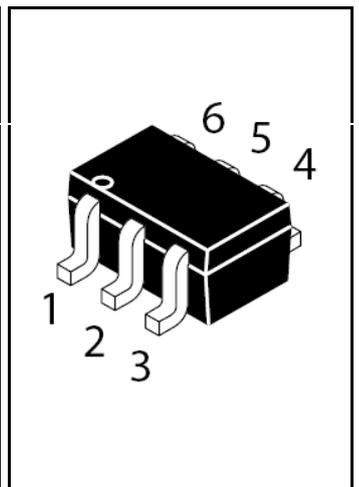
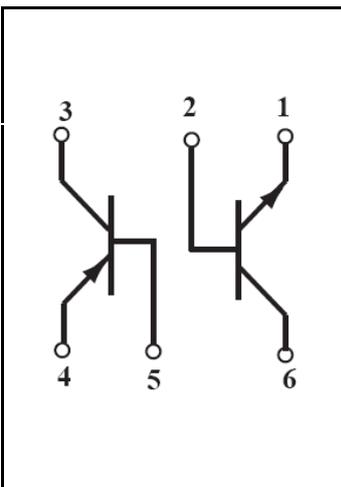


NPN/PNP Multi-Chip Transistor

- FEATURES**
- Ideal for Low Power Amplification and Switching
 - Complementary Pair
 - One 4401-Type NPN
 - One 4403-Type PNP
- MECHANICAL DATA**
- Case: SOT-363 Plastic
 - Case material: "Green" molding compound, UL flammability classification 94V-0, (No Br. Sb. Cl)
 - Lead Free in RoHS 2002/95/EC Compliant



NPN 4401_ Maximum Ratings @ T_A = 25°C

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	60	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current -Continuous	I _C	600	mA
Collector Power Dissipation	P _C	200	mW
Thermal Resistance, Junction to Ambient	R _{θJA}	625	°C/W
Junction Temperature	T _J	150	°C
Storage Temperature Range	T _{STG}	-55~+150	°C

NPN 4401_ Electrical Characteristics @ T_A = 25°C unless otherwise specified

Characteristic	Test Condition	Symbol	Min.	Typ.	Max.	Unit
Collector-base breakdown voltage	I _C =100μA, I _E =0	V _{CB0}	60			V
Collector-emitter breakdown voltage	I _C =1mA, I _B =0	V _{CEO}	40			V
Emitter-base breakdown voltage	I _E =100μA, I _C =0	V _{EBO}	6			V
Collector-base cut-off current	V _{CB} =50V, I _E =0	I _{CB0}			0.1	uA
Collector-emitter cut-off current	V _{CE} =35V, I _B =0	I _{CEO}			0.5	uA
Emitter-base cut-off current	V _{EB} =5V, I _C =0	I _{EBO}			0.1	uA
DC current gain	V _{CE} =1V, I _C =0.1mA	h _{FE1}	20			
	V _{CE} =1V, I _C =1mA	h _{FE2}	40			
	V _{CE} =1V, I _C =10mA	h _{FE3}	80			
	V _{CE} =1V, I _C =150mA	h _{FE4}	100		300	
	V _{CE} =2V, I _C =500mA	h _{FE5}	40			
Collector-emitter saturation voltage	I _C =150mA, I _B =15mA	V _{CE(sat)1}			0.4	V
	I _C =500mA, I _B =50mA	V _{CE(sat)2}			0.75	V
Base-emitter saturation voltage	I _C =150mA, I _B =15mA	V _{BE(sat)1}	0.75		0.95	V
	I _C =500mA, I _B =50mA	V _{BE(sat)2}			1.2	V
Transition frequency	V _{CE} =10V, I _C =20mA, f=100MHz	f _T	250			MHz
Collector output capacitance	V _{CB} =5V, I _E =0, f=1MHz	C _{ob}			6.5	pF
Delay time	V _{CC} =30V, V _{BE} =2V I _C =150mA, I _{B1} =15mA	T _d			15	nS
Rise time		T _r			20	nS
Storage time	V _{CC} =30V, I _C =150mA I _{B1} =-I _{B2} =15mA	T _s			225	nS
Fall time		T _f			30	nS

PNP 4403_Maximum Ratings @ $T_A = 25^\circ\text{C}$

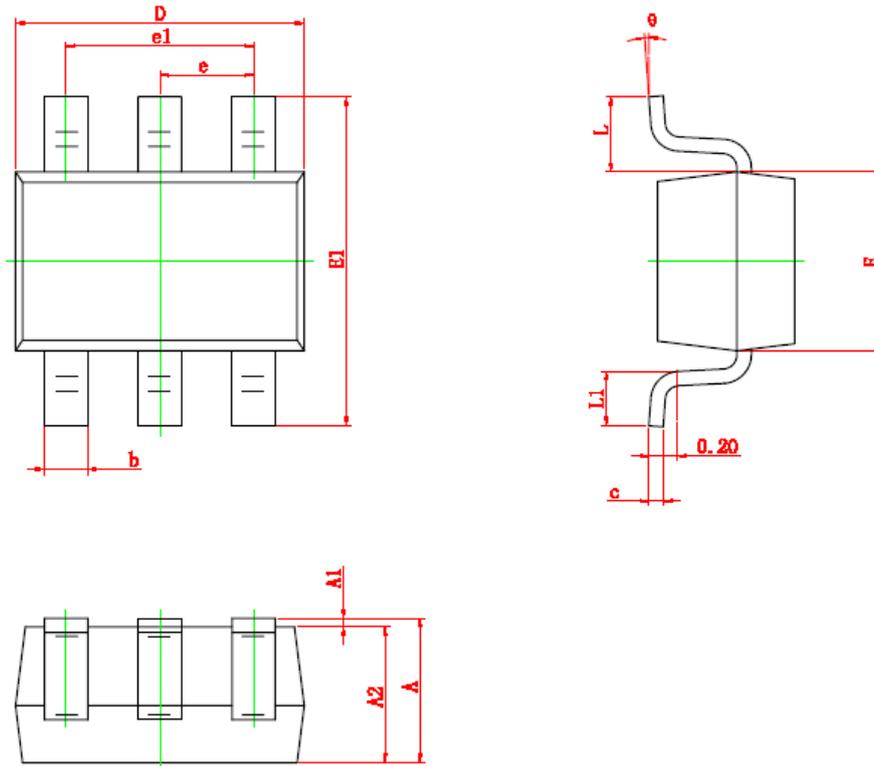
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-40	V
Collector-Emitter Voltage	V_{CEO}	-40	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current -Continuous	I_C	-600	mA
Collector Power Dissipation	P_C	200	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55~+150	$^\circ\text{C}$

PNP 4403_Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Test Condition	Symbol	Min.	Typ.	Max.	Unit
Collector-base breakdown voltage	$I_C = -100\mu\text{A}, I_E = 0$	V_{CBO}	-40			V
Collector-emitter breakdown voltage	$I_C = -1\text{mA}, I_B = 0$	V_{CEO}	-40			V
Emitter-base breakdown voltage	$I_E = -100\mu\text{A}, I_C = 0$	V_{EBO}	-5			V
Collector-base cut-off current	$V_{CB} = -50\text{V}, I_E = 0$	I_{CBO}			-0.1	μA
Collector-emitter cut-off current	$V_{CE} = -35\text{V}, I_B = 0$	I_{CEO}			-0.5	μA
Emitter-base cut-off current	$V_{EB} = -5\text{V}, I_C = 0$	I_{EBO}			-0.1	μA
DC current gain	$V_{CE} = -1\text{V}, I_C = -0.1\text{mA}$	h_{FE1}	30			
	$V_{CE} = -1\text{V}, I_C = -1\text{mA}$	h_{FE2}	60			
	$V_{CE} = -1\text{V}, I_C = -10\text{mA}$	h_{FE3}	100			
	$V_{CE} = -2\text{V}, I_C = -150\text{mA}$	h_{FE4}	100		300	
	$V_{CE} = -2\text{V}, I_C = -500\text{mA}$	h_{FE5}	20			
Collector-emitter saturation voltage	$I_C = -150\text{mA}, I_B = -15\text{mA}$	$V_{CE(sat)1}$			-0.4	V
	$I_C = -500\text{mA}, I_B = -50\text{mA}$	$V_{CE(sat)2}$			-0.75	V
Base-emitter saturation voltage	$I_C = -150\text{mA}, I_B = -15\text{mA}$	$V_{BE(sat)1}$	-0.75		-0.95	V
	$I_C = -500\text{mA}, I_B = -50\text{mA}$	$V_{BE(sat)2}$			-1.3	V
Transition frequency	$V_{CE} = -10\text{V}, I_C = -20\text{mA}, f = 100\text{MHz}$	f_T	200			MHz
Collector output capacitance	$V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$	C_{ob}			8.5	pF
Delay time	$V_{CC} = -30\text{V}, V_{BE} = -2\text{V}$	T_d			15	nS
Rise time	$I_C = -150\text{mA}, I_{B1} = -15\text{mA}$	T_r			20	nS
Storage time	$V_{CC} = -30\text{V}, I_C = -150\text{mA}$	T_s			225	nS
Fall time	$I_{B1} = -I_{B2} = -15\text{mA}$	T_f			30	nS

REV. 2, Jun-2012, KSTR07

SOT-363 Outline Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

Device Marking :

Device P/N	Marking code
MMDT4413	K13

Electrical characteristic curves

Fig.1 Power Dissipation vs. Ambient Temperature

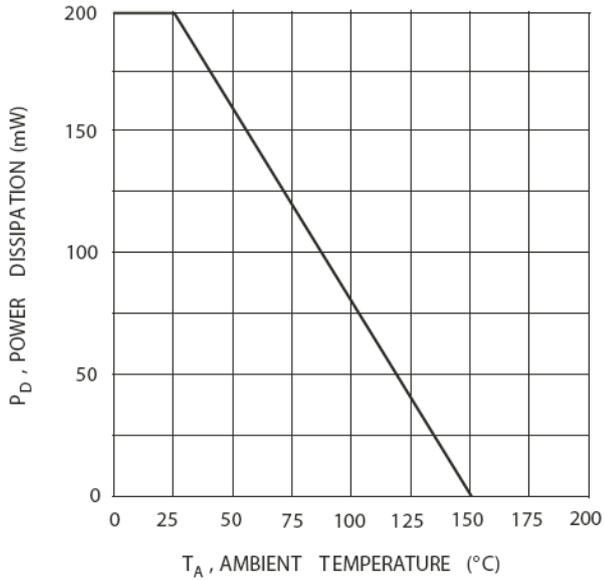


Fig.2 DC Current Gain vs. Collector Current (NPN-4401)

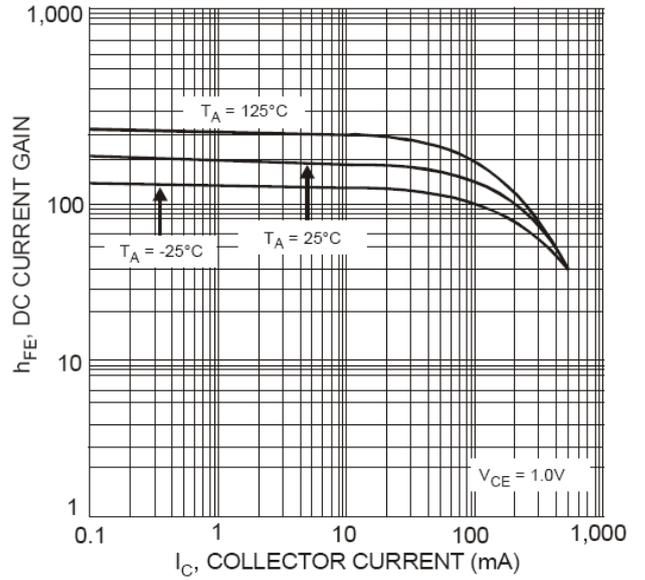


Fig.3 Capacitance (NPN-4401)

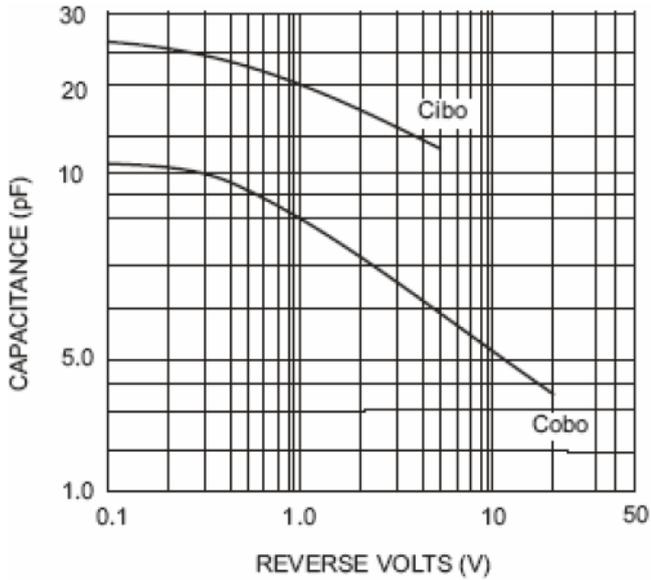


Fig.4 Collector Saturation Region (NPN-4401)

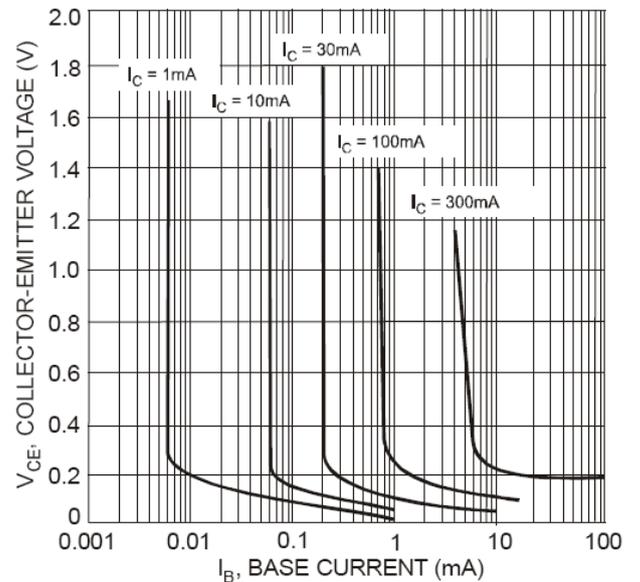


Fig.5 Collector Emitter Saturation Voltage vs. Collector Current (NPN-4401)

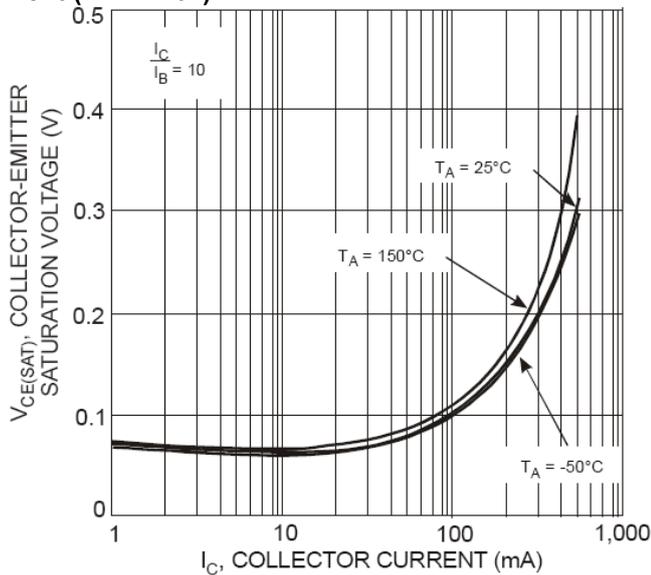


Fig.6 Base-Emitter Voltage vs. Collector Current (NPN-4401)

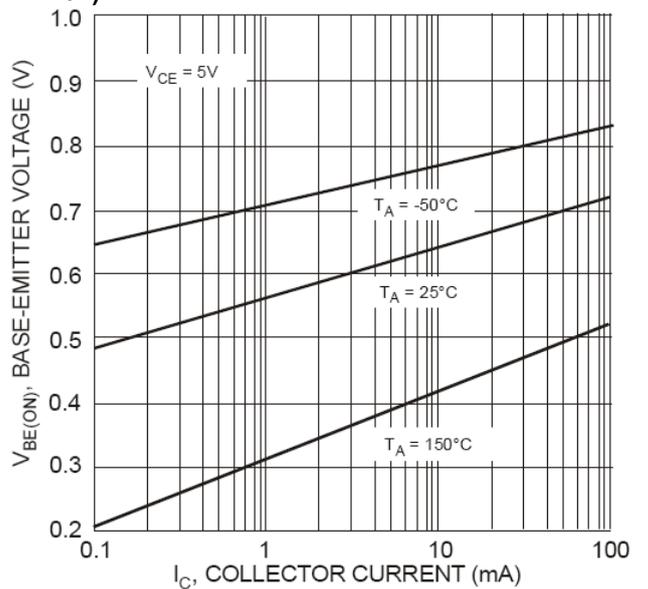


Fig.7 Gain-Bandwidth Product vs. Collector Current (NPN-4401)

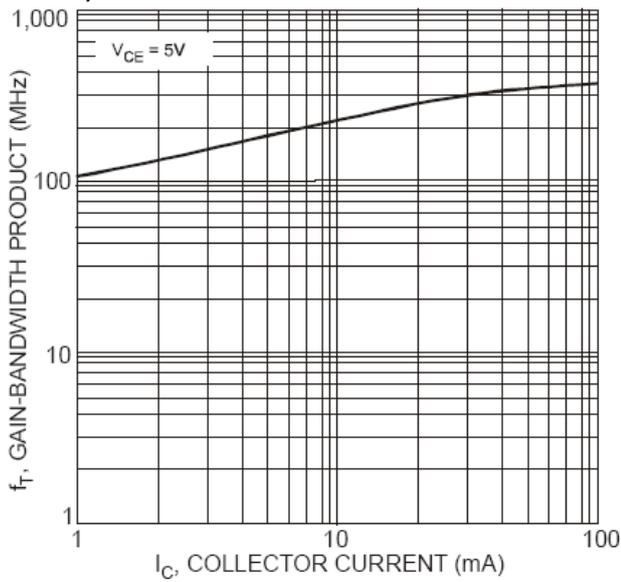


Fig.8 DC Current Gain vs. Collector Current (PNP-4403)

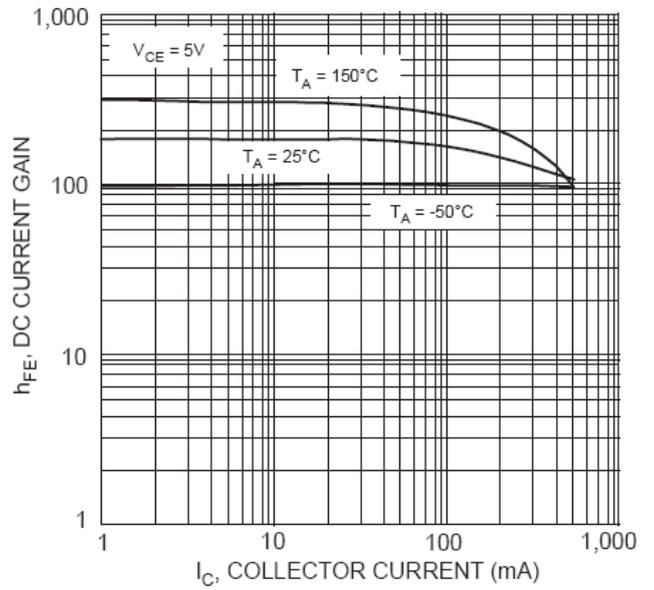


Fig.9 Capacitance (PNP-4403)

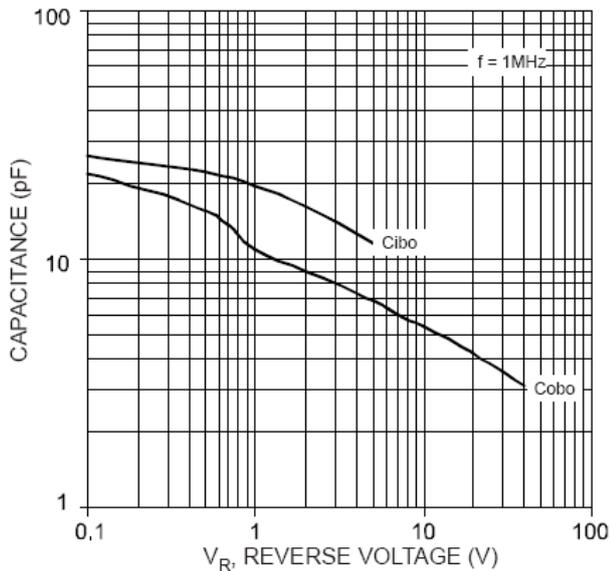


Fig.10 Collector Saturation Region (PNP-4403)

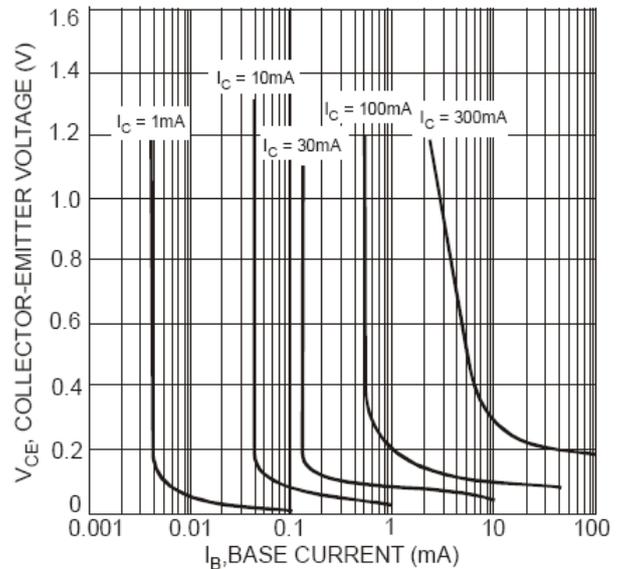


Fig.11 Collector Emitter Saturation Voltage vs. Collector Current (PNP-4403)

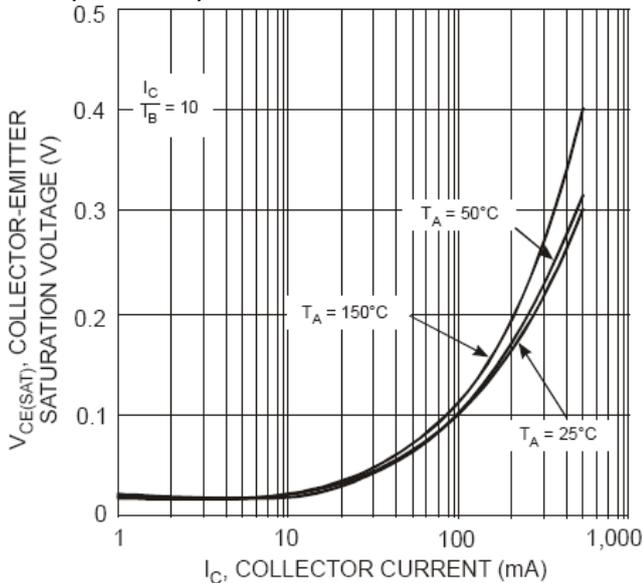


Fig.12 Base-Emitter Voltage vs. Collector Current (PNP-4403)

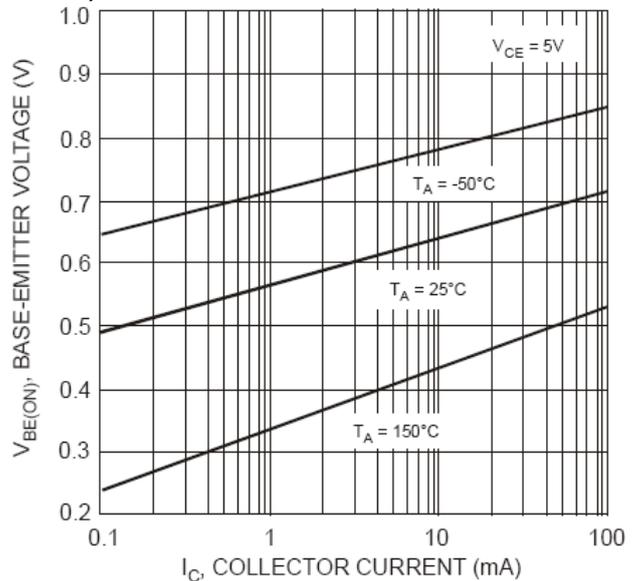
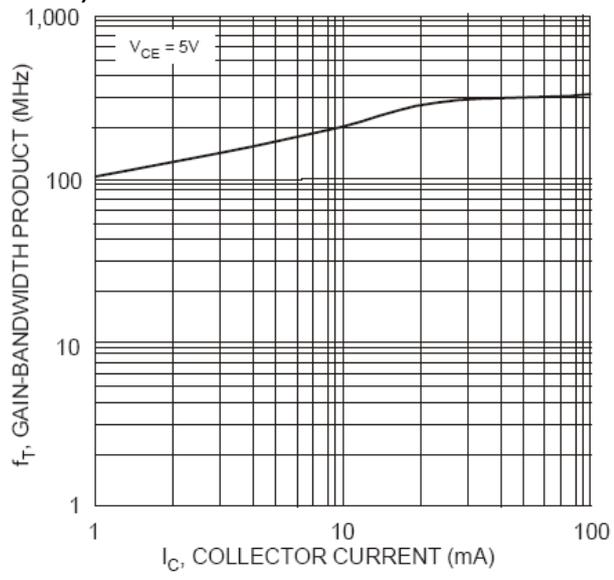


Fig.13 Gain-Bandwidth Product vs. Collector Current (PNP-4403)



Important Notice and Disclaimer

LSC reserves the right to make changes to this document and its products and specifications at any time without notice. Customers should obtain and confirm the latest product information and specifications before final design, purchase or use.

LSC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does LSC assume any liability for application assistance or customer product design. LSC does not warrant or accept any liability with products which are purchased or used for any unintended or unauthorized application.

No license is granted by implication or otherwise under any intellectual property rights of LSC.

LSC products are not authorized for use as critical components in life support devices or systems without express written approval of LSC.