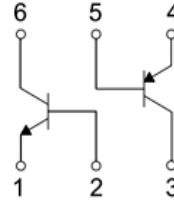


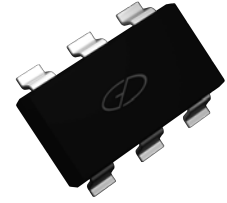
Complementary NPN+PNP Transistor

Features

- Complementary pair
- One 5551-Type NPN
- One 5401-Type PNP
- Epitaxial planar die construction
- Ideal for low power amplification and switching



Schematic Diagram



SOT-363

NPN Absolute Maximum Ratings

($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	180	V
Collector-Emitter Voltage	V_{CEO}	160	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current-Continuous	I_C	0.2	A
Collector Power Dissipation	P_D	0.2	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	625	$^{\circ}\text{C/W}$
Junction Temperature	T_J	-55 to +150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 to +150	$^{\circ}\text{C}$

PNP Absolute Maximum Ratings

($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	-160	V
Collector-Emitter Voltage	V_{CEO}	-150	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current-Continuous	I_C	-0.2	A
Collector Power Dissipation	P_D	0.2	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	625	$^{\circ}\text{C/W}$
Junction Temperature	T_J	-55 to +150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 to +150	$^{\circ}\text{C}$

Complementary NPN+PNP Transistor

NPN Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Max	Unit
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=100\mu\text{A}$, $I_E=0$	180	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=1\text{mA}$, $I_B=0$	160	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=10\mu\text{A}$, $I_C=0$	6	-	V
Collector Cut-off Current	I_{CBO}	$V_{CB}=120\text{V}$, $I_E=0$	-	0.05	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB}=4\text{V}$, $I_C=0$	-	0.05	μA
DC Current Gain	h_{FE}	$V_{CE}=5\text{V}$, $I_C=1\text{mA}$	80	-	-
		$V_{CE}=5\text{V}$, $I_C=10\text{mA}$	100	300	
		$V_{CE}=5\text{V}$, $I_C=50\text{mA}$	30	-	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=10\text{mA}$, $I_B=1\text{mA}$	-	0.15	V
		$I_C=50\text{mA}$, $I_B=5\text{mA}$	-	0.2	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=10\text{mA}$, $I_B=1\text{mA}$	-	1	V
		$I_C=500\text{mA}$, $I_B=5\text{mA}$	-	1	V
Output Capacitance	C_{ob}	$V_{CB}=10\text{V}$, $f=1.0\text{MHz}$, $I_E=0$	-	6.0	pF
Current Gain-Bandwidth Product	f_T	$V_{CE}=10\text{V}$, $I_C=10\text{mA}$, $f=100\text{MHz}$	100	300	MHz
Noise Figure	NF	$V_{CE}=5.0\text{V}$, $I_C=0.2\text{mA}$, $R_S=1.0\text{k}\Omega$, $f=1.0\text{kHz}$	-	8.0	dB

Complementary NPN+PNP Transistor

PNP Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Max	Unit
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=-100\mu\text{A}$, $I_E=0$	-160	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=-1\text{mA}$, $I_B=0$	-150	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=-10\mu\text{A}$, $I_C=0$	-5	-	V
Collector Cut-off Current	I_{CBO}	$V_{CB}=-120\text{V}$, $I_E=0$	-	-50	nA
Emitter Cut-off Current	I_{EBO}	$V_{EB}=-3\text{V}$, $I_C=0$	-	-50	nA
DC Current Gain	h_{FE}	$V_{CE}=-5\text{V}$, $I_C=-1\text{mA}$	50	-	-
		$V_{CE}=-5\text{V}$, $I_C=-10\text{mA}$	100	300	
		$V_{CE}=-5\text{V}$, $I_C=-50\text{mA}$	50	-	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=-10\text{mA}$, $I_B=-1\text{mA}$	-	-0.2	V
		$I_C=-50\text{mA}$, $I_B=-5\text{mA}$	-	-0.5	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=-10\text{mA}$, $I_B=-1\text{mA}$	-	-1	V
		$I_C=-50\text{mA}$, $I_B=-5\text{mA}$	-	-1	V
Output Capacitance	C_{ob}	$V_{CB}=-10\text{V}$, $f=1.0\text{MHz}$, $I_E=0$	-	6.0	pF
Current Gain-Bandwidth Product	f_T	$V_{CE}=-10\text{V}$, $I_C=-10\text{mA}$, $f=100\text{MHz}$	100	300	MHz
Noise Figure	NF	$V_{CE}=-5.0\text{V}$, $I_C=-0.2\text{mA}$, $R_S=10\Omega$, $f=1.0\text{kHz}$	-	8.0	dB

Complementary NPN+PNP Transistor

NPN Typical Characteristic Curves

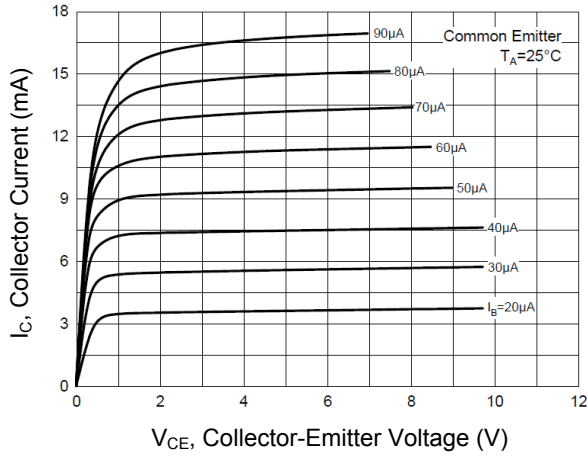


Figure 1. Static Characteristics

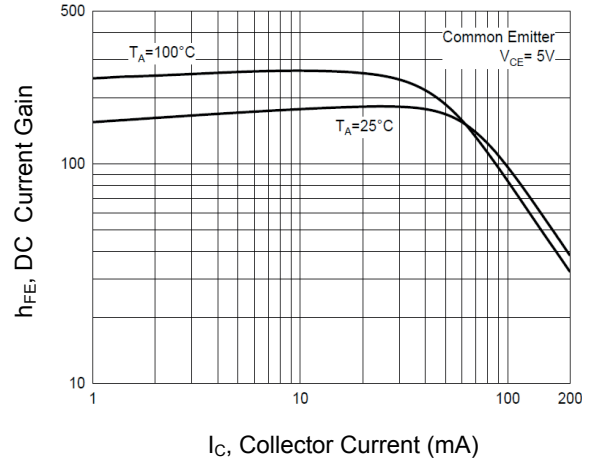


Figure 2. DC Current Gain Characteristics

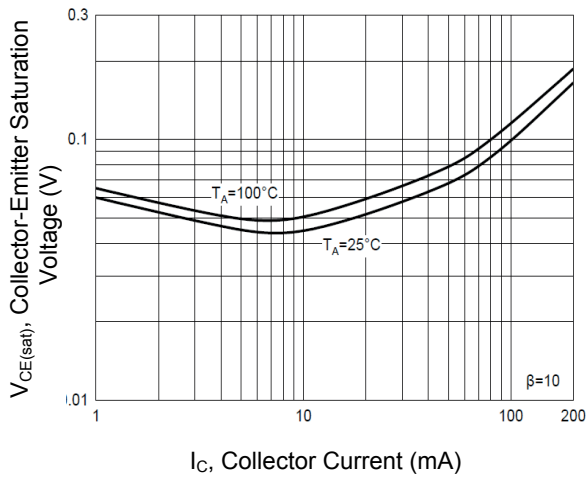


Figure 3. Collector-Emitter Saturation Voltage Characteristics

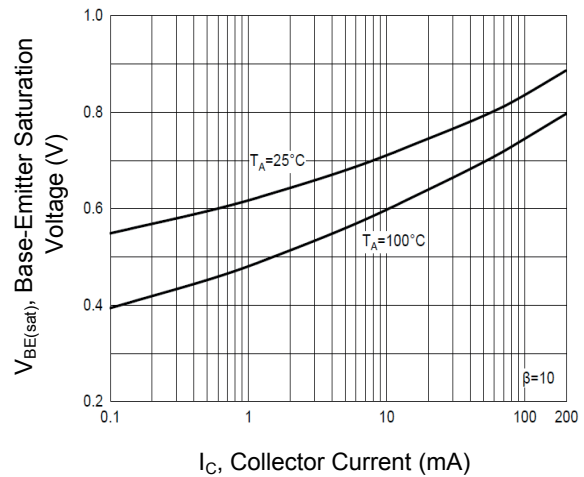


Figure 4. Base-Emitter Saturation Voltage Characteristics

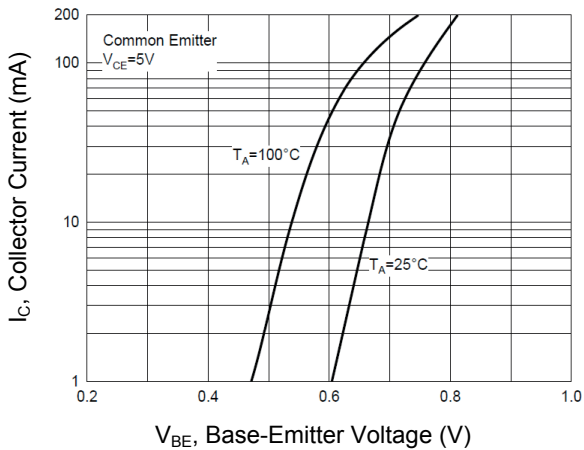


Figure 5. Base-Emitter Voltage Characteristics

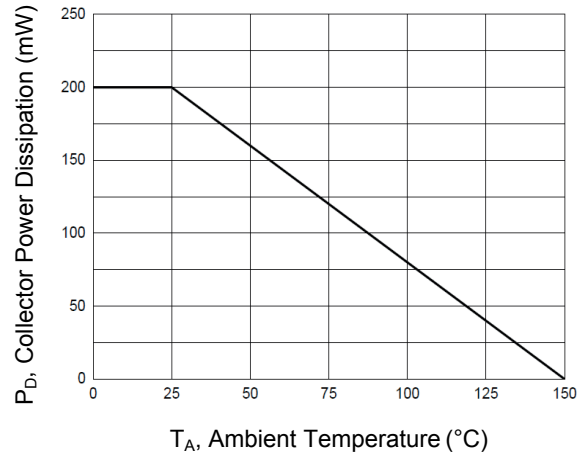


Figure 6. Collector Power Derating Curve

Complementary NPN+PNP Transistor

PNP Typical Characteristic Curves

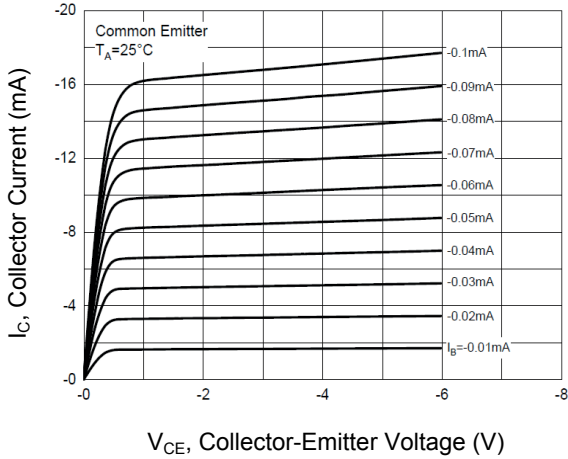


Figure 7. Static Characteristics

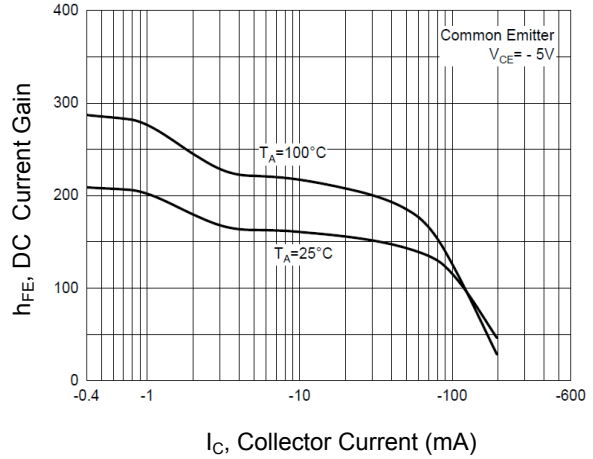


Figure 8. DC Current Gain Characteristics

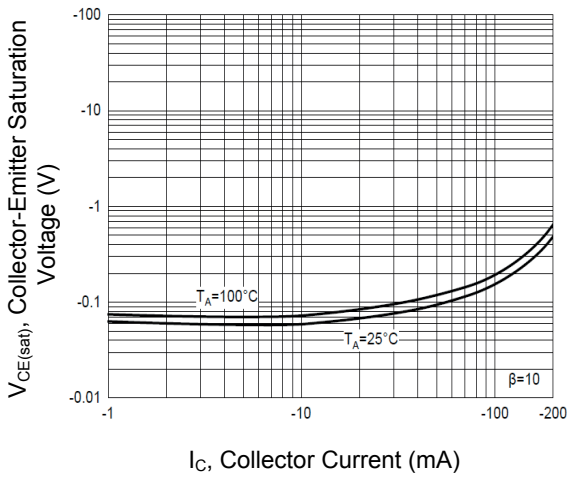


Figure 9. Collector-Emitter Saturation Voltage Characteristics

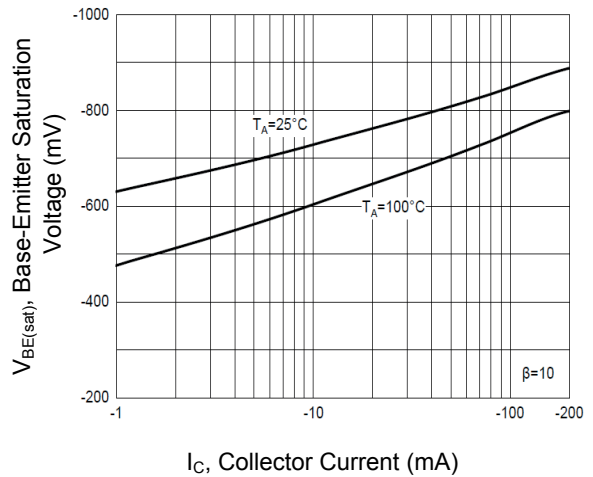


Figure 10. Base-Emitter Saturation Voltage Characteristics

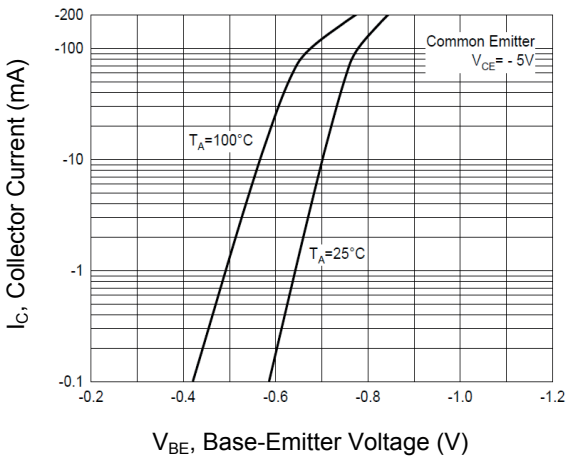


Figure 11. Base-Emitter Voltage Characteristics

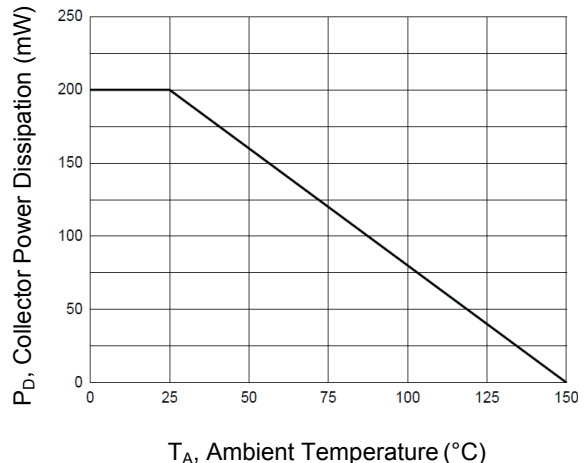
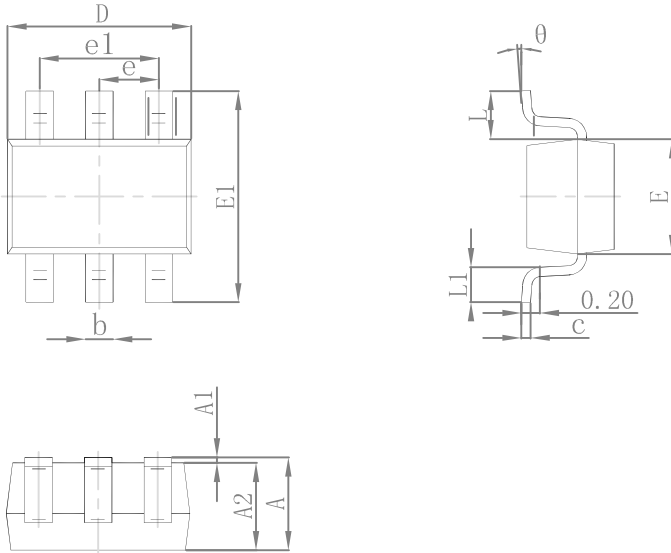


Figure 12. Collector Power Derating Curve

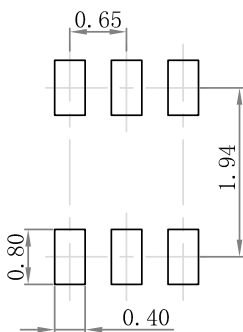
Complementary NPN+PNP Transistor

Package Outline Dimensions (SOT-363)



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°

Recommended Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

Ordering Information

Device	Package	Marking	Quantity	HSF Status
MMDT5451	SOT-363	KNM	3,000pcs / Reel	RoHS Compliant