SANYO SEMICONDUCTOR

NPN	PNP
TIP110	TIP115
TIP111	TIP116
TIP112	TIP117

DARLINGTON COMPLEMENTARY SILICON POWER TRANSISTORS

60-80-100 VOLTS, 2 AMPERE

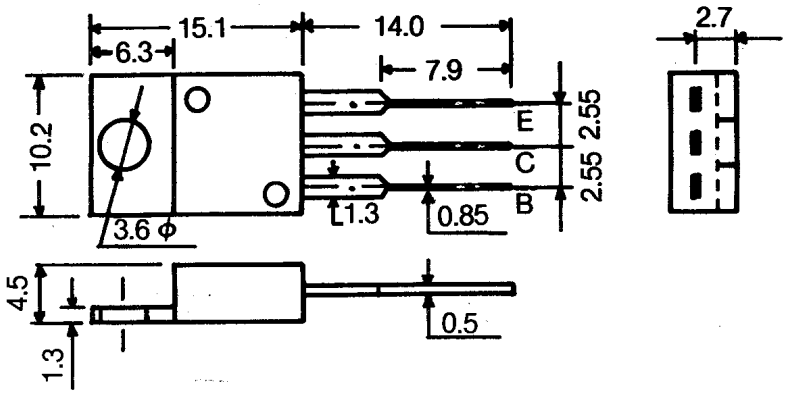
HIGH CURRENT GAIN h_{FE} = 4000 typ. @3V, 1.5A
LOW SATURATION VOLTAGE $V_{CE(SAT)}$ = 1.0V typ. @1.5A
MONOLITHIC CONSTRUCTION WITH BUILT-IN
(1) BASE-EMITTER RESISTORS AND
(2) COLLECTOR-EMITTER DIODE

ABSOLUTE MAXIMUM RATINGS @ Ta = 25°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°C	P_D	50			W
TOTAL POWER DISSIPATION @ T_A = 25°C	P_D	2.0			W
OPERATING AND STORAGE JUNCTION TEMPERATURE RANGE	T_J, T_{stg}	− 55 to + 150			°C

OUTLINE DIMENSION

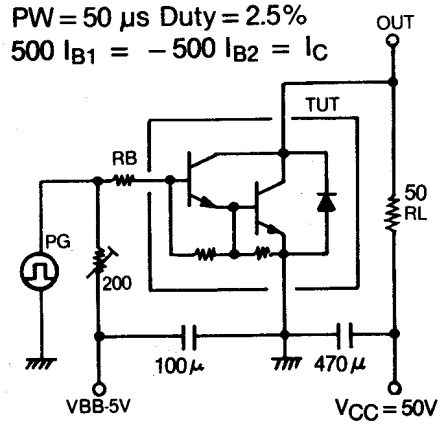
JEDEC: TO-220
UNIT: MM



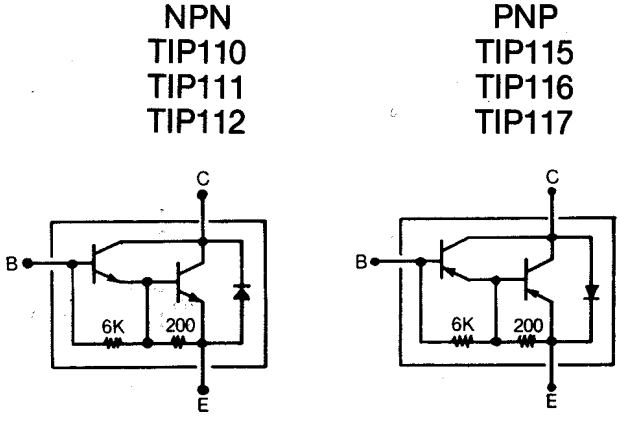
ELECTRICAL CHARACTERISTICS @ Ta = 25°C

CHARACTERISTIC		SYMBOL	MIN	MAX	UNIT
COLLECTOR-EMITTER SUSTAINING VOLTAGE (1)		$V_{CEO(SUS)}$			Vdc
(I_C = 30 mAdc, I_B = 0)	TIP110, TIP115		60	—	
	TIP111, TIP116		80	—	
	TIP112, TIP117		100	—	
COLLECTOR CUTOFF CURRENT		I_{CEO}			Adc
(V_{CE} = 30 Vdc, I_B = 0)	TIP110, TIP115		—	0.5	
(V_{CE} = 40 Vdc, I_B = 0)	TIP111, TIP116		—	0.5	
(V_{CE} = 50 Vdc, I_B = 0)	TIP112, TIP117		—	0.5	
COLLECTOR CUTOFF CURRENT		I_{CBO}			Adc
(V_{CB} = 60 Vdc, I_E = 0)	TIP110, TIP115		—	0.2	
(V_{CB} = 80 Vdc, I_E = 0)	TIP111, TIP116		—	0.2	
(V_{CB} = 100 Vdc, I_E = 0)	TIP112, TIP117		—	0.2	
EMITTER CUTOFF CURRENT		I_{EBO}			mAdc
(V_{BE} = 5.0 Vdc, I_C = 0)			—	2.0	
DC CURRENT GAIN		h_{FE}			—
(I_C = 1.0 Adc, V_{CE} = 4.0 Vdc)			1000	—	
(I_C = 2.0 Adc, V_{CE} = 4.0 Vdc)			500	—	
COLLECTOR-EMITTER SATURATION VOLTAGE		$V_{CE(SAT)}$			Vdc
(I_C = 2.0 Adc, I_B = 8.0 mAdc)			—	2.5	
BASE-EMITTER ON VOLTAGE		$V_{BE(ON)}$			Vdc
(I_C = 2.0 Adc, V_{CE} = 4.0 Vdc)			—	2.8	
GAIN BANDWIDTH PRODUCT		f_T	20 typ.	—	mHz
(I_C = 1.5 A, V_{CE} = 5.0V)					
OUTPUT CAPACITANCE					
(V_{CB} = 10 V, I_E = 0, f = 0.1 mHz)	TIP 110,111,112		35 typ.	—	pF
	TIP 115, 116, 117		40 typ.	—	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

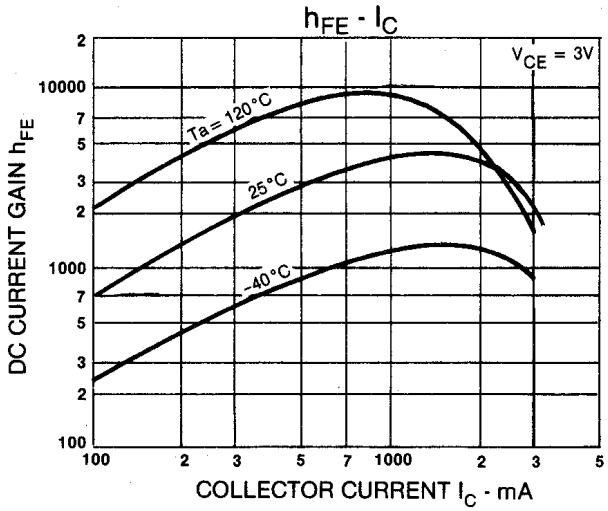


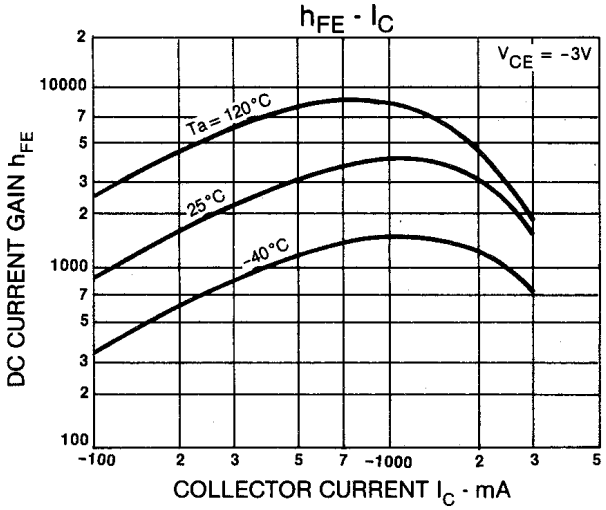
DARLINGTON SCHEMATIC

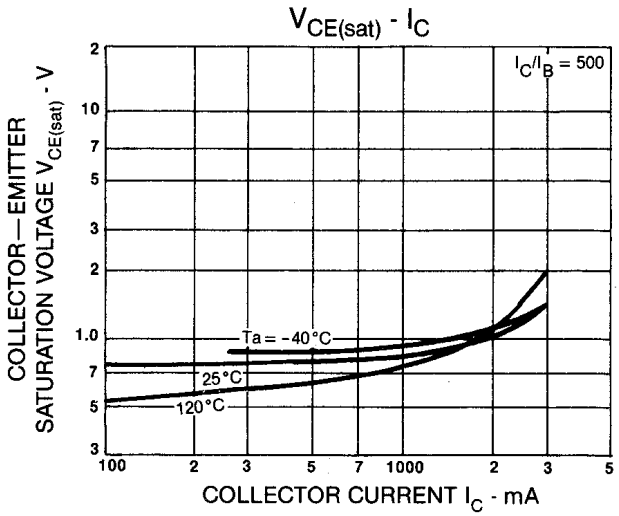


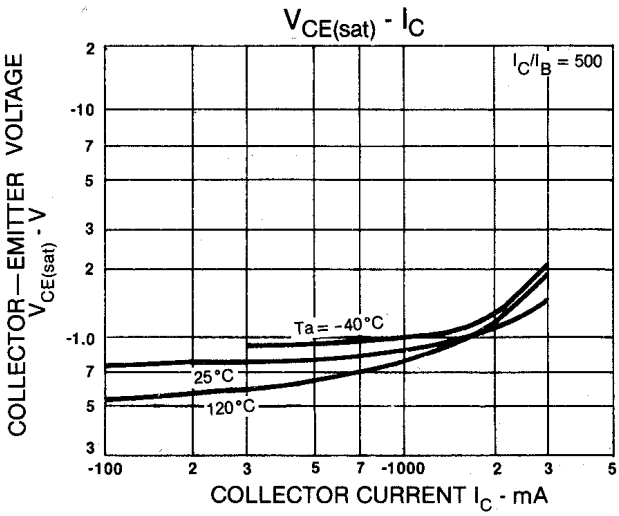
NPN TIP 110, TIP 111, TIP 112

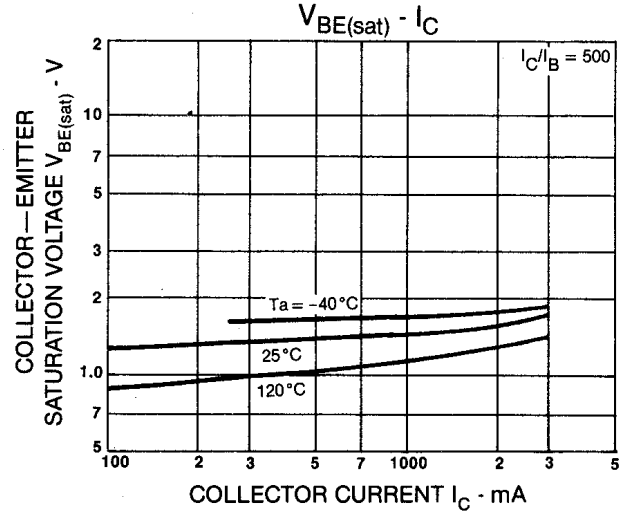
PNP TIP 115, TIP 116, TIP 117

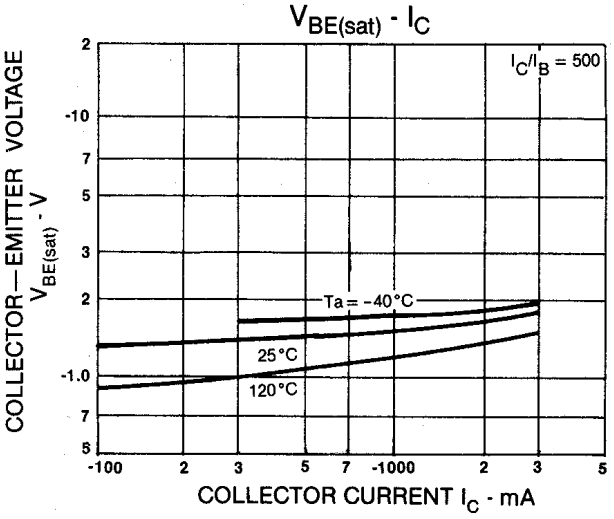












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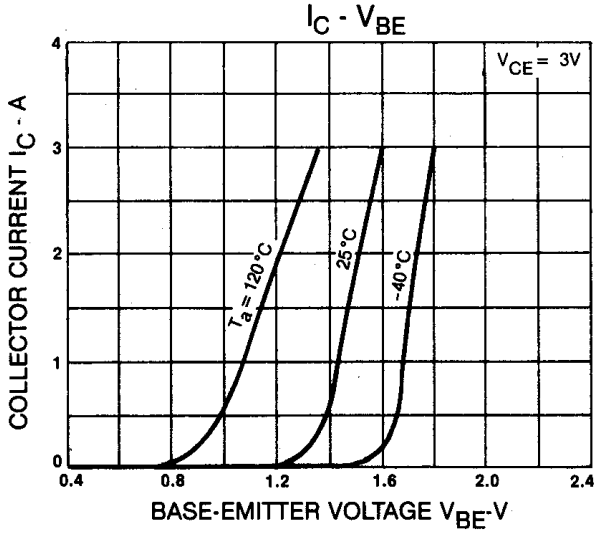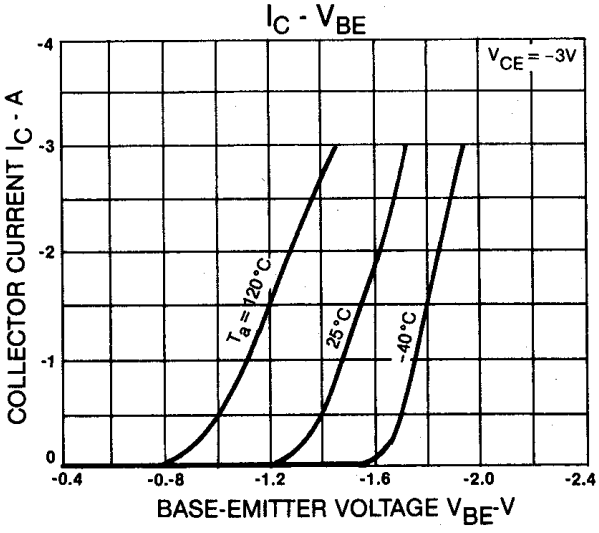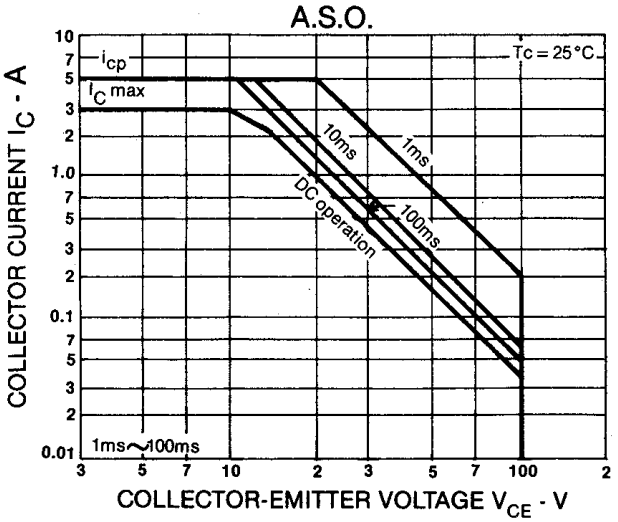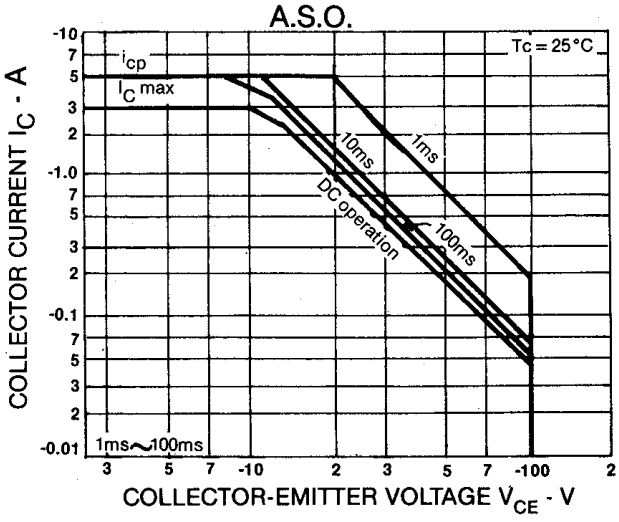
PNP TIP 115, TIP 116, TIP 117