



SANYO SEMICONDUCTOR

DARLINGTON COMPLEMENTARY SILICON POWER TRANSISTORS

NPN

TIP110

TIP111

TIP112

PNP

TIP115

TIP116

TIP117

60-80-100 VOLTS, 2 AMPERE

HIGH CURRENT GAIN $h_{FE} = 4000$ typ. @ 3V, 1.5A
LOW SATURATION VOLTAGE $V_{CE(SAT)} = 1.0V$ typ. @ 1.5A
MONOLITHIC CONSTRUCTION WITH BUILT-IN

- (1) BASE-EMITTER RESISTORS AND
- (2) COLLECTOR-EMITTER DIODE

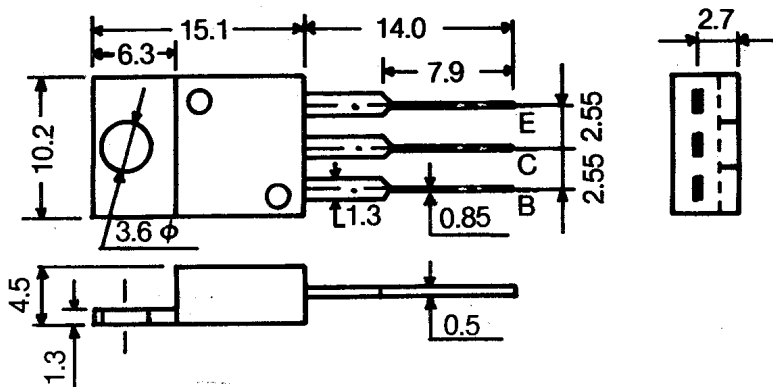
ABSOLUTE MAXIMUM RATINGS @ $T_a = 25^\circ C$

RATING	SYMBOL	TIP110, TIP115	TIP111, TIP116	TIP112, TIP117	UNIT
COLLECTOR-EMITTER VOLTAGE	V_{CEO}	60	80	100	Vdc
COLLECTOR-BASE VOLTAGE	V_{CB}	60	80	100	Vdc
EMITTER-BASE VOLTAGE	V_{EB}	5.0			Vdc
COLLECTOR CURRENT- CONTINUOUS PEAK	I_C	2.0 5.0			Adc
TOTAL POWER DISSIPATION @ $T_C = 25^\circ C$	P_D	50			W
TOTAL POWER DISSIPATION @ $T_A = 25^\circ C$	P_D	2.0			W
OPERATING AND STORAGE JUNCTION TEMPERATURE RANGE	T_J, T_{stg}	- 55 to + 150			$^\circ C$

OUTLINE DIMENSION

JEDEC: TO-220

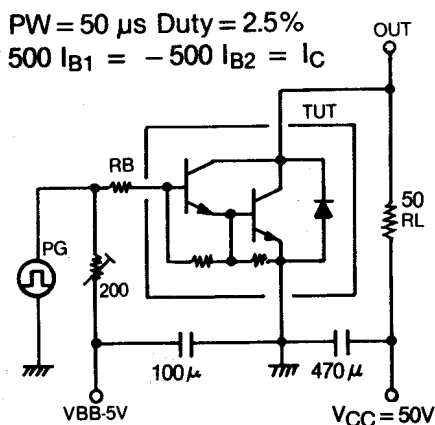
UNIT: MM



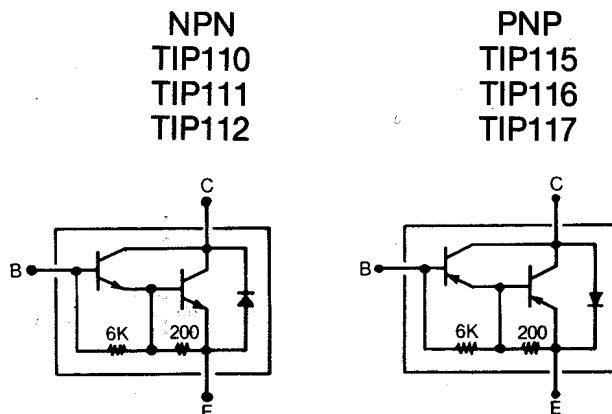
ELECTRICAL CHARACTERISTICS @ Ta = 25°C

CHARACTERISTIC	SYMBOL	MIN	MAX	UNIT
COLLECTOR-EMITTER SUSTAINING VOLTAGE (1) (I _C = 30 mA _{dc} , I _B = 0) TIP110, TIP115 TIP111, TIP116 TIP112, TIP117	V _{CEO(SUS)}	60 80 100	— — —	V _{dc}
COLLECTOR CUTOFF CURRENT (V _{CE} = 30 V _{dc} , I _B = 0) (V _{CE} = 40 V _{dc} , I _B = 0) (V _{CE} = 50 V _{dc} , I _B = 0) TIP110, TIP115 TIP111, TIP116 TIP112, TIP117	I _{CEO}	— — —	0.5 0.5 0.5	A _{dc}
COLLECTOR CUTOFF CURRENT (V _{CB} = 60 V _{dc} , I _E = 0) (V _{CB} = 80 V _{dc} , I _E = 0) (V _{CB} = 100 V _{dc} , I _E = 0) TIP110, TIP115 TIP111, TIP116 TIP112, TIP117	I _{CBO}	— — —	0.2 0.2 0.2	A _{dc}
EMITTER CUTOFF CURRENT (V _{BE} = 5.0 V _{dc} , I _C = 0)	I _{EBO}	—	2.0	mA _{dc}
DC CURRENT GAIN (I _C = 1.0 A _{dc} , V _{CE} = 4.0 V _{dc}) (I _C = 2.0 A _{dc} , V _{CE} = 4.0 V _{dc})	h _{FE}	1000 500	— —	—
COLLECTOR-EMITTER SATURATION VOLTAGE (I _C = 2.0 A _{dc} , I _B = 8.0 mA _{dc})	V _{CE(SAT)}	—	2.5	V _{dc}
BASE-EMITTER ON VOLTAGE (I _C = 2.0 A _{dc} , V _{CE} = 4.0 V _{dc})	V _{BE(ON)}	—	2.8	V _{dc}
GAIN BANDWIDTH PRODUCT (I _C = 1.5 A, V _{CE} = 5.0V)	f _T	20 typ.	—	mHz
OUTPUT CAPACITANCE (V _{CB} = 10 V, I _E = 0, f = 0.1 mHz) TIP 110, 111, 112 TIP 115, 116, 117		35 typ. 40 typ.	— —	pF pF
SWITCHING TIME (RESISTIVE LOAD)		(NPN)	(PNP)	
Turn-on Time (Test Circuit)	t _{on}	0.7 typ.	0.8 typ.	uS
Storage Time	t _s	5.0 typ.	2.4 typ.	uS
Fall Time	t _f	1.2 typ.	1.2 typ.	uS

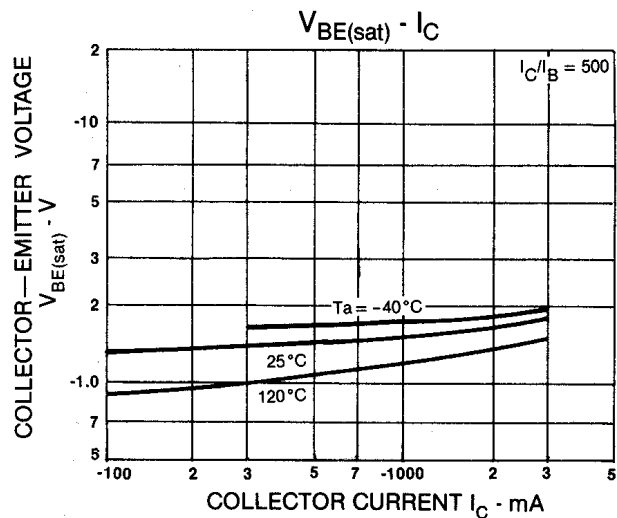
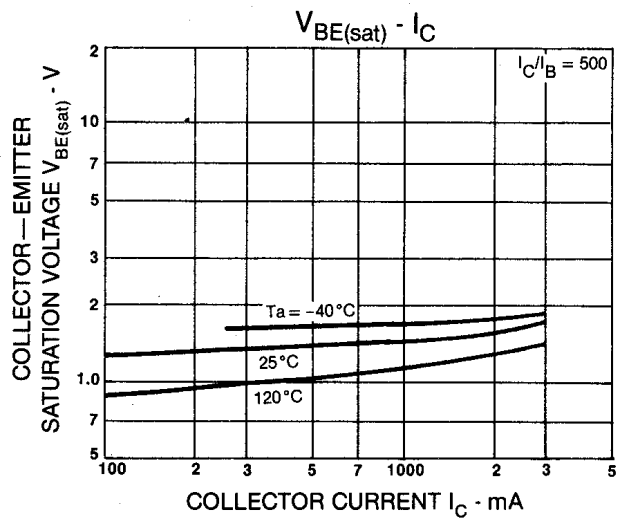
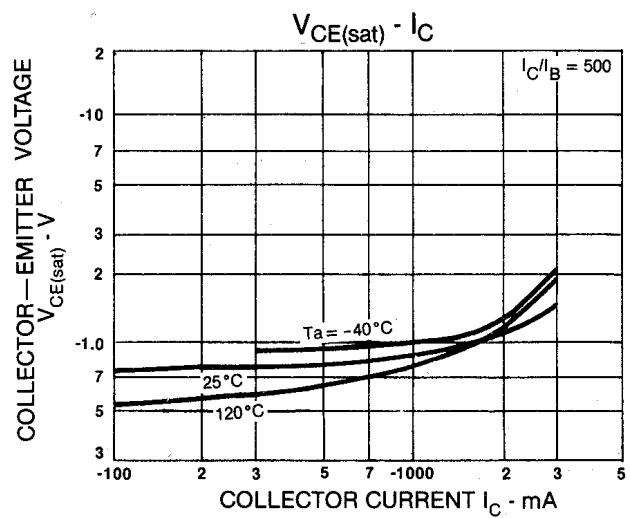
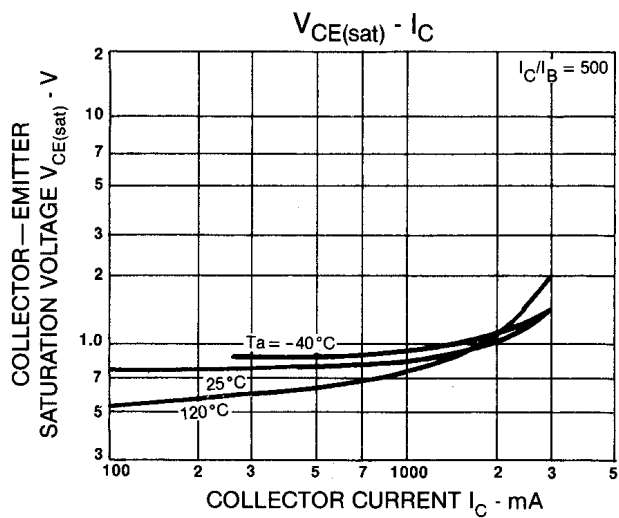
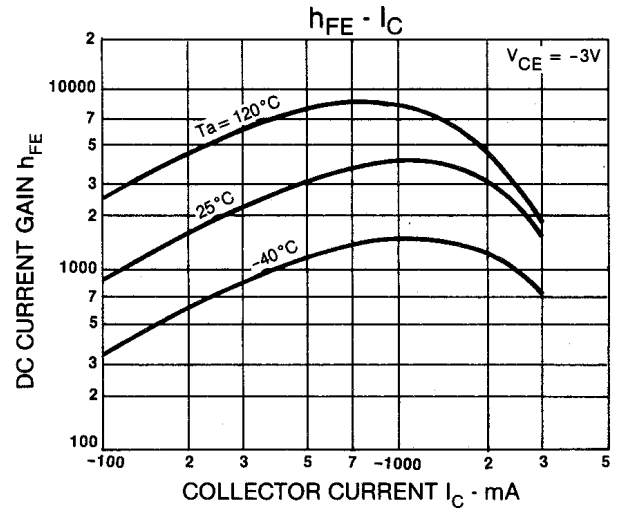
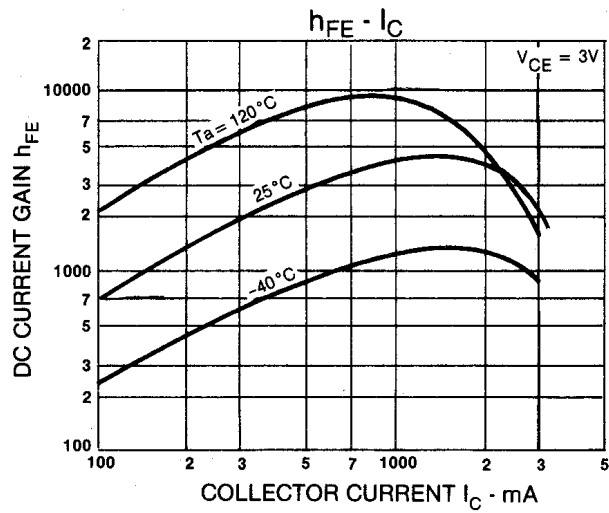
SWITCHING TIME TEST CIRCUIT



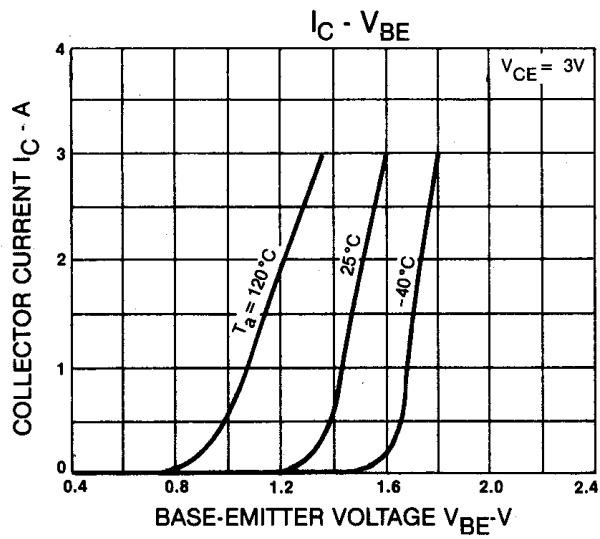
DARLINGTON SCHEMATIC



NPN TIP 110, TIP 111, TIP 112



NPN TIP 110, TIP 111, TIP 112



PNP TIP 115, TIP 116, TIP 117

