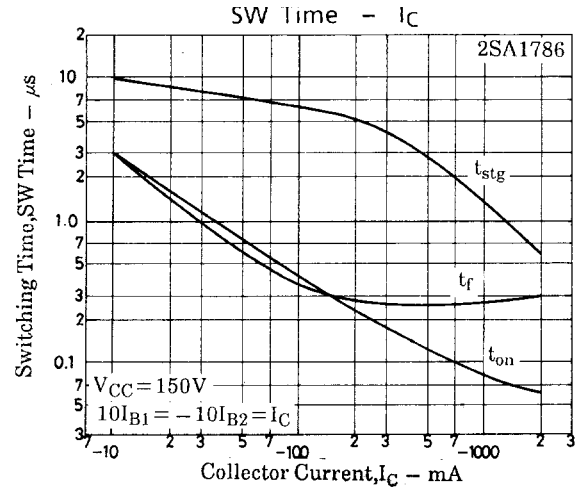

Cob – VCB
2SC4646
f = 1MHz
Output Capacitance, Cob – pF
Collector to Base Voltage, VCB – V

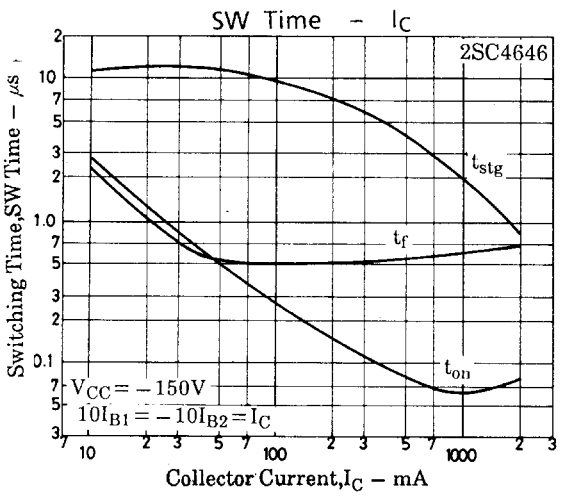

VCE(sat) – IC
2SA1786
IC/IB = 10
Ta = 75°C
–25°C
25°C
Collector to Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – mA

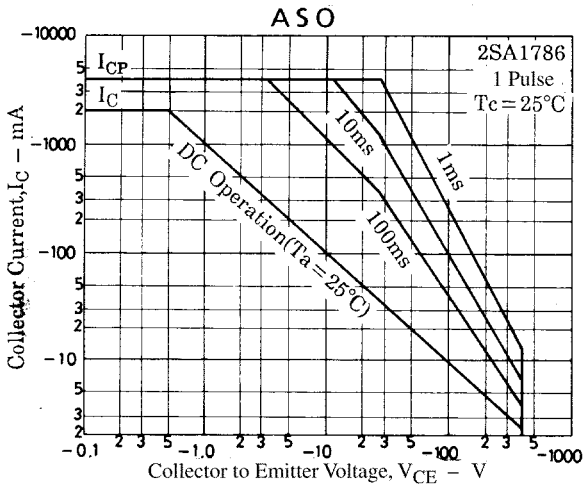

VCE(sat) – IC
2SC4646
IC/IB = 10
Ta = 75°C
25°C
–25°C
Collector to Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – mA

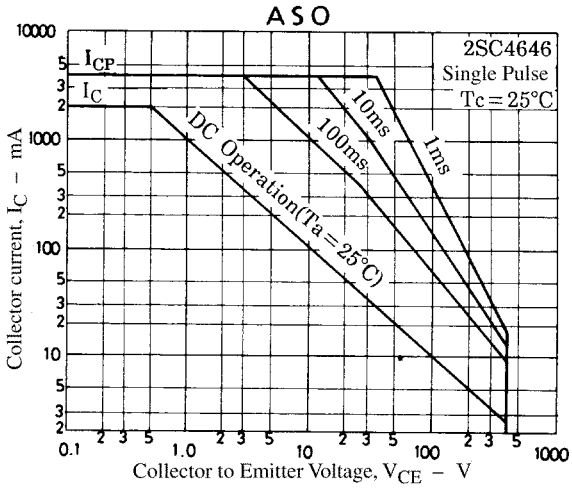

VBE(sat) – IC
2SA1786
IC/IB = 10
Ta = –25°C
75°C
25°C
Base to Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – mA

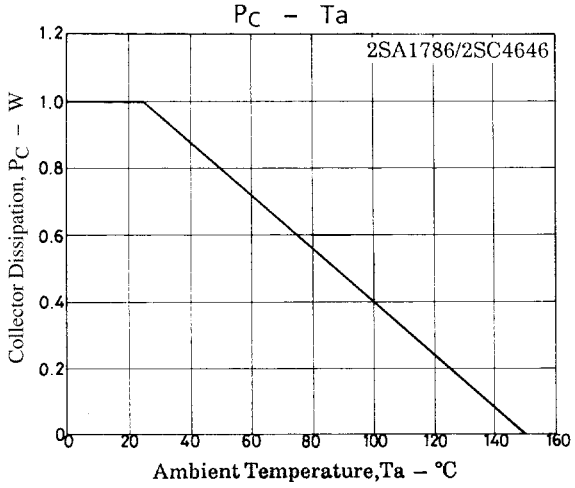

VBE(sat) – IC
2SC4646
IC/IB = 10
Ta = –25°C
75°C
25°C
Base to Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – mA


SW Time – IC
2SA1786
tstg
tf
ton
VCC=150V
10IB1=–10IB2=IC
Switching Time,SW Time – μs
Collector Current,IC – mA


SW Time – IC
2SC4646
tstg
tf
ton
VCC=–150V
10IB1=–10IB2=IC
Switching Time,SW Time – μs
Collector Current,IC – mA


ASO
2SA1786
1 Pulse
Tc=25°C
ICP
IC
10ms
1ms
100ms
DC Operation(Ta=25°C)
Collector Current,IC – mA
Collector to Emitter Voltage, VCE – V


ASO
2SC4646
Single Pulse
Tc=25°C
ICP
IC
10ms
1ms
100ms
DC Operation(Ta=25°C)
Collector current, IC – mA
Collector to Emitter Voltage, VCE – V


PC – Ta
2SA1786/2SC4646
Collector Dissipation, PC – W
Ambient Temperature,Ta – °C