Micro Commercial Components

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MMDT4413

NPN/PNP Plastic-Encapsulate Transistors

Features

- Lead Free Finish/RoHS Compliant ("P" Suffix designates RoHS Compliant. See ordering information)
- Epitaxial Planar Die Construction
- One 4401-Type NPN ,One 4403-Type PNP
- Epoxy meets UL 94 V-0 flammability rating
- Moisure Sensitivity Level 1
- Marking:K13
- Halogen free available upon request by adding suffix "-HF"

Maximum Ratings @ 25ºC Unless Otherwise Specified

NPN 4401 Section

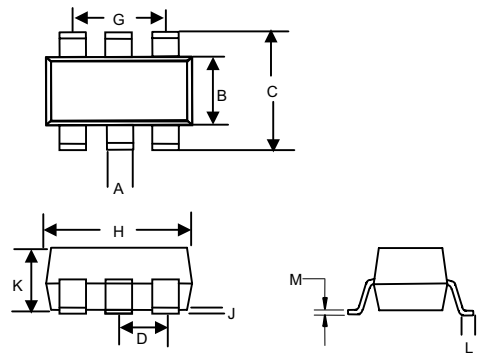
Symbol	Rating	Rating	Unit
V_{CEO}	Collector-Emitter Voltage	40	V
V_{CBO}	Collector-Base Voltage	60	V
V_{EBO}	Emitter-Base Voltage	6	V
I_C	Collector Current-Continuous	0.6	A
P_C	Collector Dissipation	0.2	W
RthJA	Thermal Resistance Junction to Ambient Air	625	W
T_J	Operating Junction Temperature	-55 to +150	℃
T_{STG}	Storage Temperature	-55 to +150	℃

Electrical Characteristics @ 25ºC Unless Otherwise Specified

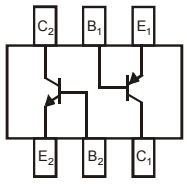
NPN 4401 Section

Symbol	Parameter		Min	Max	Units
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage (I_C=1mAdc, I_B=0)		40	---	Vdc
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage (I_C=100uAdc, I_E=0)		60	---	Vdc
$V_{(BR)EBO}$	Collector-Emitter Breakdown Voltage (I_E=100uAdc, I_C=0)		6	---	Vdc
I_{CBO}	Collector Cutoff Current (V_{CB}=50Vdc,I_E=0)		---	0.1	uAdc
I_{EBO}	Emitter Cutoff Current (V_{EB}=-5Vdc,I_C=0)		---	0.1	uAdc
h_{FE}	DC Current Gain (I_C=0.1mAdc, V_{CE}=1Vdc) (I_C=1mAdc, V_{CE}=1Vdc) (I_C=10mAdc, V_{CE}=1Vdc) (I_C=150mAdc, V_{CE}=1Vdc) (I_C=500mAdc, V_{CE}=2Vdc)		 20 40 80 100 40	 --- --- ---- 300 ---	---
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage (I_C=150mAdc, I_B=15mAdc) (I_C=500mAdc, I_B=50mAdc)		 --- ---	 0.4 0.75	Vdc
$V_{BE(sat)}$	Base-Emitter Saturation Voltage (I_C=150mAdc, I_B=15mAdc) (I_C=500mAdc, I_B=50mAdc)		 0.75 ---	 0.95 1.2	Vdc
f_T	Current Gain-Bandwidth Product (V_{CE}=10.0Vdc, I_C=20mAdc, f=100MHz)		250	---	MHz
C_{ob}	Output Capacitance (V_{CB}=5Vdc, f=1.0MHz, I_E=0)		---	6.5	pF
t_d	Delay Time	V_{CC}=30V,I_C=150mA,	---	15	ns
t_r	Rise Time	V_{BE}=2.0V, I_{B1}=15.00mA		20	ns
t_S	Storage Time	V_{CC}=30V, I_C=150mA,	---	225	ns
t_f	Fall Time	I_{B1}=-I_{B2}=15mA	---	30	ns

SOT-363



DIMENSIONS					
	INCHES		MM		
DIM	MIN	MAX	MIN	MAX	NOTE
A	.006	.014	0.15	0.35	
B	.045	.053	1.15	1.35	
C	.085	.096	2.15	2.45	
D	.026		0.65Nominal		
G	.047	.055	1.20	1.40	
H	.071	.087	1.80	2.20	
J	---	.004	---	0.10	
K	.035	.043	0.90	1.10	
L	.010	.018	0.26	0.46	
M	.003	.006	0.08	0.15	



Maximum Ratings @ 25°C Unless Otherwise Specified

PNP 4403 Section

Symbol	Parameter	Rating	Unit
V_{CEO}	Collector-Emitter Voltage	-40	V
V_{CBO}	Collector-Base Voltage	-40	V
V_{EBO}	Emitter-Base Voltage	-5	V
I_C	Collector Current-Continuous	-0.6	A
P_C	Collector Dissipation	0.2	W
RthJA	Thermal Resistance Junction to Ambient Air	625	W
T_J	Operating Junction Temperature	-55 to +150	℃
T_{STG}	Storage Temperature	-55 to +150	℃

Electrical Characteristics @ 25°C Unless Otherwise Specified

PNP 4403 Section

Symbol	Parameter		Min	Max	Units
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage (I_C=-1mAdc, I_B=0)		-40	---	Vdc
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage (I_C=-100uAdc, I_E=0)		-40	---	Vdc
$V_{(BR)EBO}$	Collector-Emitter Breakdown Voltage (I_E=-100uAdc, I_C=0)		-5	---	Vdc
I_{CBO}	Collector Cutoff Current (V_{CB}=-50Vdc,I_E=0)		---	-0.1	uAdc
I_{EBO}	Emitter Cutoff Current (V_{EB}=-5Vdc,I_C=0)		---	-0.1	uAdc
h_{FE}	DC Current Gain (I_C=-0.1mAdc, V_{CE}=-1Vdc) (I_C=-1mAdc, V_{CE}=-1Vdc) (I_C=-10mAdc, V_{CE}=-1Vdc) (I_C=-150mAdc, V_{CE}=-2Vdc) (I_C=-500mAdc, V_{CE}=-2Vdc)		 30 60 100 100 20	 --- --- ---- 300 ---	---
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage (I_C=-150mAdc, I_B=-15mAdc) (I_C=-500mAdc, I_B=-50mAdc)		 --- ---	 -0.4 -0.75	Vdc
$V_{BE(sat)}$	Base-Emitter Saturation Voltage (I_C=-150mAdc, I_B=-15mAdc) (I_C=-500mAdc, I_B=-50mAdc)		 -0.75 ---	 -0.95 -1.3	Vdc
f_T	Current Gain-Bandwidth Product (V_{CE}=-10.0Vdc, I_C=-20mAdc, f=100MHz)		200	---	MHz
C_{ob}	Output Capacitance (V_{CB}=-10Vdc, f=1.0MHz, I_E=0)		---	8.5	pF
t_d	Delay Time	V_{CC}=-30V,I_C=-150mA, V_{BE}=-2.0V, I_{B1}=-15.0mA	---	15	ns
t_r	Rise Time		---	20	ns
t_S	Storage Time	V_{CC}=-30V, I_C=-150mA, I_{B1}=-I_{B2}=-15mA	---	225	ns
t_f	Fall Time		---	30	ns

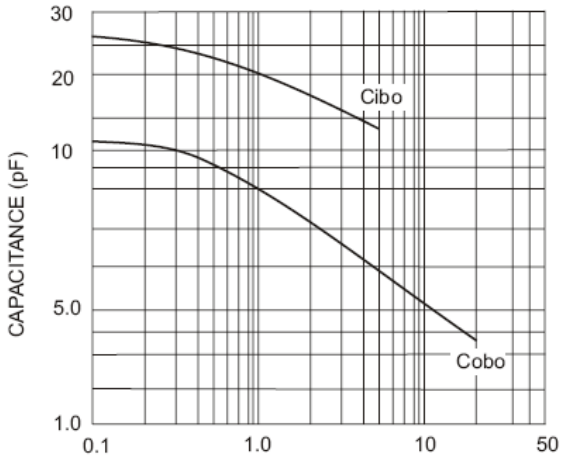


Fig. 1 Typical Capacitance (4401)

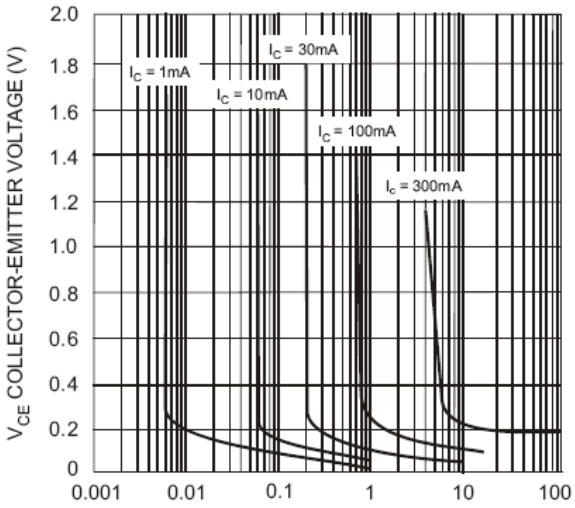


Fig. 2 Typical Collector Saturation Region (4401)

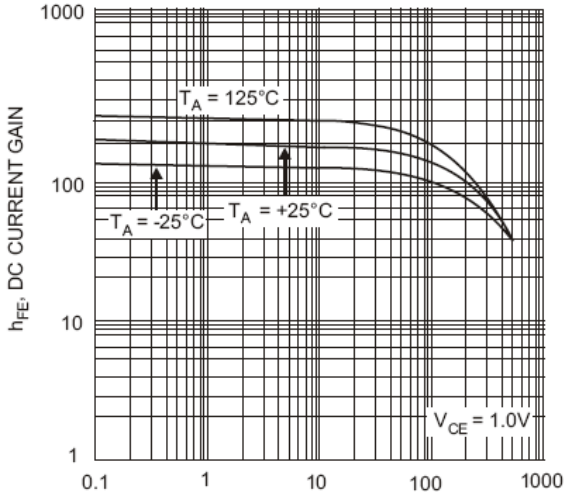


Fig. 3 Typical DC Current Gain vs Collector Current (4401)

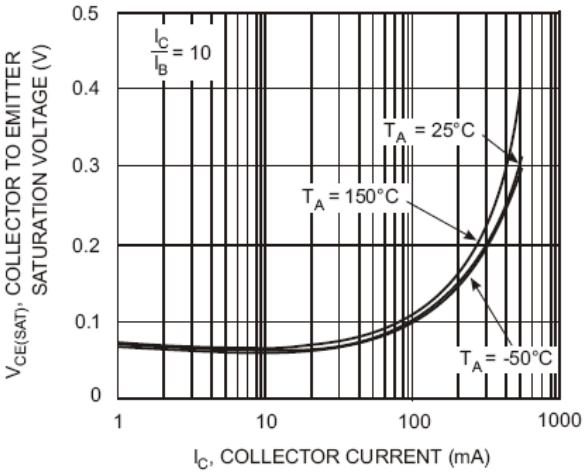


Fig. 4 Collector Emitter Saturation Voltage vs. Collector Current (4401)

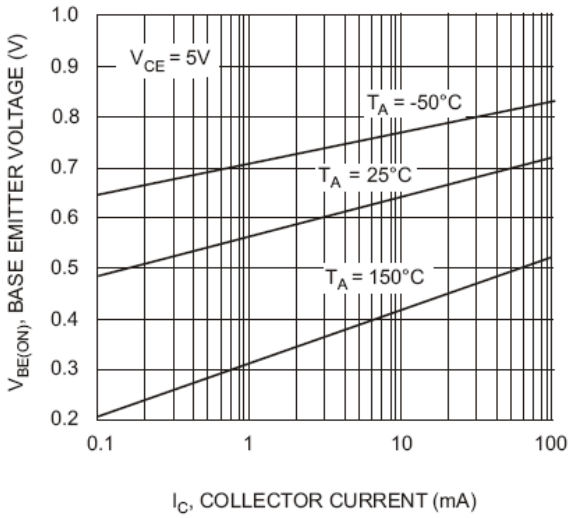


Fig. 5 Base Emitter Voltage vs. Collector Current (4401)

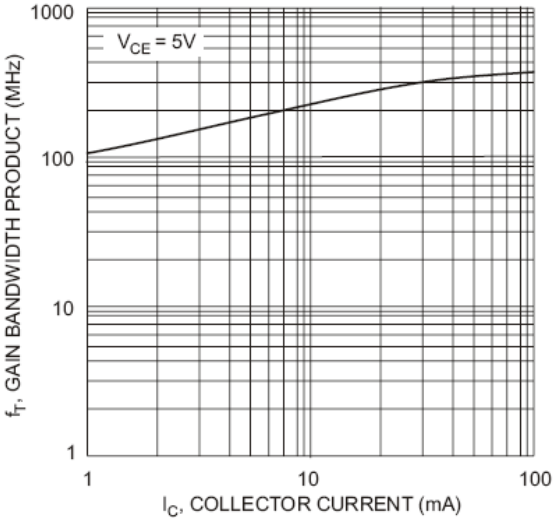


Fig. 6 Gain Bandwidth Product vs. Collector Current (4401)

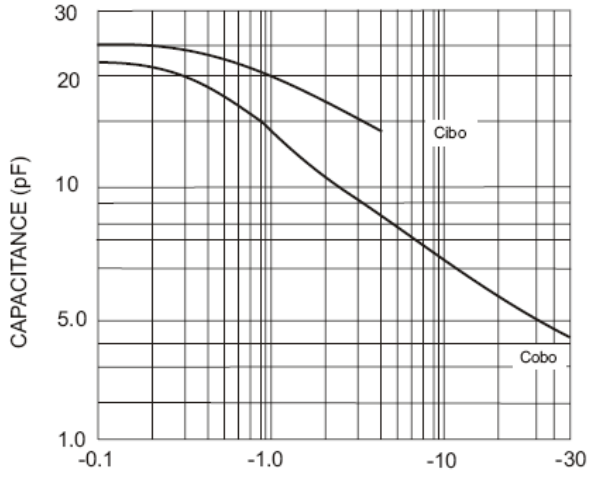


Fig. 7 Typical Capacitance (4403)

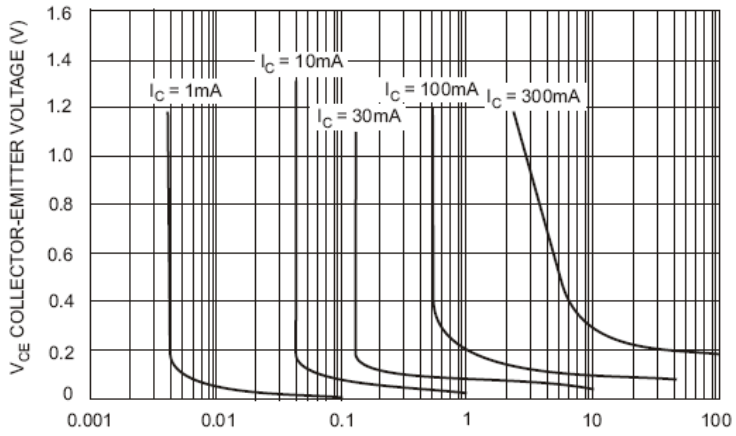


Fig. 8 Typical Collector Saturation Region (4403)

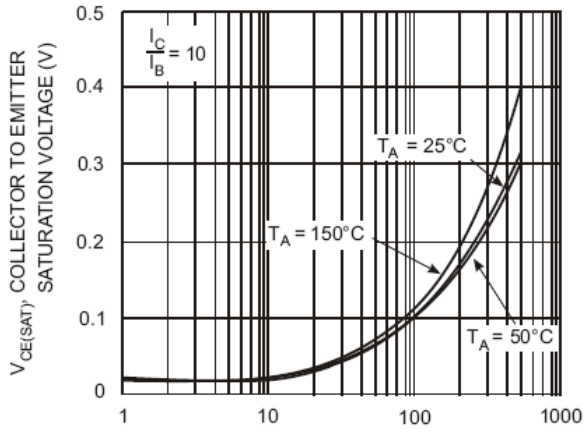


Fig. 9 Collector Emitter Saturation Voltage vs. Collector Current (4403)

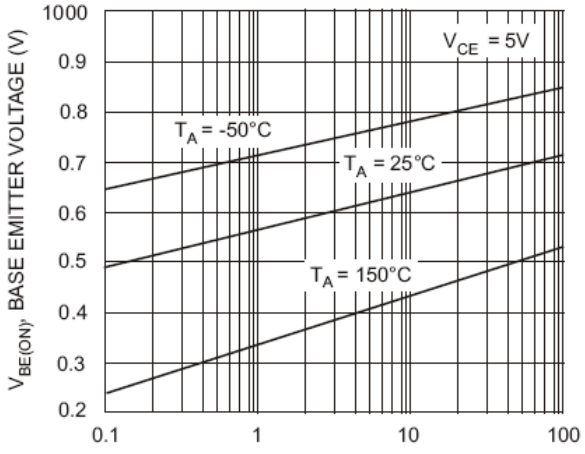


Fig. 10 Base-Emitter Voltage vs. Collector Current (4403)

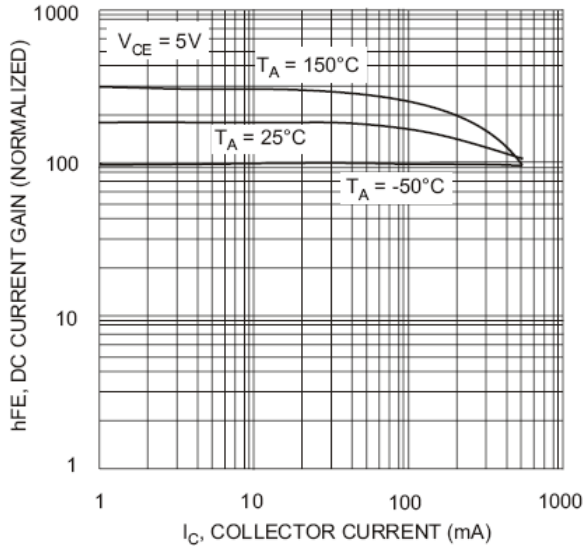


Fig. 11 DC Current Gain vs. Collector Current (4403)

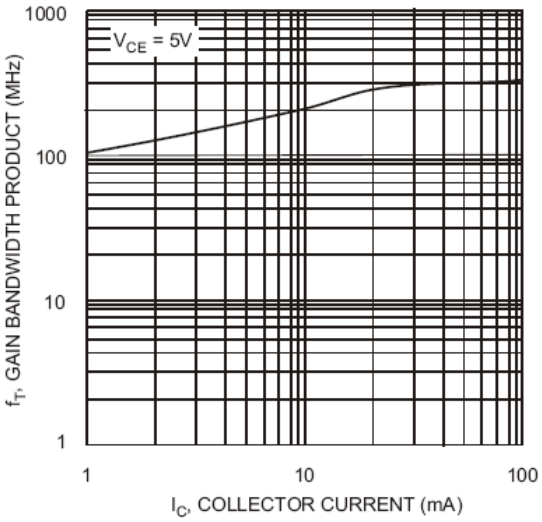


Fig. 12 Gain Bandwidth Product vs. Collector Current (4403)

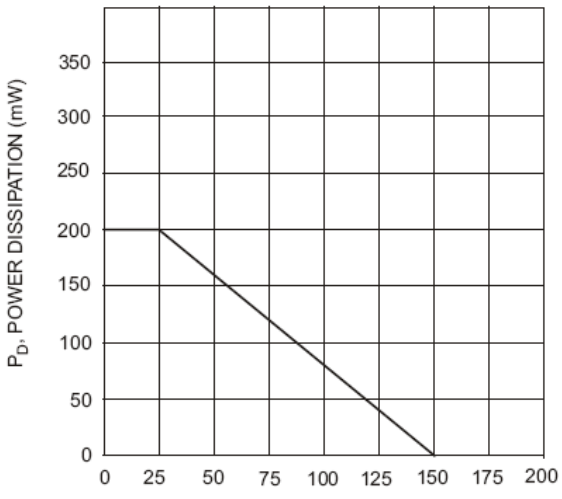


Fig. 13, Max Power Dissipation vs Ambient Temperature (4403)

Micro Commercial Components

Ordering Information :

Device	Packing
Part Number-TP	Tape&Reel;3Kpcs/Reel

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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