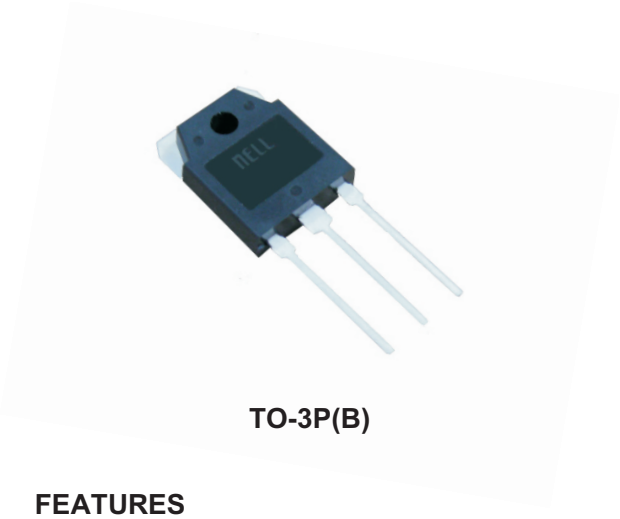
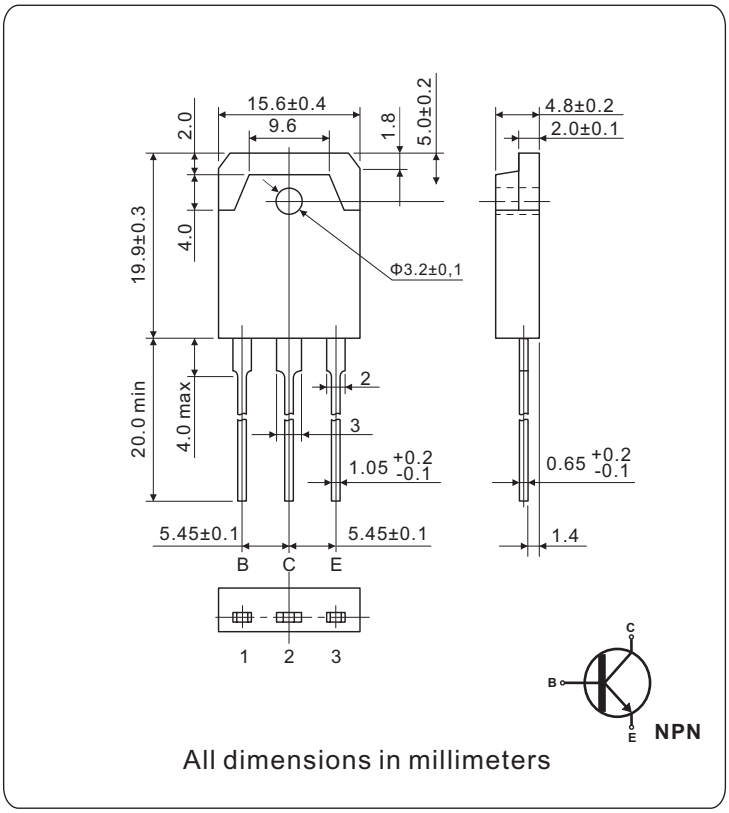
Silicon NPN triple diffusion planar transistor
25A/400V Switching Regulator Applications



TO-3P(B)



All dimensions in millimeters

FEATURES

- High-speed switching
- High breakdown voltage and high reliability
- Wide SOA (Safe Operation Area)
- TO-3P package which can be installed to the heat sink with one screw

APPLICATIONS

- Switching regulator
- High frequency inverters
- Ultrasonic generators
- General purpose power amplifiers

ABSOLUTE MAXIMUM RATINGS (T_a = 25°C)

SYMBOL	PARAMETER		VALUE	UNIT
V_{CBO}	Collector to base voltage (I_E=0)		500	V
V_{CEO}	Collector to emitter voltage (I_B=0)		400	
V_{EBO}	Emitter to base voltage		7	
I_{CP}	Peak collector current (PW ≤ 300μs, duty cycle ≤ 10%)		40	A
I_C	Collector current		25	
I_B	Base current		8	
P_C	Collector power dissipation	T_C= 25°C	160	W
		T_A= 25°C	2.5	
T_j	Junction temperature		150	°C
T_{stg}	Storage temperature		-55 to 150	

THERMAL CHARACTERISTICS (T_C = 25°C)

SYMBOL	PARAMETER	Min.	Typ.	Max.	UNIT
$R_{th(j-c)}$	Thermal resistance, junction to case			0.70	V

ELECTRICAL CHARACTERISTICS (T_a = 25°C)

SYMBOL	PARAMETER	CONDITIONS		VALUE			UNIT
				MIN.	TYP.	MAX.	
I_{CBO}	Collector cutoff current	V_{CB} = 400V, I_E = 0				10	μA
I_{EBO}	Emitter cutoff current	V_{EB} = 5V, I_C = 0				10	
$V_{CE(SUS)}$	Collector to emitter sustaining voltage	I_C = 10A, L = 200μH, I_{BI} = 1A, I_{B2} = -4A		400			V
$V_{CE(sat)}$	Collector to emitter saturation voltage	I_C = 16A, I_B = 3.2A				0.8	V
$V_{BE(sat)}$	Base to emitter saturation voltage	I_C = 16A, I_B = 3.2A				1.5	
f_T	Transition frequency (Gain-Bandwidth product)	V_{CE} = 10V, I_C = 3.2A			20		MHz
C_{ob}	Output capacitance	V_{CB} = 10V, f= 1MHz			300		pF
$V_{(BR)CBO}$	Collector to base breakdown voltage	I_C = 1mA, I_E = 0		500			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	I_C = 10mA, R_{BE} = ∞		400			
$V_{(BR)EBO}$	Emitter to base breakdown voltage	I_E = 1mA, I_C = 0		7			
t_{on}	Turn-on time	I_C = 20A, I_{B1} = 4.0A, I_{B2} = -8A V_{CC} = 200V, R_L = 10Ω				0.5	μs
t_{stg}	Storage time					2.5	
t_f	Fall time					0.3	
$h_{FE}1$	DC current gain	V_{CE} = 5V, I_C = 3.2A	Rank-L	15		30	
			Rank-M	20		40	
			Rank-N	30		50	
$h_{FE}2$		V_{CE} = 5V, I_C = 16A		10			
$h_{FE}3$		V_{CE} = 5V, I_C = 10mA		10			

ORDERING INFORMATION SCHEME

2SC 4110 B - M

Transistor series

NPN Type

Current & Voltage rating, I_C & V_{CEO}

25A / 400V

Package type

B = TO-3PB

DC current gain rank, $h_{FE}1$

L = 15 ~ 30

M = 20 ~ 40

N = 30 ~ 50

Switching time test circuit

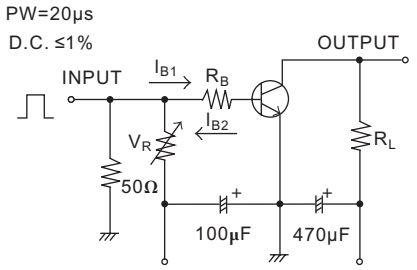


Fig.1 I_C - V_{CE} characteristics

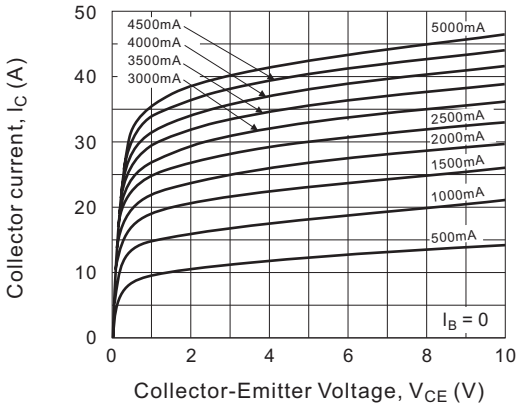


Fig.2 I_C - $V_{BE(on)}$ Temperature characteristics

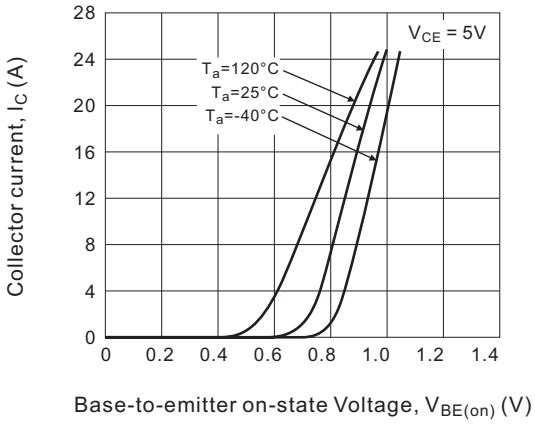


Fig.3 h_{FE} - I_C characteristics

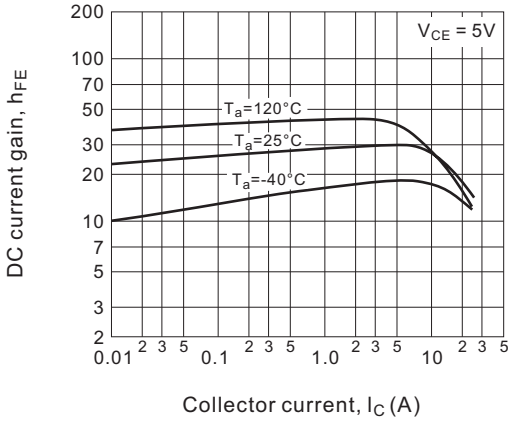


Fig.4 $V_{CE(sat)}$ - I_C characteristics

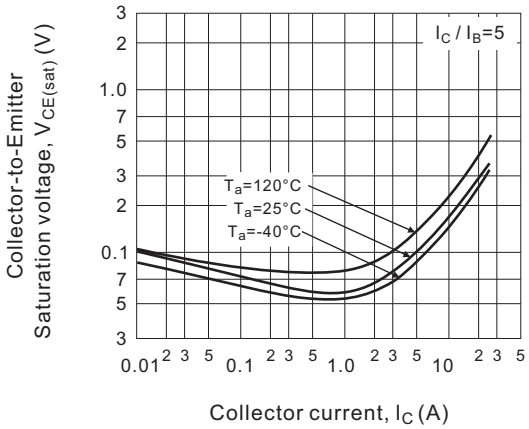


Fig.5 $V_{BE(sat)}$ - I_C Temperature characteristics

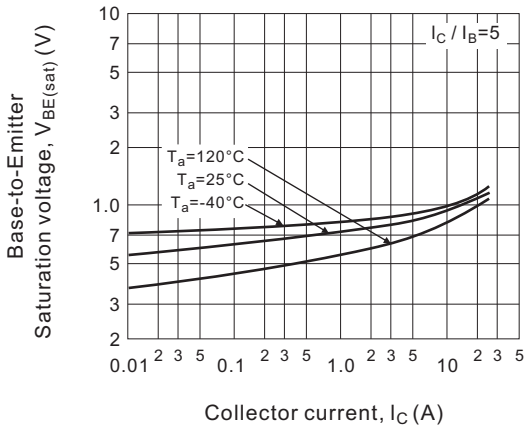


Fig.6 Switching time - I_C characteristics

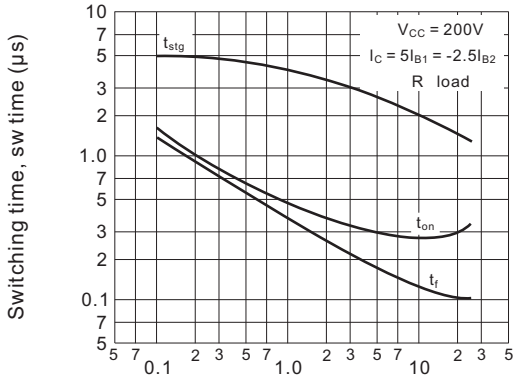


Fig.7 Forward bias SOA

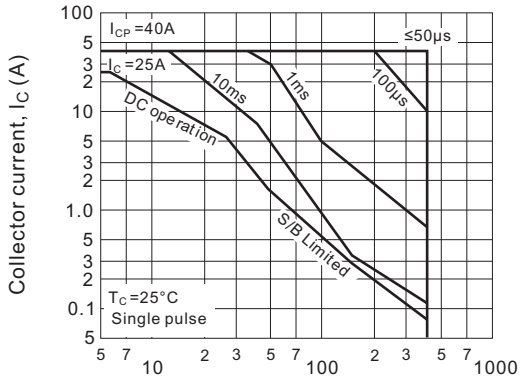


Fig.8 Reverse bias SOA

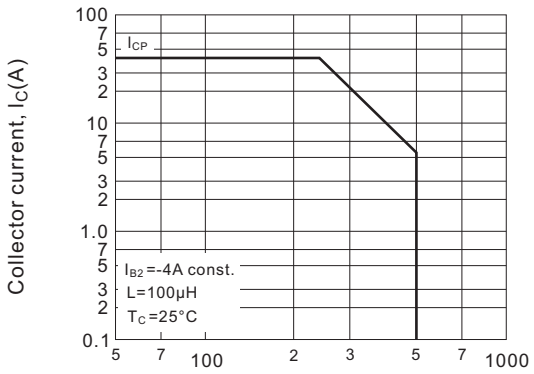


Fig.9 P_c-T_a derating

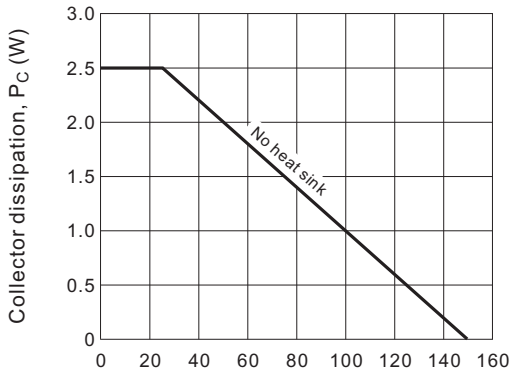


Fig.10 P_c-T_c derating

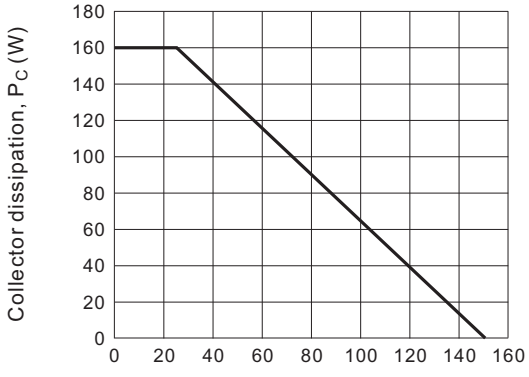


Fig.11 Thermal resistance