

**SANYO**

No.2220B

**2SC3986**

NPN Planar Silicon Darlington Transistor

Driver Applications

**Applications**

- Suitable for use in switching of L load (motor drivers, printer hammer drivers, relay drivers).

**Features**

- High DC current gain.
- Large current capacity and wide ASO.
- On-chip zener diode of  $60 \pm 10V$  between collector and base.
- Uniformity in collector-to-base breakdown voltage due to the adoption of an accurate impurity diffusion process.
- High inductive load handling capability.
- Micaless package facilitating mounting.

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

			unit
Collector-to-Base Voltage	$V_{CB0}$	50 ※	V
Collector-to-Emitter Voltage	$V_{CEO}$	50 ※	V
Emitter-to-Base Voltage	$V_{EBO}$	6	V
Collector Current	$I_C$	2	A
Collector Current (Pulse)	$I_{CP}$	4	A
Base Current	$I_B$	0.4	A
Collector Dissipation	$P_C$	2.0	W
		15	W
Junction Temperature	$T_j$	150	$^\circ C$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ C$

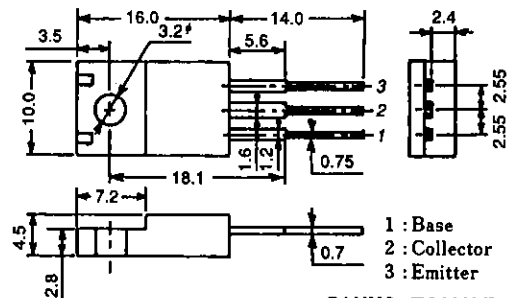
$T_c = 25^\circ C$

※ : With Zener diode ( $60 \pm 10V$ )

**Electrical Characteristics at  $T_a = 25^\circ C$** 

			min	typ	max	unit
Collector Cutoff Current	$I_{CB0}$	$V_{CB} = 40V, I_E = 0$			10	$\mu A$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = 5V, I_C = 0$			2	mA
DC Current Gain	$h_{FE}$	$V_{CE} = 5V, I_C = 1A$	1000	4000		
Gain-Bandwidth Product	$f_T$	$V_{CE} = 5V, I_C = 1A$		180		MHz
C-E Saturation Voltage	$V_{CE(sat)}$	$I_C = 1A, I_B = 4mA$		1.0	1.5	V
B-E Saturation Voltage	$V_{BE(sat)}$	$I_C = 1A, I_B = 4mA$			2.0	V
C-B Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 0.1mA, I_E = 0$	50	60	70	V
C-E Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1mA, R_{BE} = \infty$	50	60	70	V
Inductive Load Handling Capability	$E_s/b$	$L = 100mH, R_{BE} = 100\Omega$	25			mJ

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**Package Dimensions 2041A**  
(unit : mm)

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Turn-ON Time  
Storage Time  
Fall Time

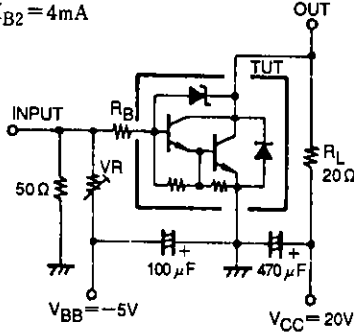
$t_{on}$   
 $t_{stg}$   
 $t_f$

See specified Test Circuit.  
 $V_{CC} = 20V, I_C = 1A,$   
 $I_{B1} = -I_{B2} = 4mA$

min	typ	max	unit
	0.2		$\mu s$
	3.5		$\mu s$
	0.5		$\mu s$

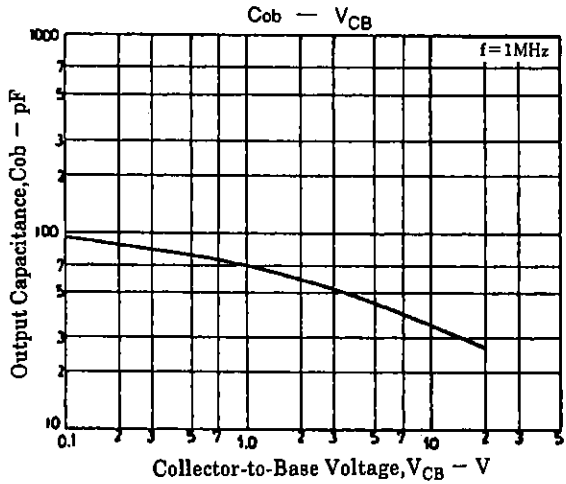
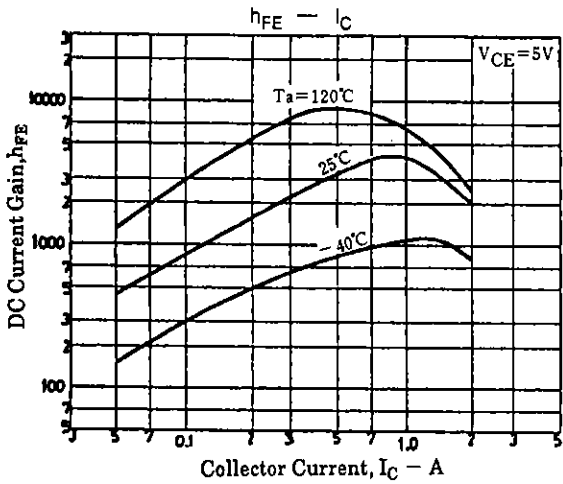
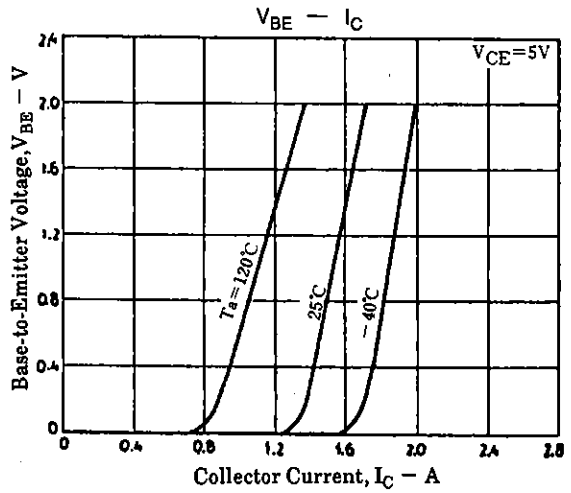
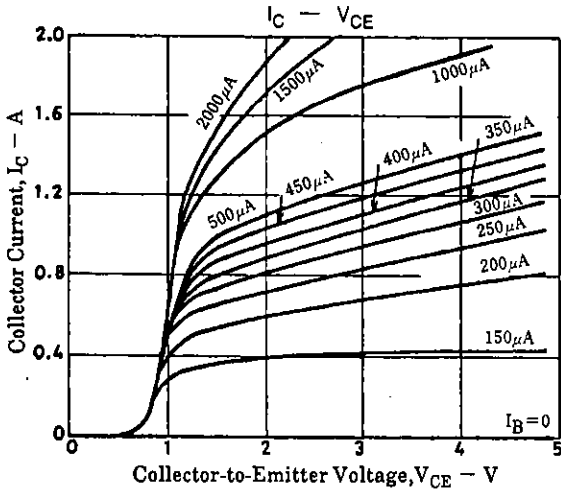
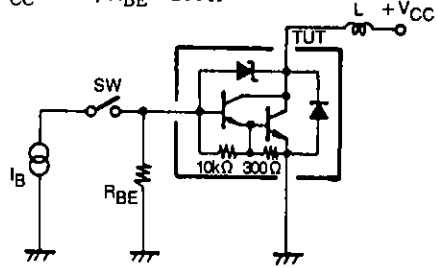
Switching Time Test Circuit

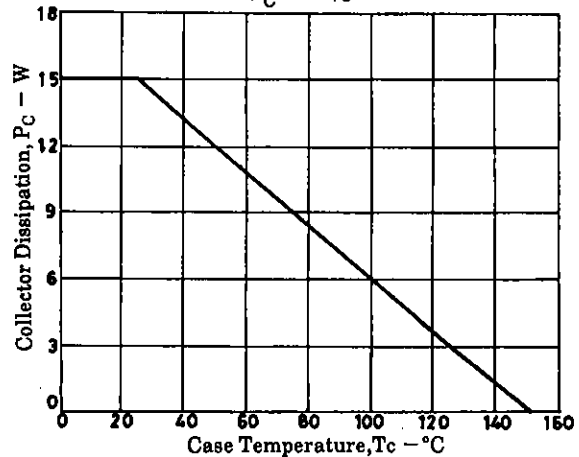
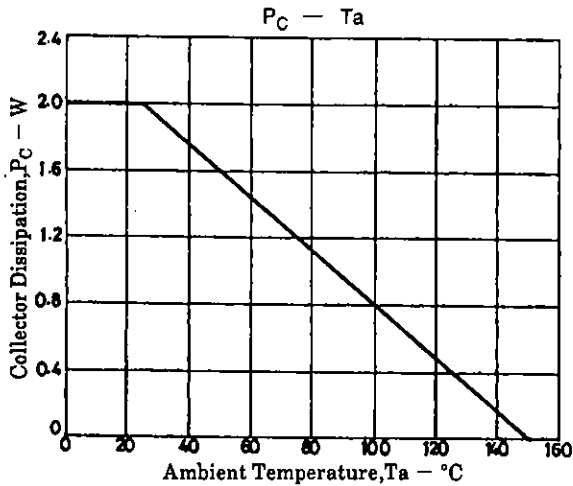
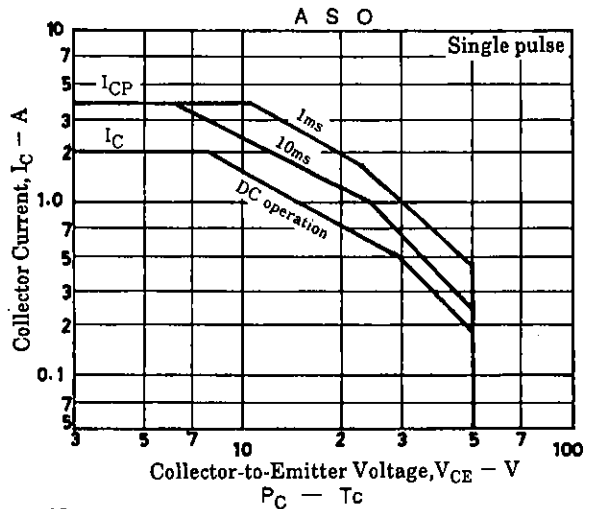
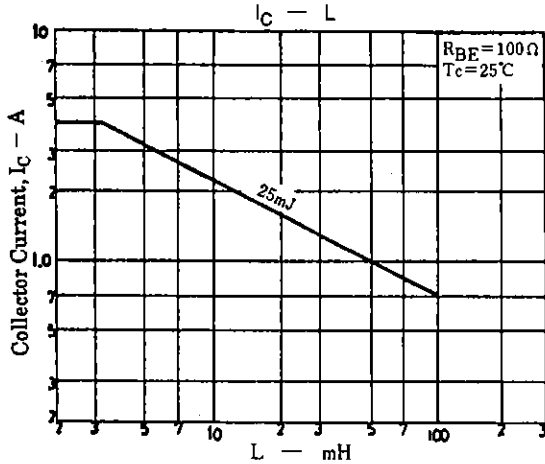
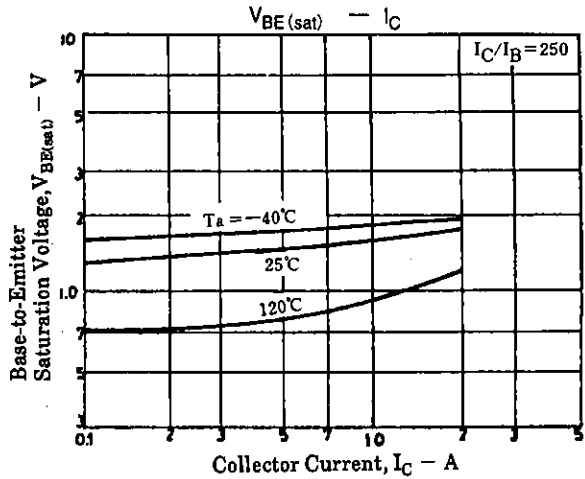
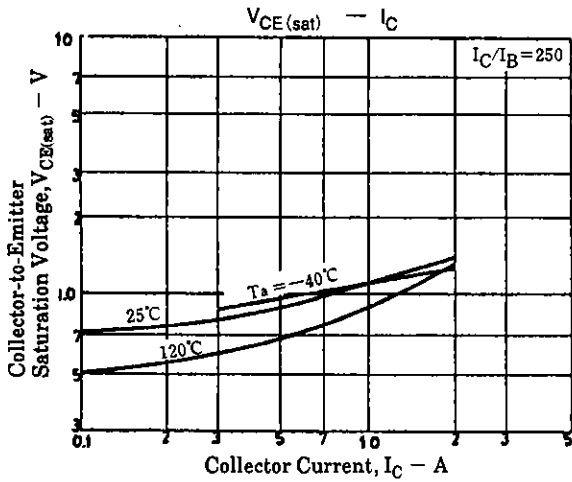
PW = 50 $\mu s$ , Duty Cycle  $\leq$  1%  
 $I_{B1} = -I_{B2} = 4mA$



Es/b Test Circuit

$V_{CC} = 20V, R_{BE} = 100\Omega$





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