SANYO SEMICONDUCTOR

NPN	PNP
TIP120	TIP125
TIP121	TIP126
TIP122	TIP127

DARLINGTON COMPLEMENTARY SILICON POWER TRANSISTORS

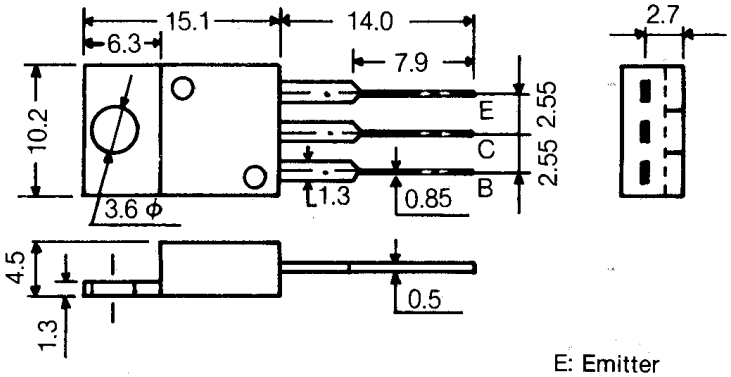
60-80-100 VOLTS, 5 AMPERE

HIGH CURRENT GAIN h_{FE} = 2500 typ. @3V, 3A
LOW SATURATION VOLTAGE $V_{CE(SAT)}$ = 1.0V typ. @2.5A
MONOLITHIC CONSTRUCTION WITH BUILT-IN
(1) BASE-EMITTER RESISTORS AND
(2) COLLECTOR-EMITTER DIODE

ABSOLUTE MAXIMUM RATINGS @ Ta = 25°C

RATING	SYMBOL	TIP120, TIP125	TIP121, TIP126	TIP122, TIP127	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	← 5.0 → ← 8.0 →			Adc
TOTAL POWER DISSIPATION @ T_C = 25°C	P_D	← 65 →			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



JEDEC: TO-220AB
EIAJ: SC-46

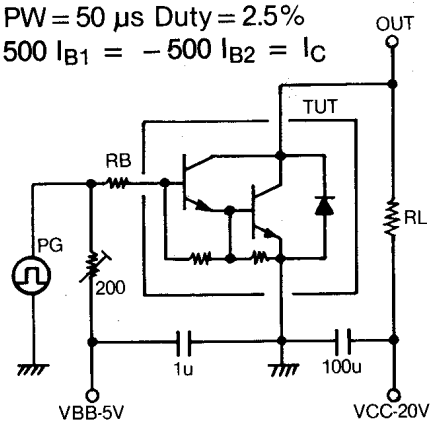
E: Emitter
C: Collector
B: Base

ELECTRICAL CHARACTERISTICS @ Ta = 25°C

CHARACTERISTIC		SYMBOL	MIN	MAX	UNIT
COLLECTOR-EMITTER SUSTAINING VOLTAGE		$V_{CEO(SUS)}$			Vdc
(I_C = 30 mAdc, I_B = 0)	TIP120, TIP125		60	—	
	TIP121, TIP126		80	—	
	TIP122, TIP127		100	—	
COLLECTOR CUTOFF CURRENT		I_{CEO}			mAdc
(V_{CE} = 30 Vdc, I_B = 0)	TIP120, TIP125		—	0.5	
(V_{CE} = 40 Vdc, I_B = 0)	TIP121, TIP126		—	0.5	
(V_{CE} = 50 Vdc, I_B = 0)	TIP122, TIP127		—	0.5	
COLLECTOR CUTOFF CURRENT		I_{CBO}			mAdc
(V_{CB} = 60 Vdc, I_E = 0)	TIP120, TIP125		—	0.2	
(V_{CB} = 80 Vdc, I_E = 0)	TIP121, TIP126		—	0.2	
(V_{CB} = 100 Vdc, I_E = 0)	TIP122, TIP127		—	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 = 0.5 Adc, V_{CE} = 3.0 Vdc)			1000	—	
(I_C = 3.0 Adc, V_{CE} = 3.0 Vdc)			1000	—	
COLLECTOR-EMITTER SATURATION VOLTAGE		$V_{CE(SAT)}$			Vdc
(I_C = 3.0 Adc, I_B = 12 mAdc)			—	2.0	
(I_C = 5.0 Adc, I_B = 20 mAdc)			—	4.0	
BASE-EMITTER ON VOLTAGE		$V_{BE(ON)}$			Vdc
(I_C = 3.0 Adc, V_{CE} = 3.0 Vdc)			—	2.5	
GAIN BANDWIDTH PRODUCT		f_T	20 typ.		mHz
(I_C = 2.5 A, V_{CE} = 5.0V)					

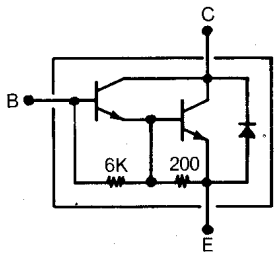
SWITCHING TIME TEST CIRCUIT

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

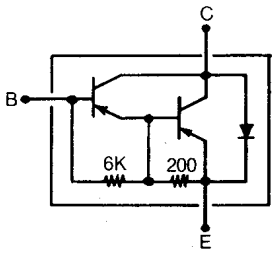


DARLINGTON SCHEMATIC

NPN
TIP120
TIP121
TIP122



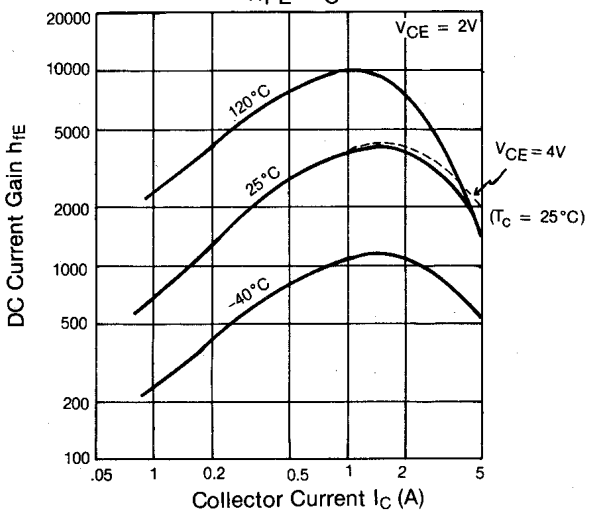
PNP
TIP125
TIP126
TIP127



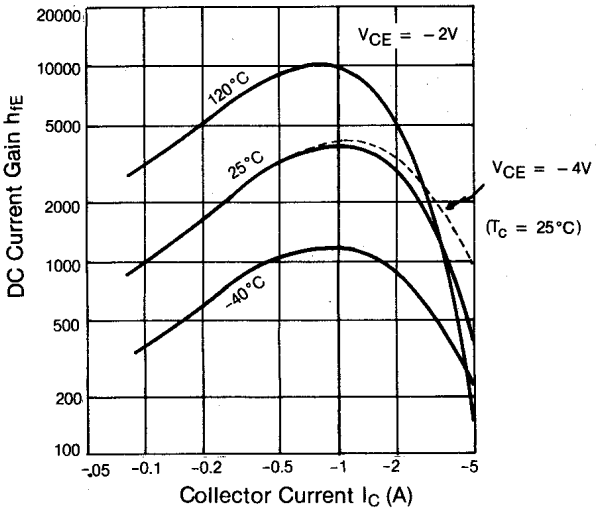
NPN
TIP 120, TIP 121, TIP 122

PNP
TIP 125, TIP 126, TIP 127

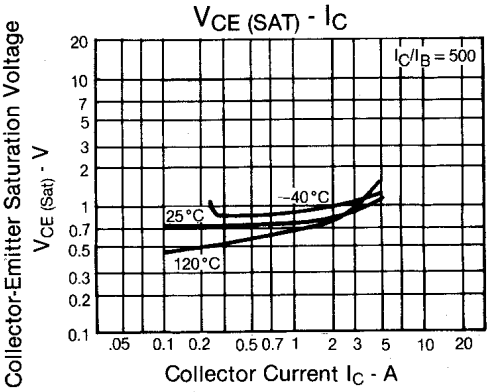
h_{FE} - I_C



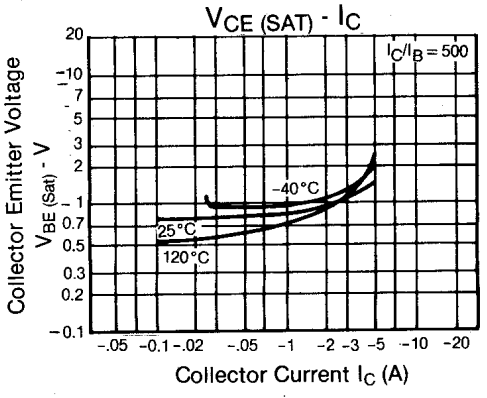
h_{FE} - I_C



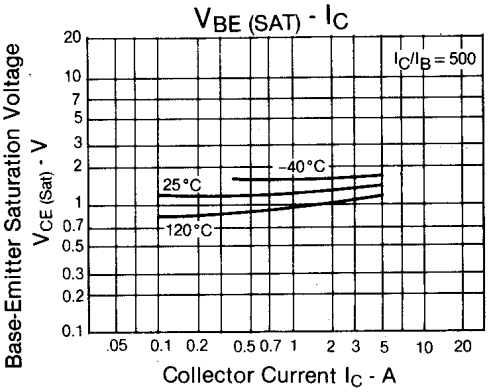
$V_{CE\ (SAT)}$ - I_C



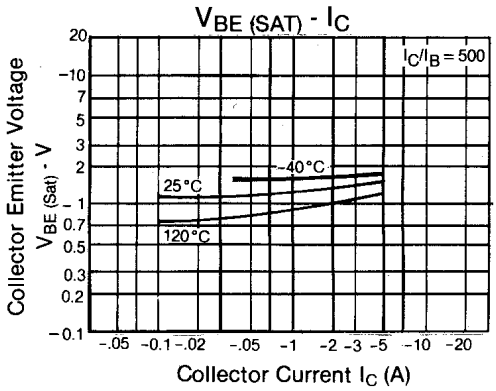
$V_{CE\ (SAT)}$ - I_C



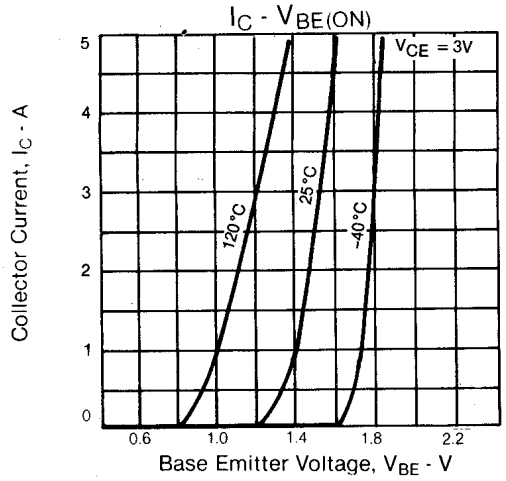
$V_{BE\ (SAT)}$ - I_C



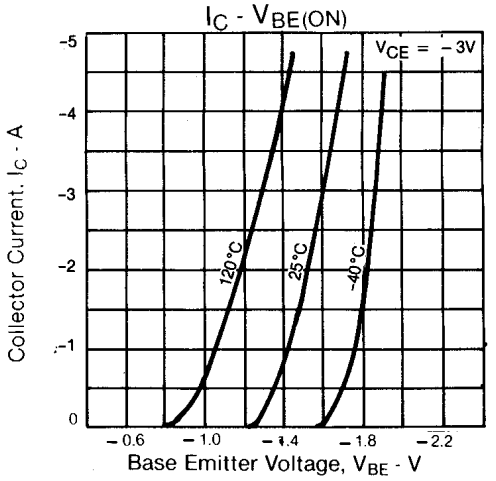
$V_{BE\ (SAT)}$ - I_C



I_C - $V_{BE(ON)}$



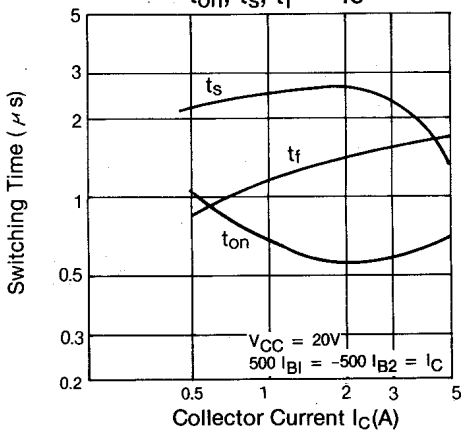
I_C - $V_{BE(ON)}$



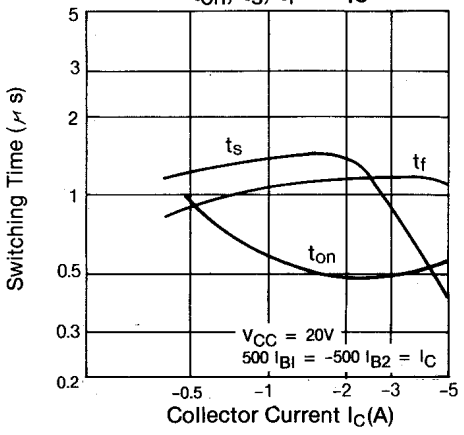
NPN
TIP 120, TIP 121, TIP 122

PNP
TIP 125, TIP 126, TIP 127

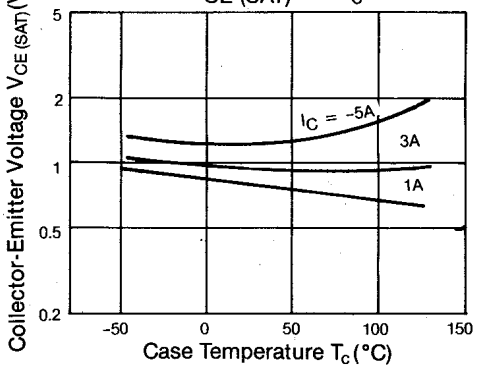
t_{on}, t_s, t_f – I_C



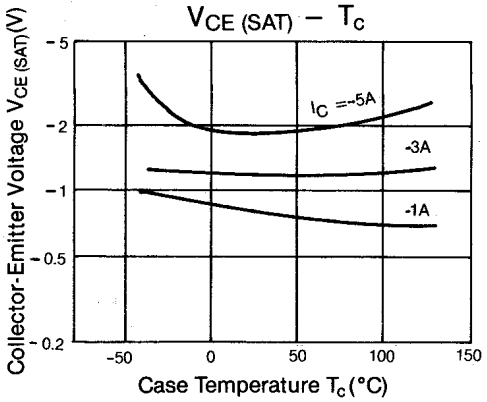
t_{on}, t_s, t_f – I_C



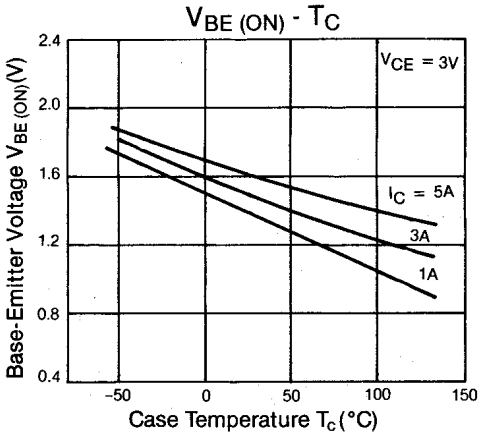
$V_{CE\ (SAT)}$ – T_C



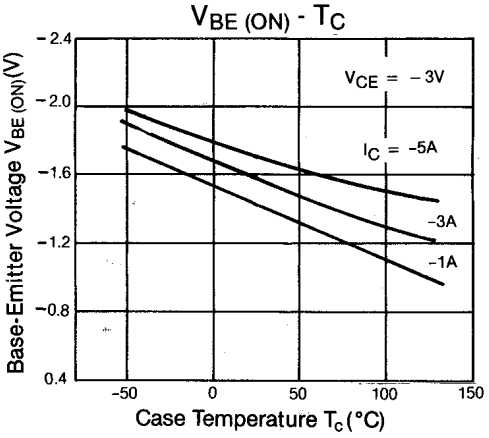
$V_{CE\ (SAT)}$ – T_C



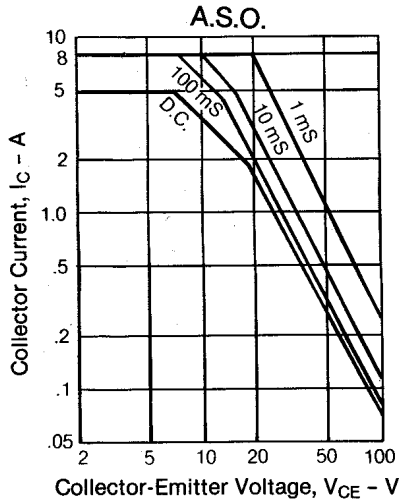
$V_{BE\ (ON)}$ - T_C



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



A.S.O.



A.S.O.