SMA6010

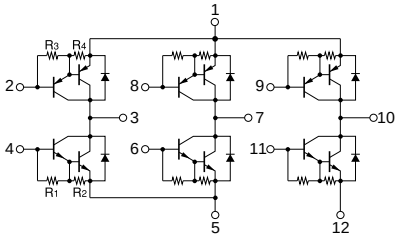
PNP + NPN Darlington
3-phase motor drive

Absolute maximum ratings

(Ta=25°C)

Symbol	Ratings		Unit
	NPN	PNP	
V_{CBO}	60	–60	V
V_{CEO}	60	–60	V
V_{EBO}	6	–6	V
I_C	4	–4	A
I_{CP}	6 (PW≤1ms, Du≤50%)	–6 (PW≤1ms, Du≤50%)	A
I_B	0.5	–0.5	A
P_T	4 (Ta=25°C)		W
	20 (Tc=25°C)		
T_j	150		°C
T_{stg}	–40 to +150		°C
θ_{j-c}	6.25		°C/W

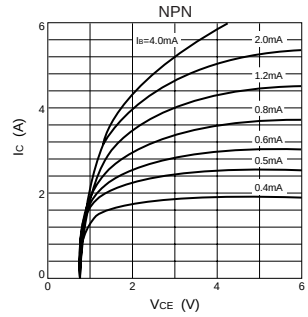
■Equivalent circuit diagram

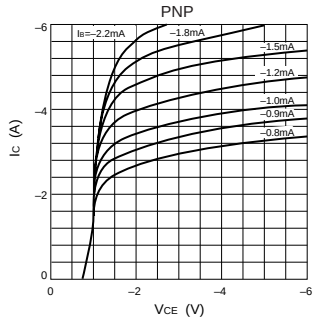


R1: 3kΩ typ R2: 200Ω typ R3: 2kΩ typ R4: 150Ω typ

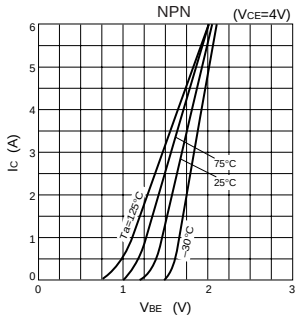
Characteristic curves

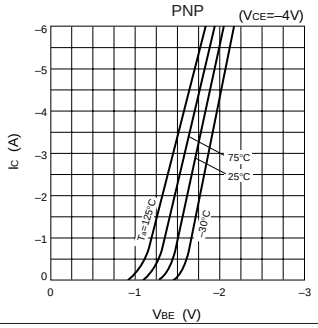
IC-VCE Characteristics (Typical)



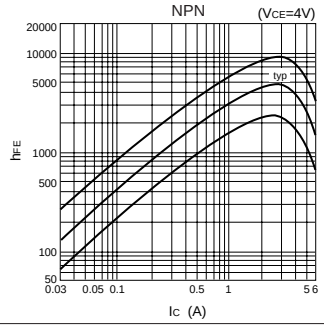


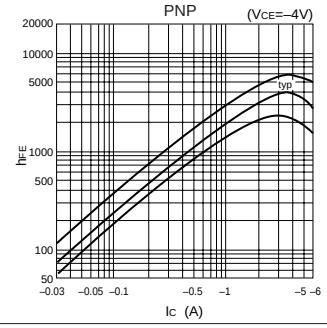
IC-VBE Temperature Characteristics (Typical)



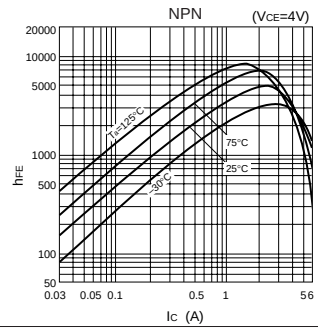


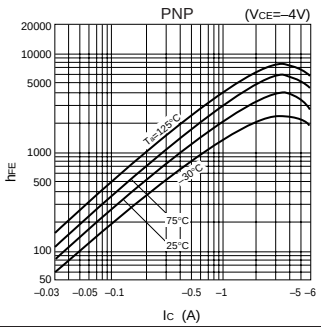
hFE-IC Characteristics (Typical)





hFE-IC Temperature Characteristics (Typical)





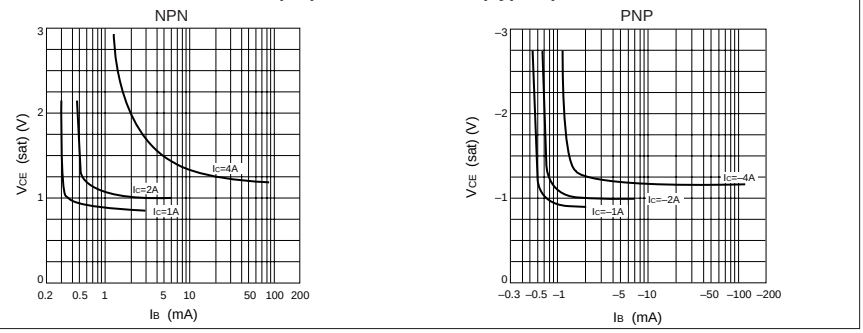
Electrical characteristics

(T_a=25°C)

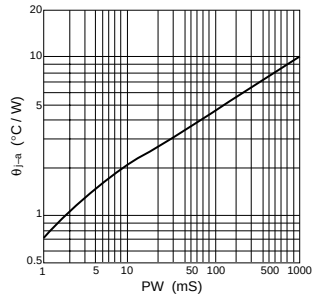
Symbol	NPN					PNP				
	Specification			Unit	Conditions	Specification			Unit	Conditions
	min	typ	max			min	typ	max		
I_{CBO}			10	μA	V_{CB}=60V			–10	μA	V_{CB}=–60V
I_{EBO}			10	mA	V_{EB}=6V			–10	mA	V_{EB}=–6V
V_{CEO}	60			V	I_C=10mA	–60			V	I_C=–20mA
h_{FE}	2000	5000	12000		V_{CE}=4V, I_C=3A	2000	5000	12000		V_{CE}=–4V, I_C=–3A
V_{CE}(sat)			1.5	V	I_C=3A, I_B=6mA			–1.5	V	I_C=–3A, I_B=–6mA
V_{BE}(sat)			2.0	V				–2.0	V	
V_{FEC}			1.8	V	I_{FEC}=1A			–1.8	V	I_{FEC}=–1A
t_{on}		1.0		μs	V_{CC}≒30V,		0.4		μs	V_{CC}≒–30V,
t_{stg}		4.0		μs	I_C=3A,		0.8		μs	I_C=–3A,
t_f		1.5		μs	I_{B1}=–I_{B2}=10mA		0.6		μs	I_{B1}=–I_{B2}=–10mA
f_T		75		MHz	V_{CE}=12V, I_E=–0.1A		200		MHz	V_{CE}=–12V, I_E=0.2A
C_{ob}		50		pF	V_{CB}=10V, f=1MHz		75		pF	V_{CB}=–10V, f=1MHz

Characteristic curves

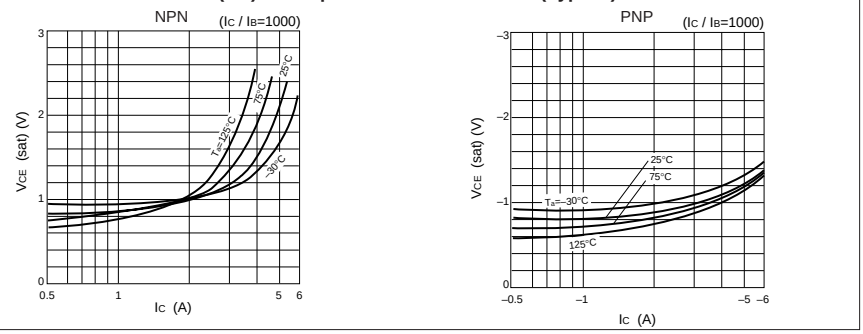
V_{CE}(sat)-I_B Characteristics (Typical)



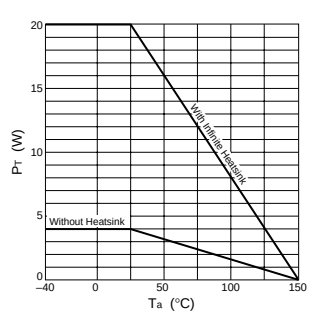
$\theta_{j\text{-}a}$-PW Characteristics



V_{CE}(sat)-I_C Temperature Characteristics (Typical)



P_T-T_a Characteristics



Safe Operating Area (SOA)