SANYO SEMICONDUCTOR

NPN	PNP
TIP140	TIP145
TIP141	TIP146
TIP142	TIP147

DARLINGTON COMPLEMENTARY SILICON POWER TRANSISTORS

60-80-100 VOLTS, 10 AMPERE

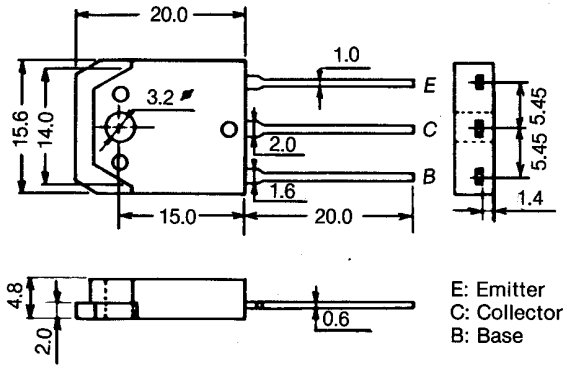
HIGH CURRENT GAIN h_{FE} = 4000 typ. @3V, 5A
LOW SATURATION VOLTAGE $V_{CE(SAT)}$ = 1.0V typ. @5A
MONOLITHIC CONSTRUCTION WITH BUILT-IN
(1) BASE-EMITTER RESISTORS AND
(2) COLLECTOR-EMITTER DIODE

ABSOLUTE MAXIMUM RATINGS @ Ta = 25°C

RATING	SYMBOL	TIP140, TIP145	TIP141, TIP146	TIP142, TIP147	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	← 10 → ← 15 →			Adc
TOTAL POWER DISSIPATION @ T_C = 25°C	P_D	← 125 →			W
TOTAL POWER DISSIPATION @ T_A = 25°C	P_D	← 3.5 →			W
OPERATING AND STORAGE JUNCTION TEMPERATURE RANGE	T_J, T_{stg}	← − 55 to + 150 →			°C

OUTLINE DIMENSION

JEDEC: TO-3P
UNIT: MM

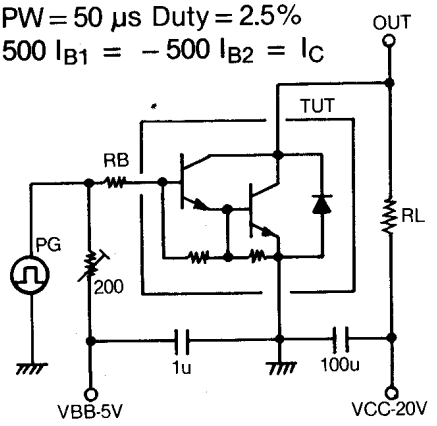


ELECTRICAL CHARACTERISTICS @ Ta = 25°C

CHARACTERISTIC		SYMBOL	MIN	MAX	UNIT
COLLECTOR-EMITTER SUSTAINING VOLTAGE (I_C = 30 mAdc, I_B = 0)	TIP140, TIP145 TIP141, TIP146 TIP142, TIP147	$V_{CEO(SUS)}$	 60 80 100	 — — —	Vdc
COLLECTOR CUTOFF CURRENT (V_{CE} = 30 Vdc, I_B = 0) (V_{CE} = 40 Vdc, I_B = 0) (V_{CE} = 50 Vdc, I_B = 0)	 TIP140, TIP145 TIP141, TIP146 TIP142, TIP147	I_{CEO}	 — — —	 2.0 2.0 2.0	mAdc
COLLECTOR CUTOFF CURRENT (V_{CB} = 60 Vdc, I_E = 0) (V_{CB} = 80 Vdc, I_E = 0) (V_{CB} = 100 Vdc, I_E = 0)	 TIP140, TIP145 TIP141, TIP146 TIP142, TIP147	I_{CBO}	 — — —	 1.0 1.0 1.0	mAdc
EMITTER CUTOFF CURRENT (V_{BE} = 5.0 Vdc, I_C = 0)		I_{EBO}	 —	 2.0	mAdc mAdc
DC CURRENT GAIN (I_C = 5.0 Adc, V_{CE} = 4.0 Vdc) (I_C = 10.0 Adc, V_{CE} = 4.0 Vdc)		h_{FE}	 1000 500	 — —	—
COLLECTOR-EMITTER SATURATION VOLTAGE (I_C = 5.0 Adc, I_B = 10 mAdc) (I_C = 10.0 Adc, I_B = 40 mAdc)		$V_{CE(SAT)}$	 — —	 2.0 3.0	Vdc
BASE-EMITTER ON VOLTAGE (I_C = 10.0 Adc, V_{CE} = 4.0 Vdc)		$V_{BE(ON)}$	 —	 3.0	Vdc
GAIN BANDWIDTH PRODUCT (I_C = 5.0 A, V_{CE} = 5.0V)		f_T	20 typ.		mHz

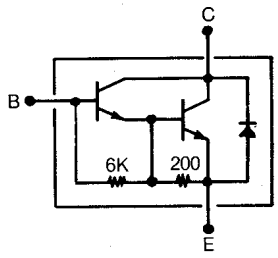
SWITCHING TIME TEST CIRCUIT

PW = 50 μs Duty = 2.5%
500 I_{B1} = − 500 I_{B2} = I_C

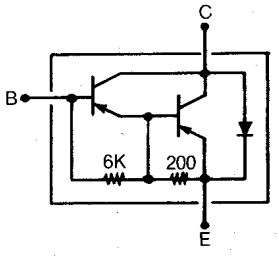


DARLINGTON SCHEMATIC

NPN
TIP140
TIP141
TIP142

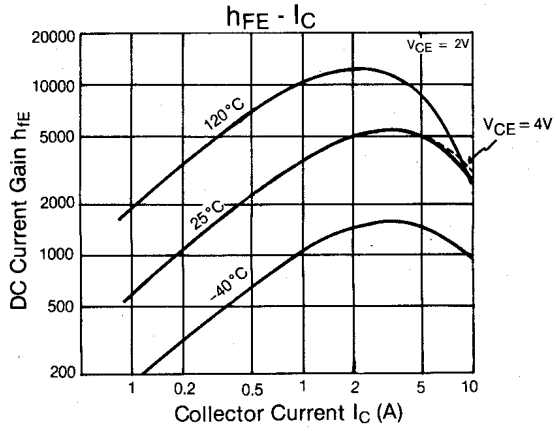


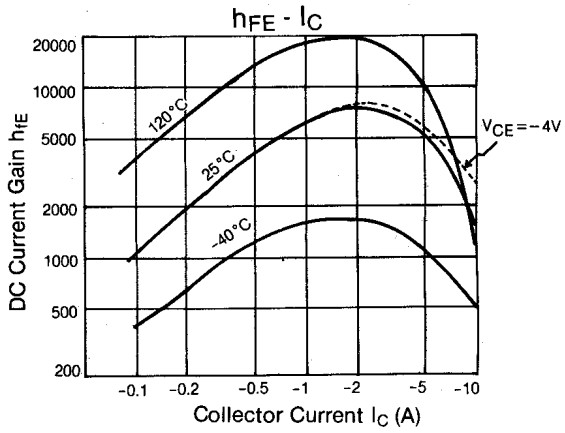
PNP
TIP145
TIP146
TIP147

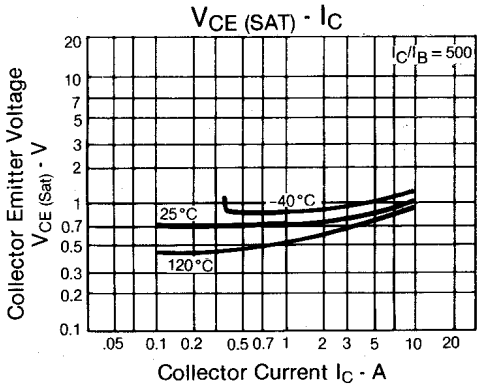


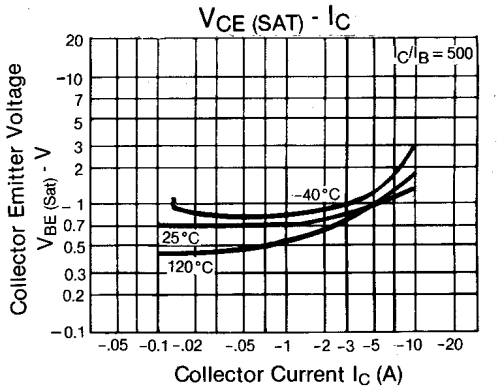
NPN
TIP 140, TIP 141, TIP 142

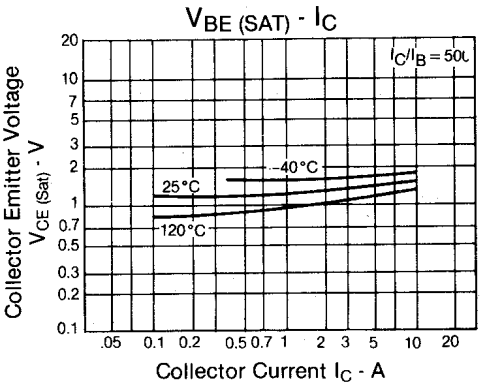
PNP
TIP 145, TIP 146, TIP 147

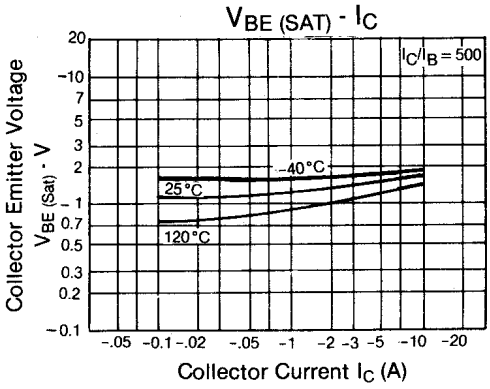


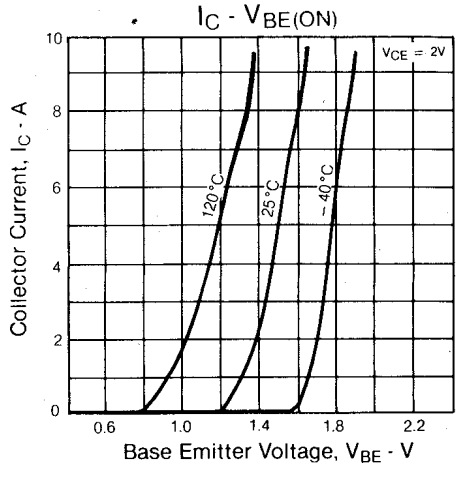


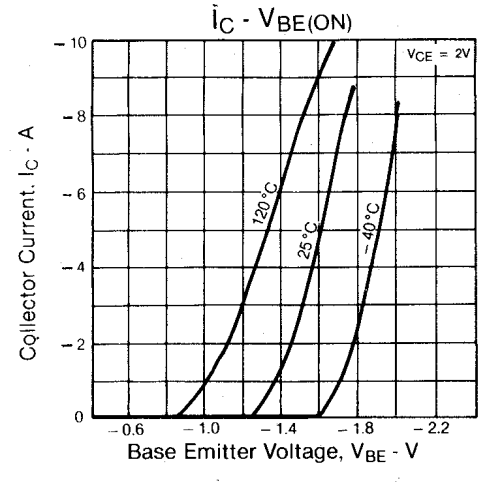




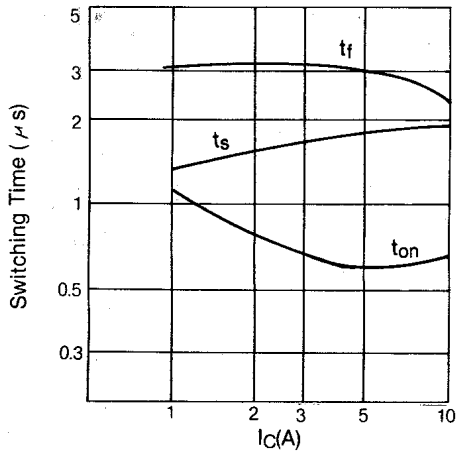




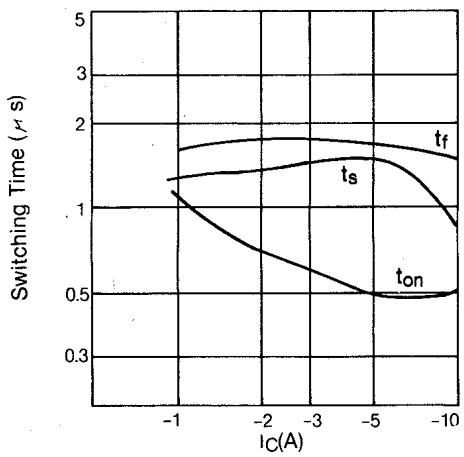




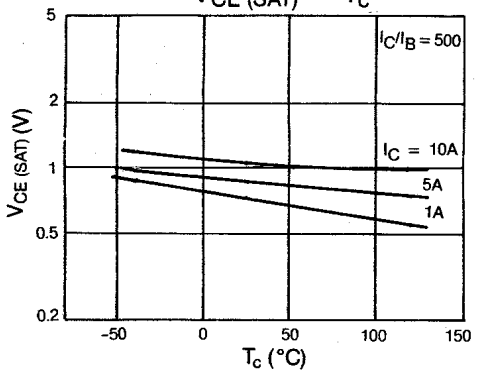
t_{on}, t_s, t_f – I_C



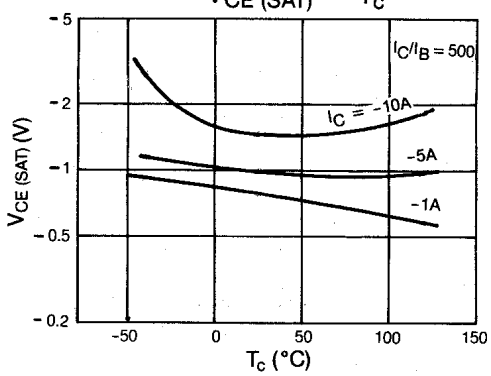
t_{on}, t_s, t_f – I_C



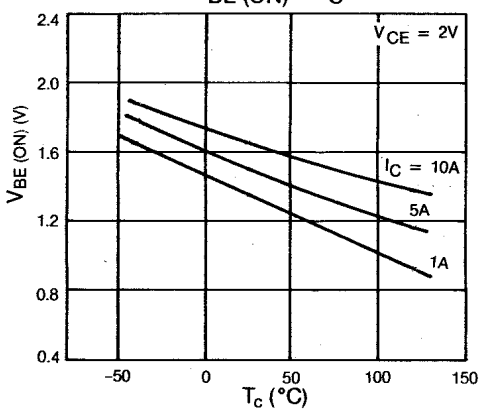
$V_{CE\ (SAT)}$ – T_C



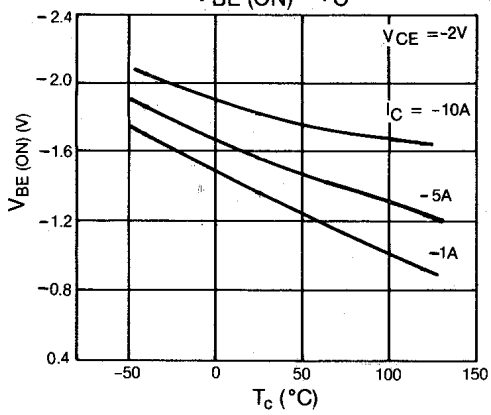
$V_{CE\ (SAT)}$ – T_C



$V_{BE\ (ON)}$ - T_C



$V_{BE\ (ON)}$ - T_C



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