

Plastic-Encapsulate Transistors

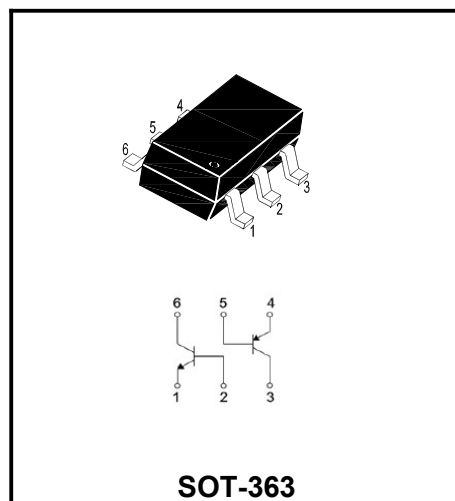
DUAL TRANSISTOR(NPN+PNP)

Features

- ◆Epitaxial Planar Die Construction
- ◆Complementary Pair
- ◆Ideal for low Power Amplification and Switching
- ◆One 4401(NPN), one 4403(PNP)

Mechanical Data

- ◆SOT-363 Small Outline Plastic Package
- ◆Epoxy UL: 94V-0
- ◆Mounting Position: Any



Product Specification Classification

Part Number	Package	Marking	Pack
MMDT4413DW	SOT-363	K13	3000PCS/Tape

Maximum Ratings TR1(NPN)4401

Ratings at 25°C ambient temperature unless otherwise specified.

Parameters	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	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
Junction Temperature	T_J	150	°C
Storage Temperature	T_{stg}	-55-+150	°C
Thermal resistance From junction to ambient	$R_{\theta JA}$	625	°C/W

Electrical Characteristics of TR1(NPN)4401

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symbols	Test Condition	Limits			Unit
			Min	Typ	Max	
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=100\mu A, I_E=0$	60			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=1mA, I_B=0$	40			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=100\mu A, I_C=0$	6			V
Collector cut-off current	I_{CBO}	$V_{CB}=50V, I_E=0$			0.1	μA
Collector cut-off current	I_{CEO}	$V_{CE}=35V, I_B=0$			0.5	μA
Emitter cut-off current	I_{EBO}	$V_{EB}=5V, I_C=0$			0.1	μA
DC current gain	h_{FE1}	$V_{CE}=1V, I_C=0.1mA$	20			
	h_{FE2}	$V_{CE}=1V, I_C=1mA$	40			
	h_{FE3}	$V_{CE}=1V, I_C=10mA$	80			
	h_{FE4}	$V_{CE}=1V, I_C=150mA$	100			
	h_{FE5}	$V_{CE}=2V, I_C=500mA$	40			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=150mA, I_B=15mA$			0.4	V
		$I_C=500mA, I_B=50mA$			0.75	A
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C=150mA, I_B=15mA$	0.75		0.95	V
		$I_C=500mA, I_B=50mA$			1.2	V
Transition frequency	f_T	$V_{CE}=10V, I_C=20mA, f=100MHz$	250			MHz
Collector output capacitance	C_{ob}	$V_{CB}=5V, I_E=0, f=1MHz$			6.5	pF
Delay time	t_d	$V_{CC}=30V, V_{BE}=2.0V, I_C=150mA, I_{B1}=15mA$			15	ns
Rise time	t_r				20	ns
Storage time	t_s	$V_{CC}=30V, I_C=150mA, I_{B1}=I_{B2}=15mA$			225	ns
Fall time	t_f				30	ns

Maximum Ratings TR2(PNP)4403

Ratings at 25°C ambient temperature unless otherwise specified.

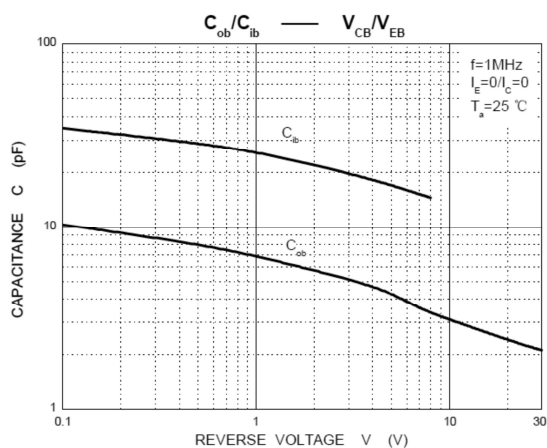
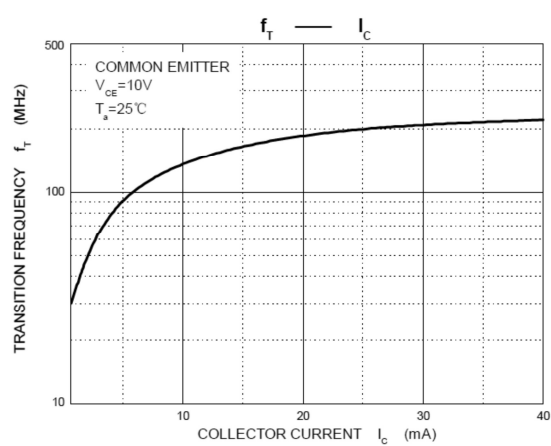
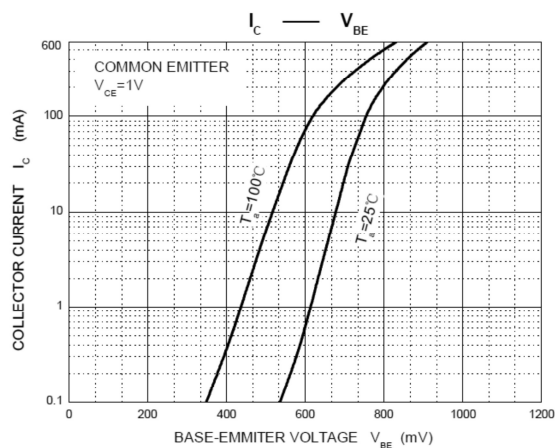
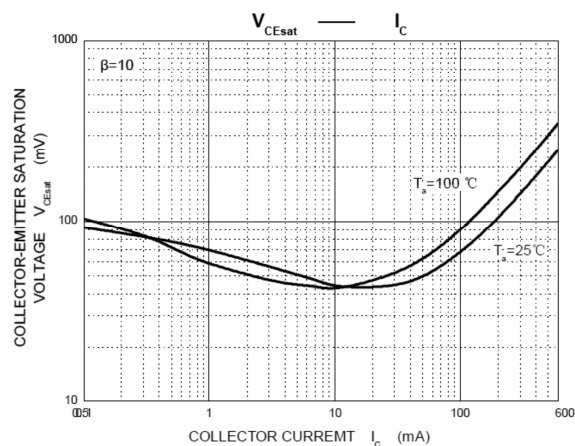
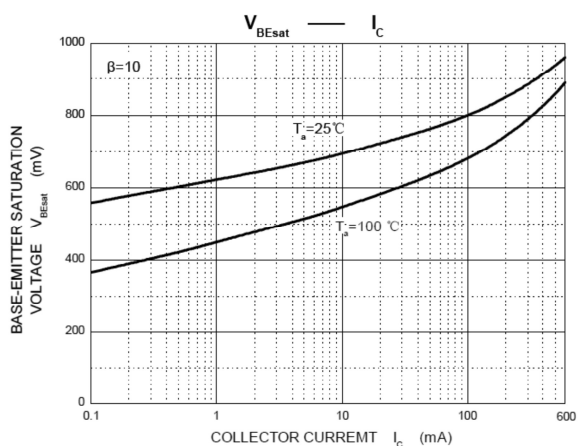
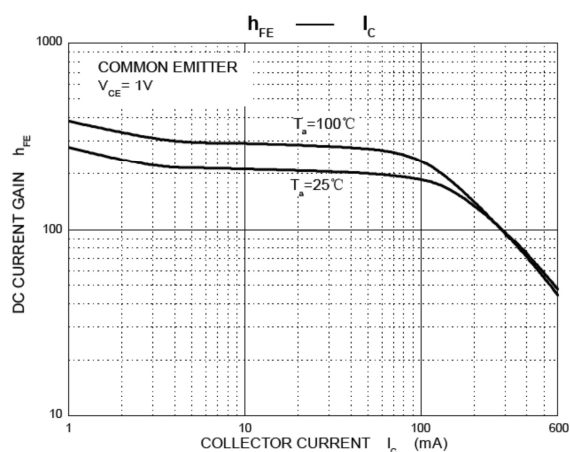
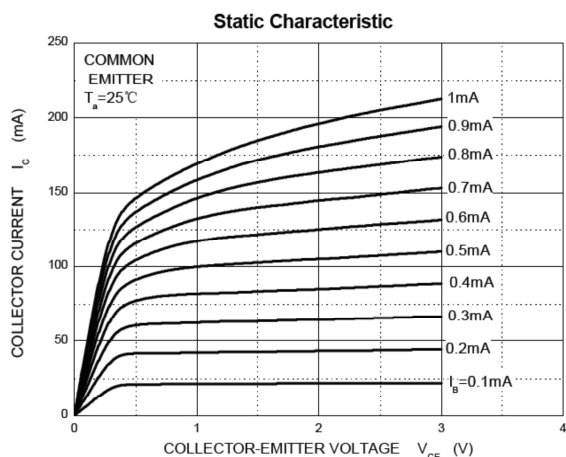
Parameters	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-40	V
Collector-Emitter Voltage	V_{CEO}	-40	V
Emitter -Base Voltage	V_{EBO}	-5	V
Collector Current-Continuous	I_C	-600	mA
Collector Power Dissipation	P_C	200	mW
Junction Temperature	T_J	150	°C
Storage Temperature	T_{stg}	-55-+150	°C
Thermal resistance From junction to ambient	$R_{\theta JA}$	625	°C/W

Electrical Characteristics of TR2 (PNP)4403

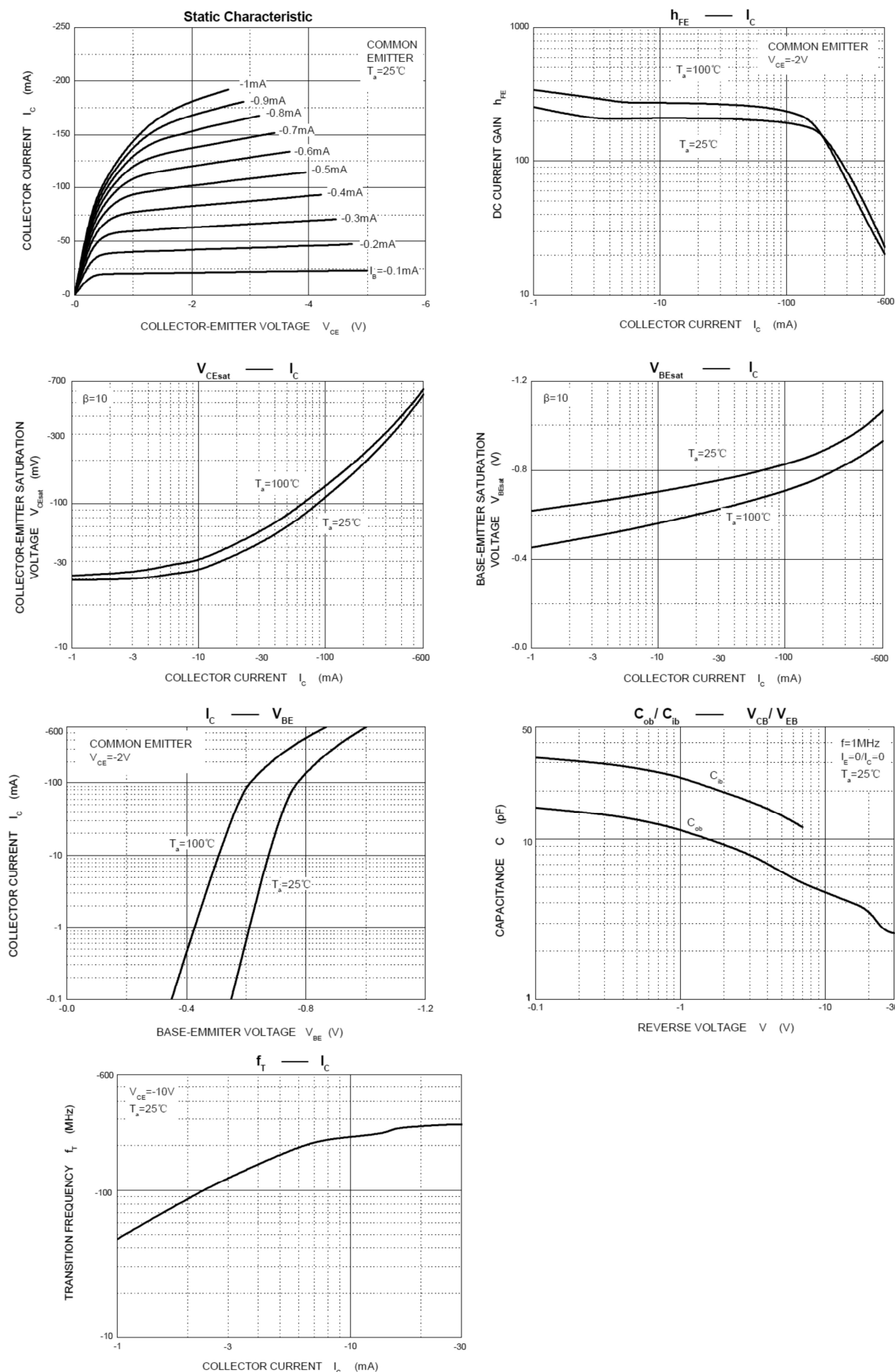
Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symbols	Test Condition	Limits			Unit
			Min	Typ	Max	
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = -100\mu A, I_E = 0$	-40			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = -1mA, I_B = 0$	-40			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = -100\mu A, I_C = 0$	-5			V
Collector cut-off current	I_{CBO}	$V_{CB} = -50V, I_E = 0$			-0.1	uA
Collector cut-off current	I_{CEO}	$V_{CE} = -35V, I_B = 0$			-0.5	uA
Emitter cut-off current	I_{EBO}	$V_{EB} = -5V, I_C = 0$			-0.1	uA
DC current gain	h_{FE1}	$V_{CE} = -1V, I_C = -0.1mA$	30			
	h_{FE2}	$V_{CE} = -1V, I_C = -1mA$	60			
	h_{FE3}	$V_{CE} = -1V, I_C = -10mA$	100			
	h_{FE4}	$V_{CE} = -2V, I_C = -150mA$	100		300	
	h_{FE5}	$V_{CE} = -2V, I_C = -500mA$	20			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -150mA, I_B = -15mA$			-0.4	V
		$I_C = -500mA, I_B = -50mA$			-0.75	A
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = -150mA, I_B = -15mA$	-0.75		-0.95	V
		$I_C = -500mA, I_B = -50mA$			1.3	V
Transition frequency	f_T	$V_{CE} = -10V, I_C = -20mA, f = 100MHz$	200			MHz
Collector output capacitance	C_{ob}	$V_{CB} = -5V, I_E = 0, f = 1MHz$			8.5	pF
Delay time	t_d	$V_{CC} = -30V, V_{BE} = -2.0V, I_C = -150mA, I_{B1} = -15mA$			15	ns
Rise time	t_r				20	ns
Storage time	t_s	$V_{CC} = -30V, I_C = -150mA, I_{B1} = - I_{B2} = -15mA$			225	ns
Fall time	t_f				30	ns

Typical characteristics NPN

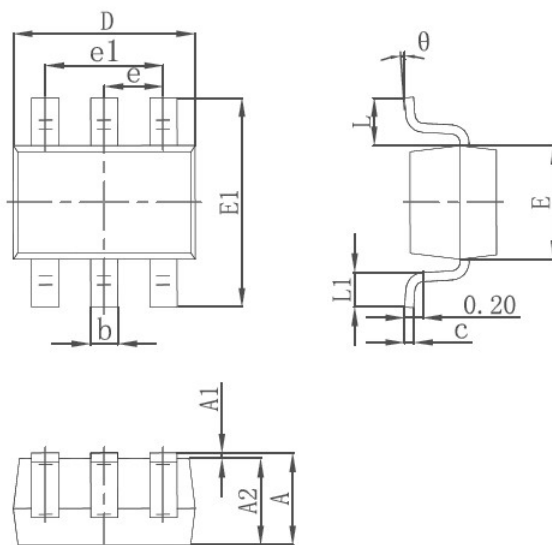


Typical characteristics PNP



Package Outline

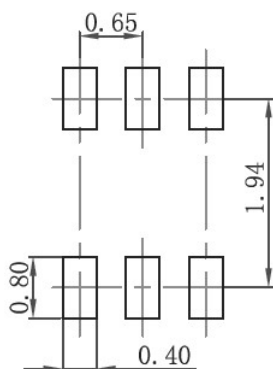
SOT-363



Symbol	Dimensions In Millimeters	
	Min	Max
A	0.900	1.100
A1	0.000	0.100
A2	0.900	1.000
b	0.150	0.350
c	0.100	0.150
D	2.000	2.200
E	1.150	1.350
E1	2.150	2.400
e	0.650 TYP	
e1	1.200	1.400
L	0.525 REF	
L1	0.260	0.460
θ	0°	8°

Precautions: PCB Design

Recommended land dimensions for SOT-363 diode. Electrode patterns for PCBs



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.05 mm.
3. The pad layout is for reference purposes only.