

**Features**

- Halogen Free. "Green" Device (Note 1)
- AEC-Q101 Qualified
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

**Maximum Ratings @ 25°C Unless Otherwise Specified**

- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C

**NPN Transistor**

Parameter	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CBO}$	180	V
Collector-Emitter Voltage	$V_{CEO}$	160	V
Emitter-Base Voltage	$V_{EBO}$	6	V
Continuous Collector Current	$I_C$	200	mA
Power Dissipation	$P_D$	200	mW
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	625	°C/W

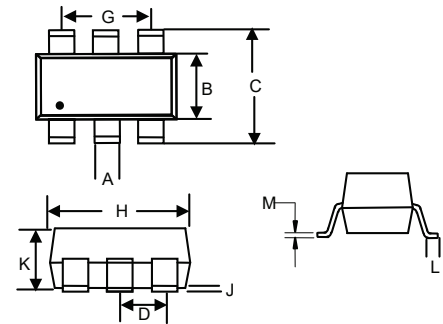
**PNP Transistor**

Parameter	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CBO}$	-160	V
Collector-Emitter Voltage	$V_{CEO}$	-150	V
Emitter-Base Voltage	$V_{EBO}$	-5	V
Continuous Collector Current	$I_C$	-200	mA
Power Dissipation	$P_D$	200	mW
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	625	°C/W

Note: 1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

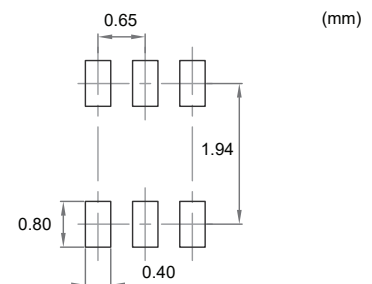
**NPN/PNP  
Small Signal  
Transistors**

**SOT-363**

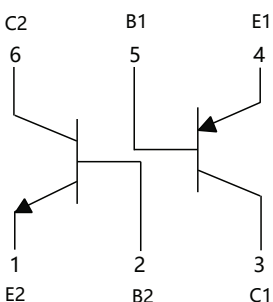


DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.006	0.014	0.15	0.35	
B	0.045	0.053	1.15	1.35	
C	0.079	0.096	2.00	2.45	
D	0.026		0.65		TYP.
G	0.047	0.055	1.20	1.40	
H	0.071	0.087	1.80	2.20	
J	----	0.004	----	0.10	
K	0.031	0.043	0.80	1.10	
L	0.010	0.018	0.26	0.46	
M	0.003	0.006	0.08	0.15	

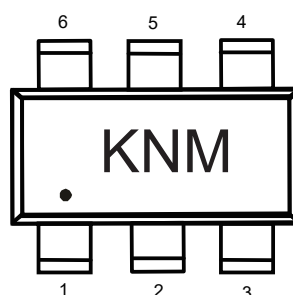
**Suggested Solder Pad Layout**



**Internal Structure**



**Device Marking**



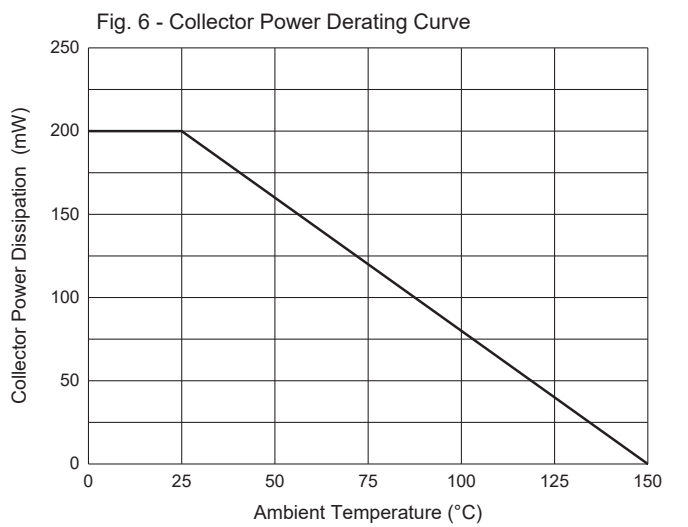
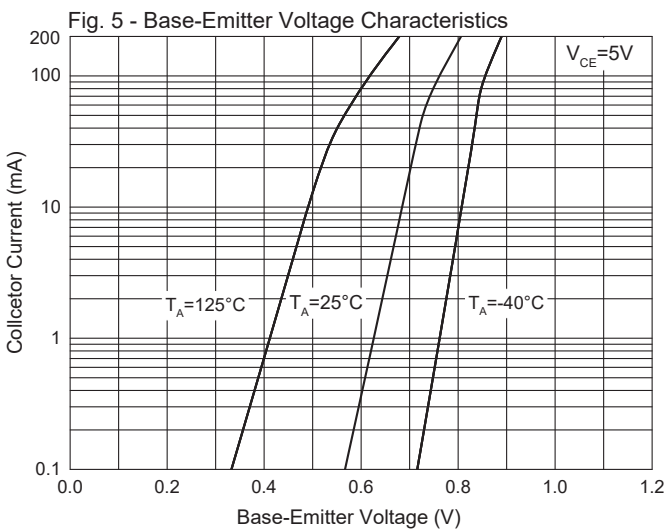
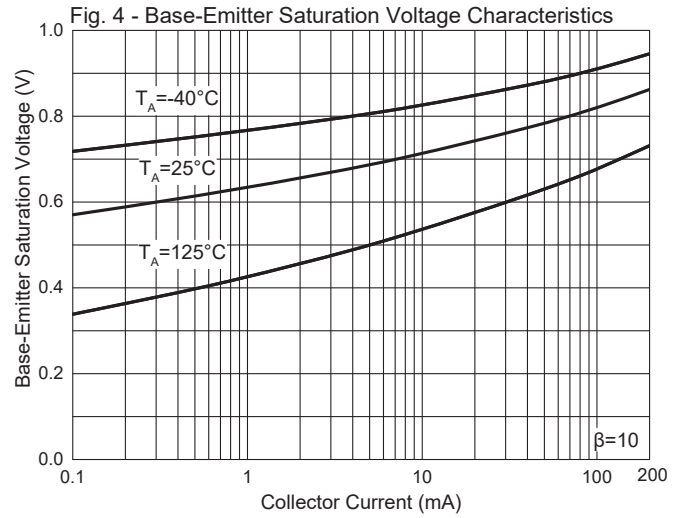
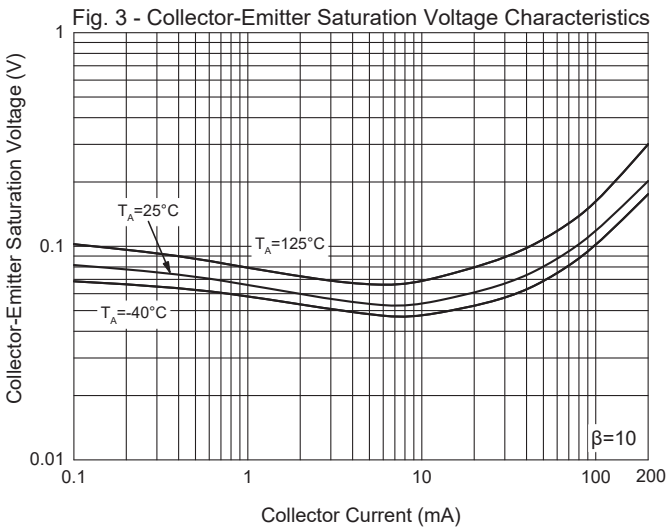
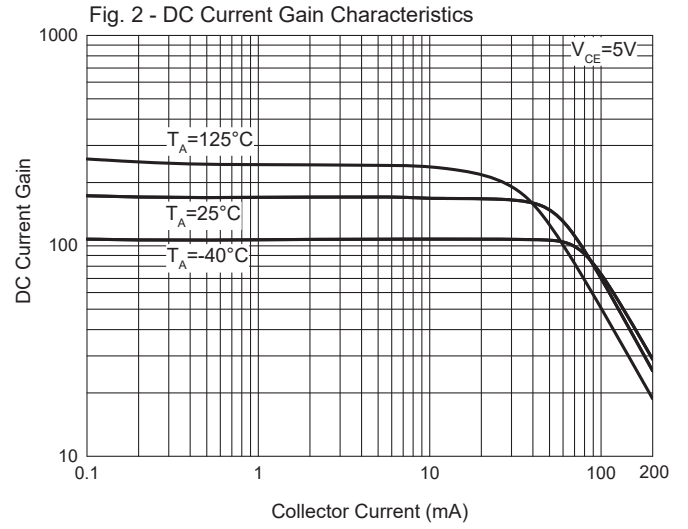
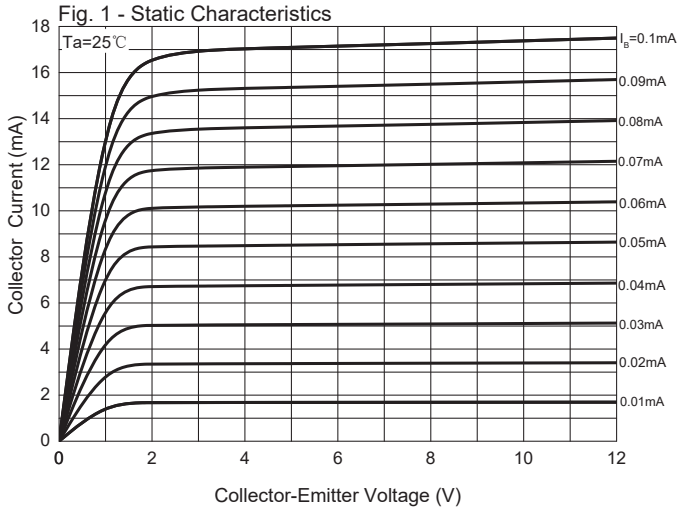
**Electrical Characteristics @  $T_A=25^\circ\text{C}$  Unless Otherwise Specified**
**NPN Transistor**

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	180			V	$I_C=100\mu\text{A}$ , $I_E=0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	160			V	$I_C=1\text{mA}$ , $I_B=0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6			V	$I_E=10\mu\text{A}$ , $I_C=0$
Collector Cutoff Current	$I_{CBO}$			50	nA	$V_{CB}=120\text{V}$ , $I_E=0$
Emitter Cutoff Current	$I_{EBO}$			50	nA	$V_{EB}=4\text{V}$ , $I_C=0$
DC Current Gain	$h_{FE(1)}$	80				$V_{CE}=5\text{V}$ , $I_C=1\text{mA}$
	$h_{FE(2)}$	100		300		$V_{CE}=5\text{V}$ , $I_C=10\text{mA}$
	$h_{FE(3)}$	30				$V_{CE}=5\text{V}$ , $I_C=50\text{mA}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			0.15	V	$I_C=10\text{mA}$ , $I_B=1\text{mA}$
				0.20	V	$I_C=50\text{mA}$ , $I_B=5\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$			1.0	V	$I_C=10\text{mA}$ , $I_B=1\text{mA}$
				1.0	V	$I_C=50\text{mA}$ , $I_B=5\text{mA}$
Transition Frequency	$f_T$	100		300	MHz	$V_{CE}=10\text{V}$ , $I_C=10\text{mA}$ , $f=100\text{MHz}$
Output Capacitance	$C_{obo}$			6	pF	$V_{CB}=10\text{V}$ , $I_E=0$ , $f=1\text{MHz}$

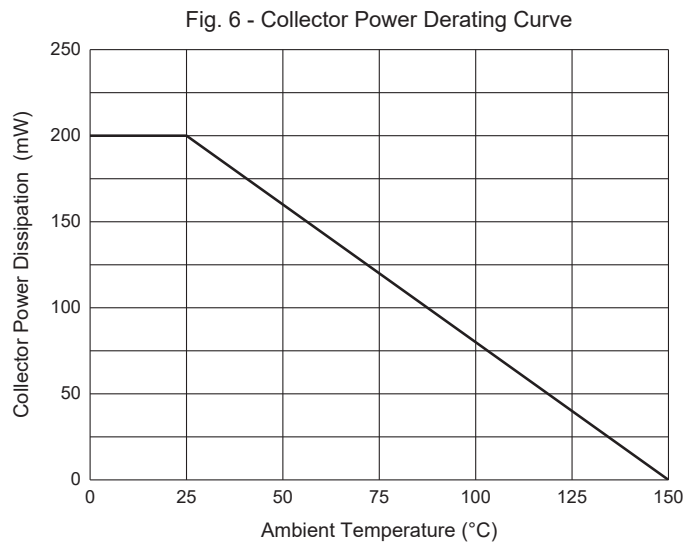
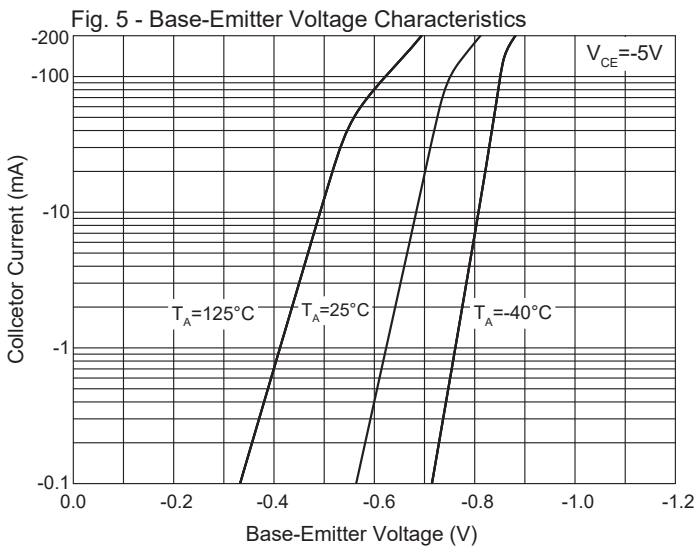
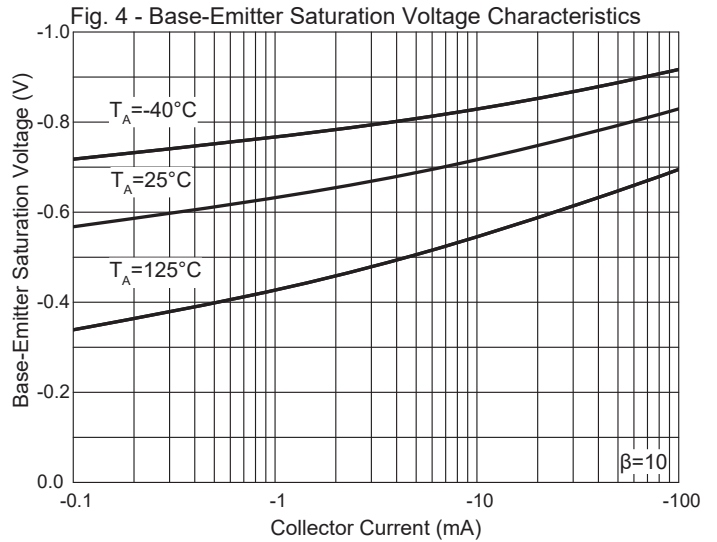
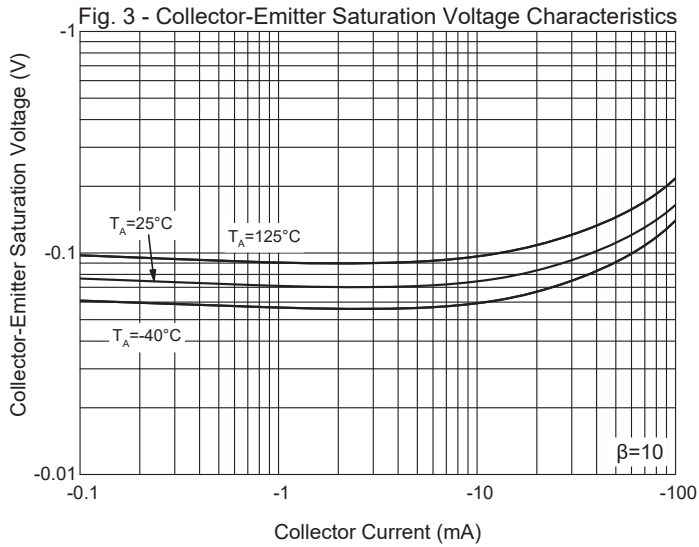
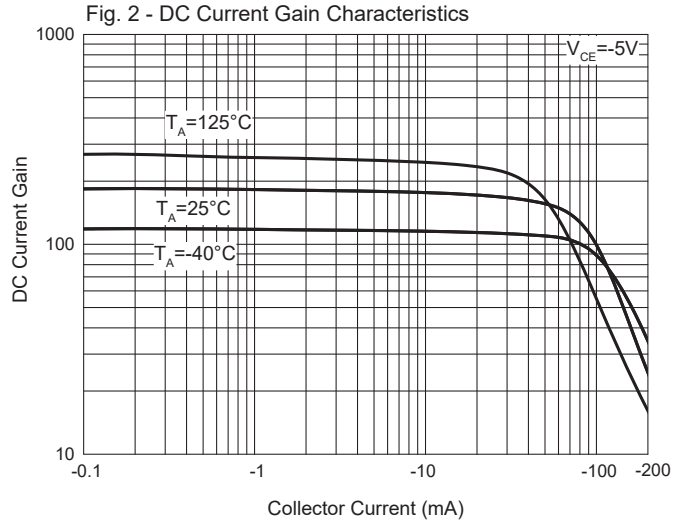
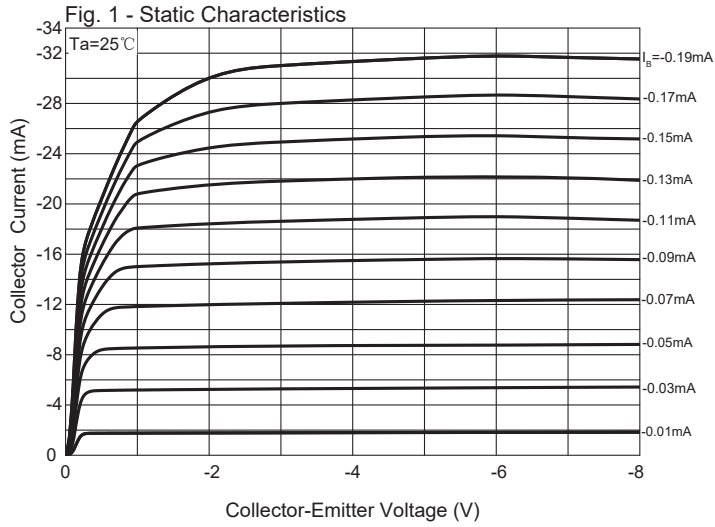
**PNP Transistor**

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-160			V	$I_C=-100\mu\text{A}$ , $I_E=0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-150			V	$I_C=-1\text{mA}$ , $I_B=0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5			V	$I_E=-10\mu\text{A}$ , $I_C=0$
Collector Cutoff Current	$I_{CBO}$			-50	nA	$V_{CB}=-120\text{V}$ , $I_E=0$
Emitter Cutoff Current	$I_{EBO}$			-50	nA	$V_{EB}=-3\text{V}$ , $I_C=0$
DC Current Gain	$h_{FE(1)}$	50				$V_{CE}=-5\text{V}$ , $I_C=-1\text{mA}$
	$h_{FE(2)}$	100		300		$V_{CE}=-5\text{V}$ , $I_C=-10\text{mA}$
	$h_{FE(3)}$	50				$V_{CE}=-5\text{V}$ , $I_C=-50\text{mA}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			-0.20	V	$I_C=-10\text{mA}$ , $I_B=-1\text{mA}$
				-0.50	V	$I_C=-50\text{mA}$ , $I_B=-5\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$			-1.0	V	$I_C=-10\text{mA}$ , $I_B=-1\text{mA}$
				-1.0	V	$I_C=-50\text{mA}$ , $I_B=-5\text{mA}$
Transition Frequency	$f_T$	100		300	MHz	$V_{CE}=-10\text{V}$ , $I_C=-10\text{mA}$ , $f=100\text{MHz}$
Output Capacitance	$C_{obo}$			6	pF	$V_{CB}=-10\text{V}$ , $I_E=0$ , $f=1\text{MHz}$

**Curve Characteristics(NPN)**



**Curve Characteristics(PNP)**



## Ordering Information

Device	Packing
MMDT5451HE3-TP	Tape&Reel: 3Kpcs/Reel

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