



MMDT2227

DUAL TRANSISTOR

NPN & PNP GENERAL PURPOSE AMPLIFIER

DESCRIPTION

The UTC **MMDT2227** is an NPN & PNP general purpose amplifier. it's suitable for a medium power amplifier and switch requiring collector currents up to 600mA.

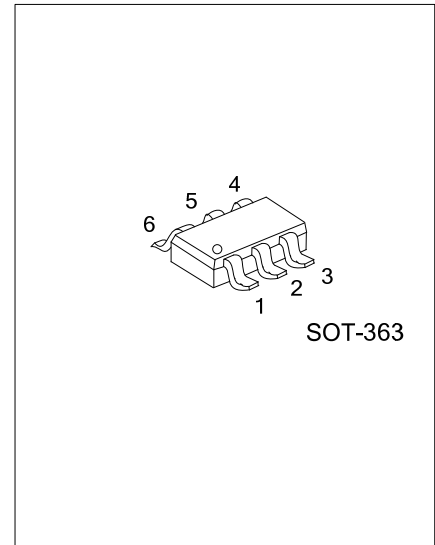
FEATURES

* Low $V_{CE(SAT)}$, $V_{CE(SAT)} = 0.3V$ (typ.) @ $I_C / I_B = 150mA / 15mA$
 $V_{CE(SAT)} < -0.4V$ (typ.) @ $I_C / I_B = -150mA / -15mA$

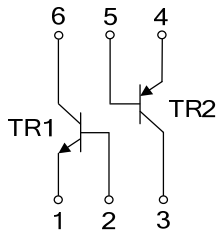
* NPN MMBT2222A

PNP MMBT2907A

* High collector current gain under high collector current condition



EQUIVALENT CIRCUIT

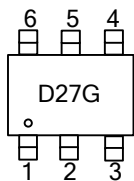


ORDERING INFORMATION

Ordering Number	Package	Pin Assignment						Packing
		1	2	3	4	5	6	
MMDT2227G-AL6-R	SOT-363	E1	B1	C2	E2	B2	C1	Tape Reel

<p>MMDT2227G-AL6-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) AL6: SOT-363</p> <p>(3) G: Halogen Free and Lead Free</p>
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MARKING



■ ABSOLUTE MAXIMUM RATINGS* (T_A=25°C, unless otherwise specified)(Note 2)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage	TR1	V _{CEO}	40	V
	TR2		-60	
Collector-Base Voltage	TR1	V _{CBO}	75	V
	TR2		-60	
Emitter-Base Voltage	TR1	V _{EBO}	6	V
	TR2		-5.0	
Collector Current - Continuous	TR1	I _C	600	mA
	TR2		-600	
Derate above 25°C		P _D	200	mW
Junction Temperature		T _J	+150	°C
Storage Temperature		T _{STG}	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	θ _{JC}	415	°C/W

■ ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise specified)

TR1

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	I _C =10mA, I _B =0 (Note)	40			V
Collector-Base Breakdown Voltage	V _{(BR)CBO}	I _C =10 μA, I _E =0	75			V
Emitter-Base Breakdown Voltage	V _{(BR)EBO}	I _E =10μA, I _C =0	6			V
Collector Cutoff Current	I _{CBO}	V _{CB} = 60V, I _E =0			10	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =3.0V, I _C =0			10	nA
ON CHARACTERISTICS						
DC Current Gain	h _{FE}	I _C =0.1mA, V _{CE} =10V	35			
		I _C =1mA, V _{CE} =10V	50			
		I _C =10mA, V _{CE} =10V	75			
		I _C =150mA, V _{CE} =10V	100		300	
		I _C =150mA, V _{CE} = 1V (Note)	50			
Collector-Emitter Saturation Voltage (Note)	V _{CE(SAT)}	I _C =150mA, I _B =15mA			0.3	V
		I _C =500mA, I _B =50mA			1.0	V
Base-Emitter Saturation Voltage (Note)	V _{BE(SAT)}	I _C =150mA, I _B =15mA	0.6		1.2	V
		I _C =500mA, I _B =50mA			2.0	V
SMALL SIGNAL CHARACTERISTICS						
Current Gain - Bandwidth Product	f _T	I _C = 20mA, V _{CE} =20V, f =100MHz	300			MHz
Output Capacitance	C _{OB}	V _{CB} =10 V, I _E =0, f=100 kHz			8	pF
Input Capacitance	C _{IB}	V _{EB} =0.5V, I _C =0, f=100 kHz			25	pF
Noise Figure	NF	I _C =100μA, V _{CE} =10V, R _S =1.0kΩ, f =1.0kHz			4	dB

Note: Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%

■ ELECTRICAL CHARACTERISTICS(Cont.)

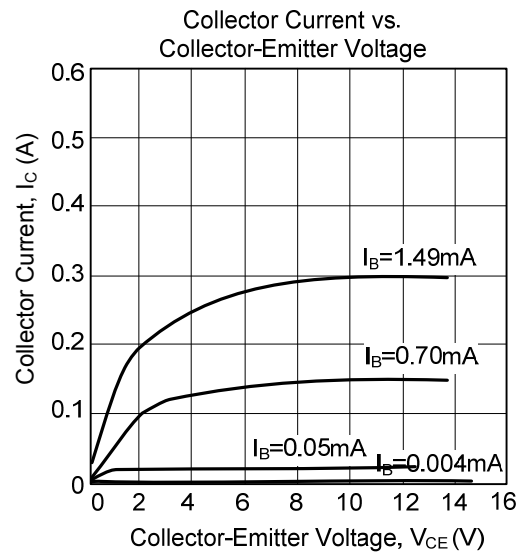
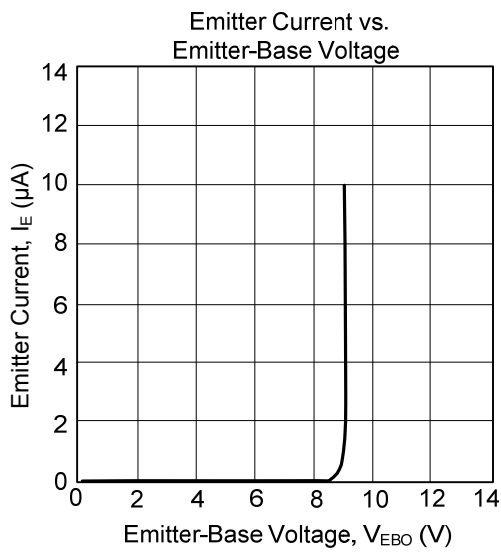
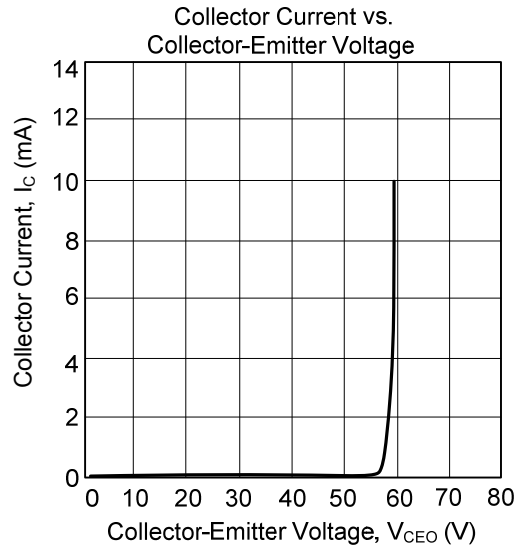
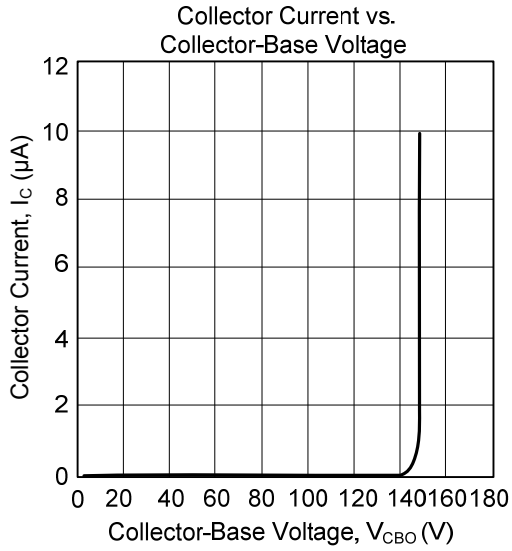
TR2

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=-10mA, I_B=0$ (Note)	-60			V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=-10\mu A, I_E=0$	-60			V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=-10\mu A, I_C=0$	-5.0			V
Collector Cutoff Current	I_{CBO}	$V_{CB}=-50V, I_E=0$			-20	nA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=-3.0V, I_C=0$			-30	nA
ON CHARACTERISTICS						
DC Current Gain	h_{FE}	$I_C=-0.1mA, V_{CE}=-10V$	75			
		$I_C=-1.0mA, V_{CE}=-10V$	100			
		$I_C=-10mA, V_{CE}=-10V$	100			
		$I_C=-150mA, V_{CE}=-10V$ (Note)	100		300	
		$I_C=-500mA, V_{CE}=-10V$ (Note)	50			
Collector-Emitter Saturation Voltage (Note)	$V_{CE(SAT)}$	$I_C=-150mA, I_B=-15mA$			-0.4	V
		$I_C=-500mA, I_B=-50mA$			-1.6	V
Base-Emitter Saturation Voltage (Note)	$V_{BE(SAT)}$	$I_C=-150mA, I_B=-15mA$			-1.3	V
		$I_C=-500mA, I_B=-50mA$			-2.6	V
SMALL SIGNAL CHARACTERISTICS						
Current Gain - Bandwidth Product	f_T	$I_C=-50mA, V_{CE}=-20V, f=100MHz$	200			MHz
Output Capacitance	C_{OB}	$V_{CB}=-10V, I_E=0, f=100kHz$			8	pF
Input Capacitance	C_{IB}	$V_{EB}=-2.0V, I_C=0, f=100kHz$			30	pF
Noise Figure	NF	$I_C=-100\mu A, V_{CE}=-10V,$ $R_S=-1.0k\Omega, f=1.0kHz$		2.0		dB

Note: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2.0\%$

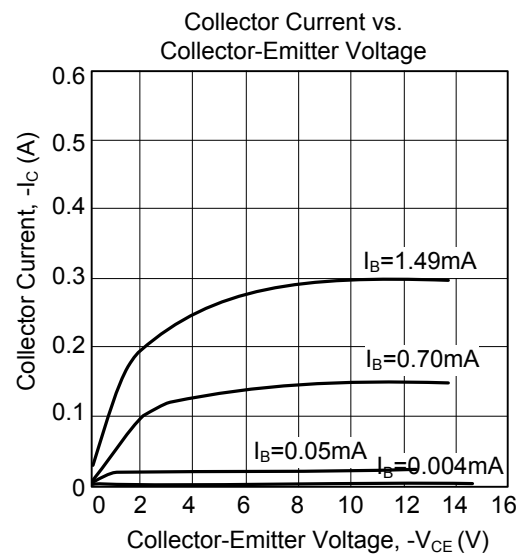
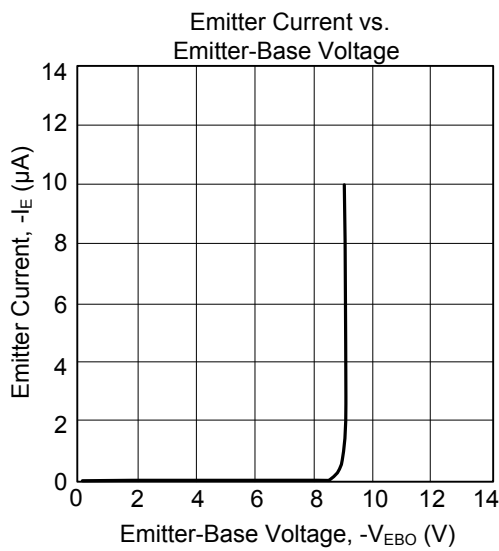
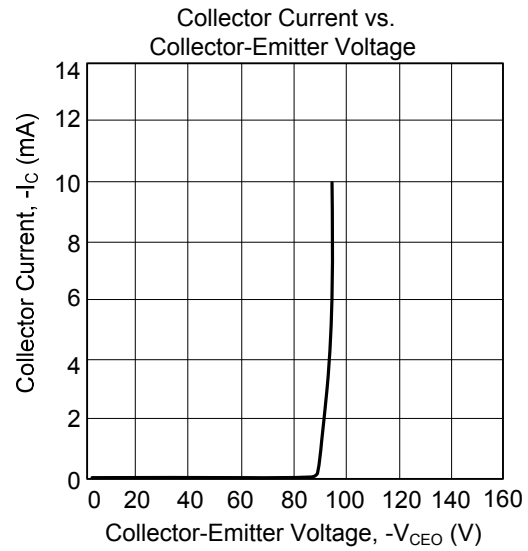
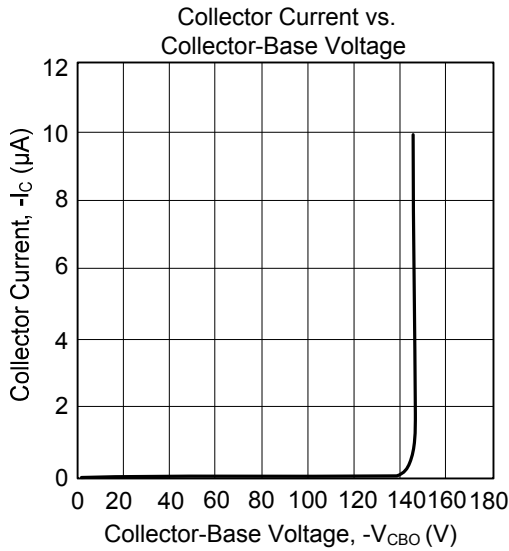
■ TYPICAL CHARACTERISTICS

MMDT2227 TR1



■ TYPICAL CHARACTERISTICS(Cont.)

MMDT2227 TR2



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