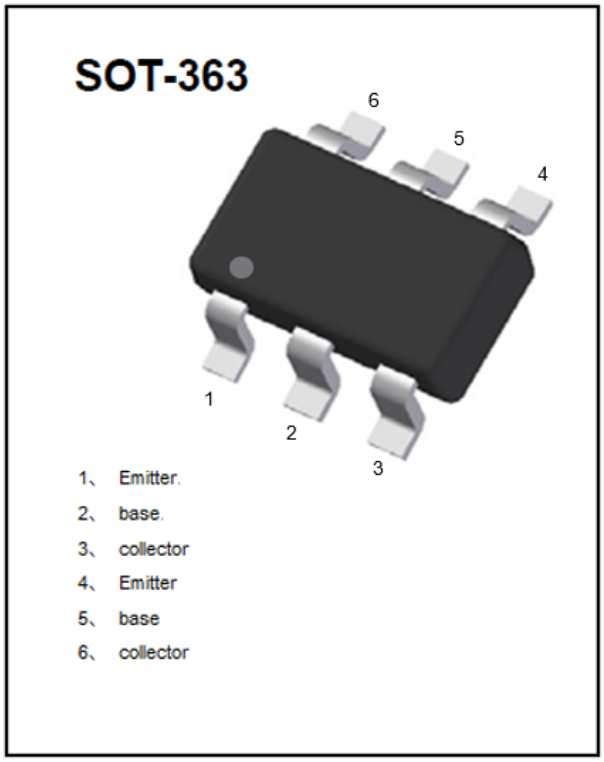
Dual NPN+PNP Small Signal Transistor



Features

- Epoxy meets UL-94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Ultra-small surface mount package
- Part no. with suffix “Q” means AEC-Q101 qualified

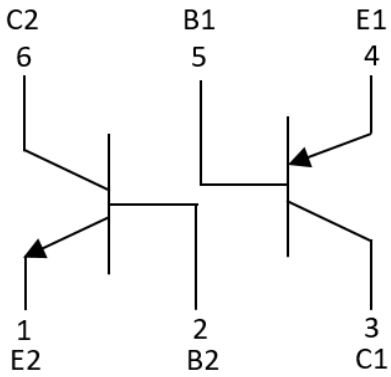
Application

- Ideal for Medium Power Amplification and Switching

Mechanical Data

- **Package:** SOT-363
- **Terminals:** Tin plated leads, solderable, per J-STD-002 and JESD22-B102
- **Marking:** KNM

■Equivalent circuit



■ Ordering Information (Example)

PREFERED P/N	PACKING CODE	UNIT WEIGHT(g)	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
MMDT5451Q	F2	Approximate 0.009g	3000	30000	120000	7” reel

■TR1 PNP Pin3、4、5 Maximum Ratings (Ta=25℃ Unless otherwise specified)

Item	Symbol	Unit	Value
Collector-Base Voltage	V_{CBO}	V	-160
Collector-Emitter Voltage	V_{CEO}	V	-150
Emitter-Base Voltage	V_{EBO}	V	-5
Collector Current	I_C	mA	-200
Total Device Dissipation (*)	P_D	mW	200
Thermal Resistance Junction to Ambient (*)	R_{thJA}	K/W	625
Junction Temperature	T_j	℃	150
Storage Temperature	T_{STG}	℃	-55 to +150

(*) Device mounted on FR-4 PCB 1.0 x 1.0 x 0.06 inch

■TR1 PNP Pin3、4、5 Electrical Characteristics (Ta=25℃ unless otherwise specified)

Item	Symbol	Unit	Conditions	Min	TYP	Max
Collector-base breakdown voltage	V_{CBO}	V	I_C= -100μA,I_E=0	-160		
Collector-emitter breakdown voltage	V_{CEO}	V	I_C= -1mA,I_B=0	-150		
Emitter-base breakdown voltage	V_{EBO}	V	I_E= -10μA,I_C=0	-5		
Collector cut-off current	I_{CBO}	nA	V_{CB}= -120V,I_E=0			-50
Emmiter cut-off current	I_{EBO}	nA	V_{EB}= -3V, I_C=0			-50
DC current gain	h_{FE}		V_{CE}= -5V,I_C= -1mA	50		
	h_{FE}		V_{CE}= -5V,I_C= -10mA	100		300
	h_{FE}		V_{CE}=-5V,I_C= -50mA	50		
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	I_C= -10mA,I_B= -1mA			-0.2
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	I_C= -50mA,I_B= -5mA			-0.5
Base-emitter saturation voltage	$V_{BE(sat)}$	V	I_C= -10mA,I_B= -1mA			-1
Base-emitter saturation voltage	$V_{BE(sat)}$	V	I_C= -50mA,I_B= -5mA			-1
Transition frequency	f_T	MHz	V_{CE}= -10V,I_C= -10mA,f=100MHz	100		300
Output capacitance	Cobo	pF	V_{CE}= -10V,I_E=0,f=1MHz			6

■TR2 NPN Pin1、2、6 Maximum Ratings (Ta=25℃ Unless otherwise specified)

Item	Symbol	Unit	Value
Collector-Base Voltage	V_{CBO}	V	180
Collector-Emitter Voltage	V_{CEO}	V	160
Emitter-Base Voltage	V_{EBO}	V	6
Collector Current	I_C	mA	200
Total Device Dissipation (*)	P_D	mW	200
Thermal Resistance Junction to Ambient (*)	R_{thJA}	K/W	625
Junction Temperature	T_j	℃	150
Storage Temperature	T_{STG}	℃	-55 to +150

(*) Device mounted on FR-4 PCB 1.0 x 1.0 x 0.06 inch

■TR2 NPN Pin1、2、6 Electrical Characteristics (Ta=25℃ unless otherwise specified)

Item	Symbol	Unit	Conditions	Min	TYP	Max
Collector-base breakdown voltage	V_{CBO}	V	I_C=100μA,I_E=0	180		
Collector-emitter breakdown voltage	V_{CEO}	V	I_C=1mA,I_B=0	160		
Emitter-base breakdown voltage	V_{EBO}	V	I_E=10μA,I_C=0	6		
Collector cut-off current	I_{CBO}	nA	V_{CB}=120V,I_E=0			50
Emmiter cut-off current	I_{EBO}	nA	V_{EB}=4V, I_C=0			50
DC current gain	h_{FE}		V_{CE}=5V,I_C=1mA	80		
	h_{FE}		V_{CE}=5V,I_C=10mA	100		300
	h_{FE}		V_{CE}=5V,I_C=50mA	30		
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	I_C=10mA,I_B=1mA			0.15
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	I_C=50mA,I_B=5mA			0.2
Base-emitter saturation voltage	$V_{BE(sat)}$	V	I_C=10mA,I_B=1mA			1
Base-emitter saturation voltage	$V_{BE(sat)}$	V	I_C=50mA,I_B=5mA			1
Transition frequency	f_T	MHz	V_{CE}=10V,I_C=10mA,f=100MHz	100		300
Output capacitance	Cobo	pF	V_{CE}=10V,I_E=0,f=1MHz			6

■ TR1 PNP Pin3、4、5 Characteristics (Typical)

Fig. 1 - Static characteristic

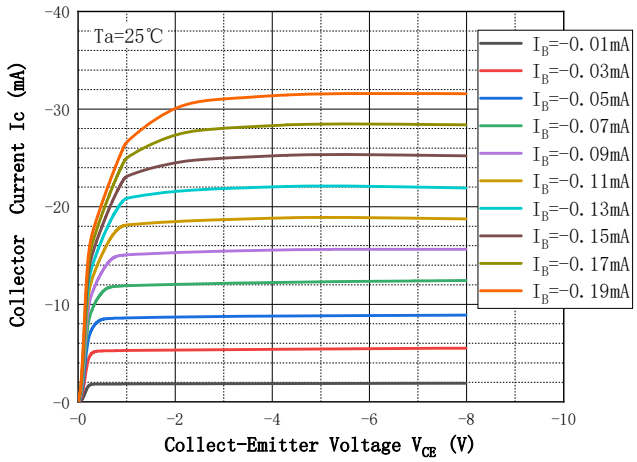


Fig. 2 - DC Current Gain

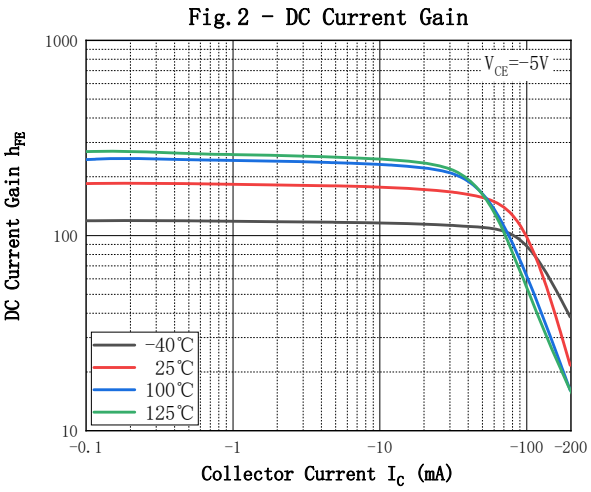


Fig. 3 - Collect-Emitter Saturation Voltage

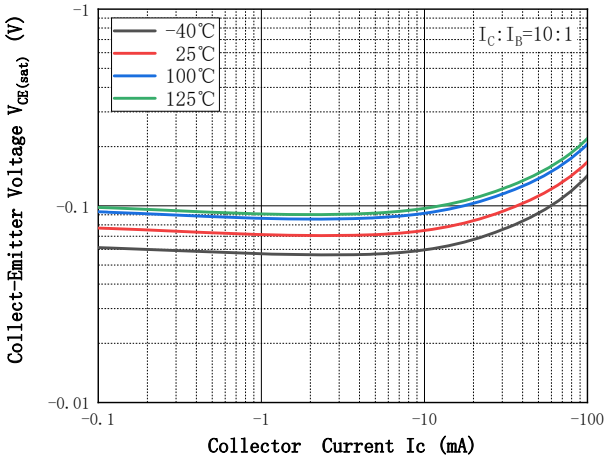


Fig. 4 - Base-Emitter Voltage

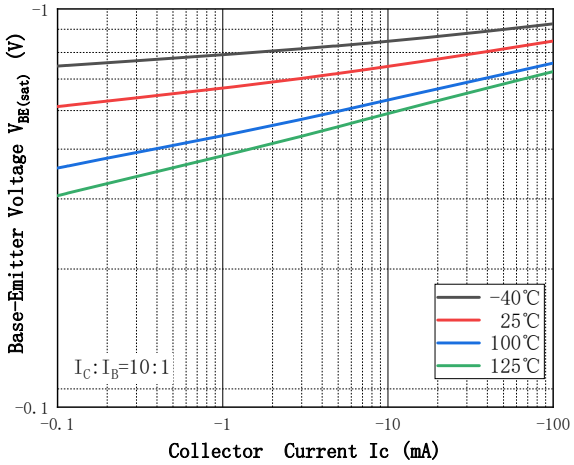


Fig. 5 - Base-Emitter On Voltage

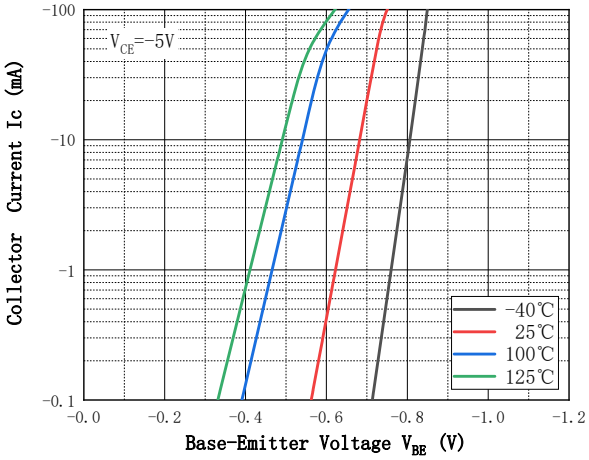
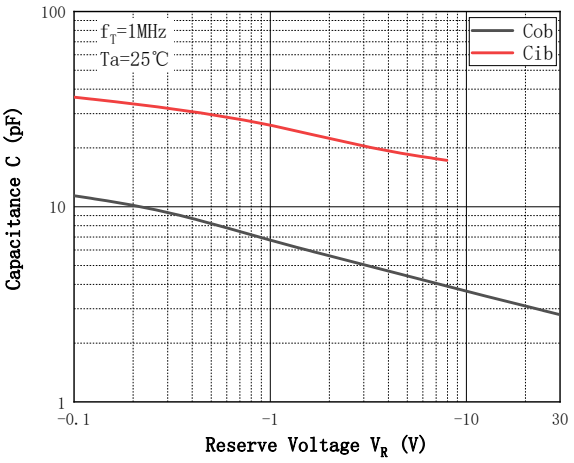


Fig. 6 - Cob/Cib—VCB/VEB



■ TR2 NPN Pin1、2、6 Characteristics (Typical)

Fig. 1-Static Characteristic

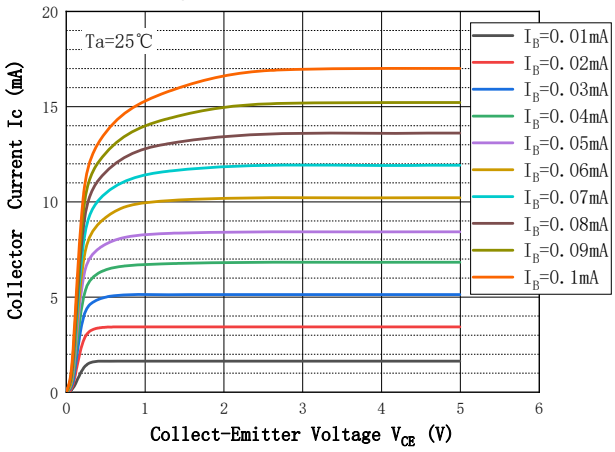


Fig. 2 - DC Current Gian

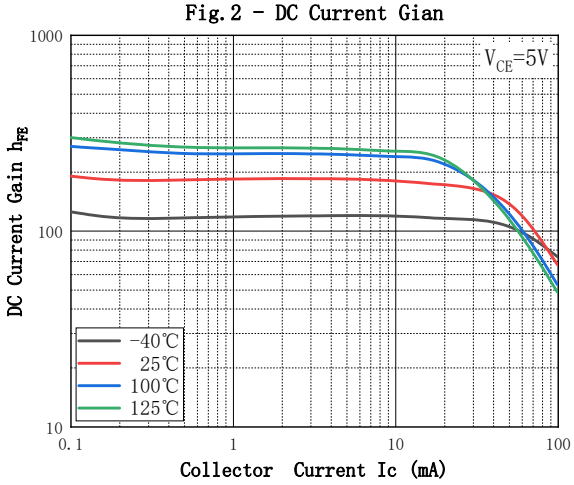


Fig. 3 - Collect-Emitter Saturation Voltage

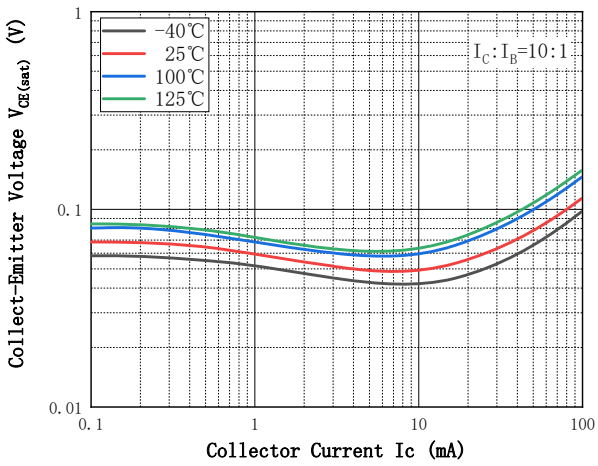


Fig. 4 - Base-Emitter Voltage

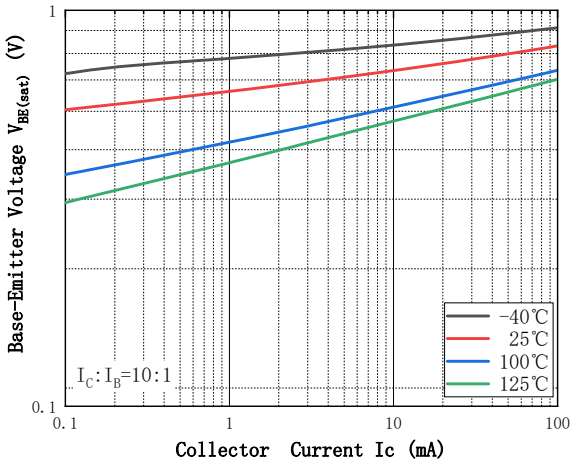


Fig. 5 - Base-Emitter On Voltage

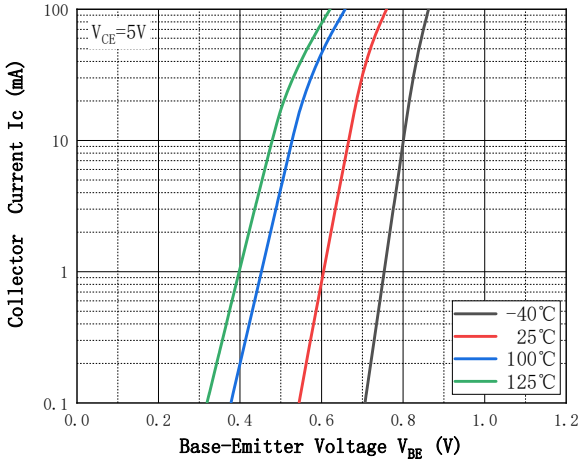
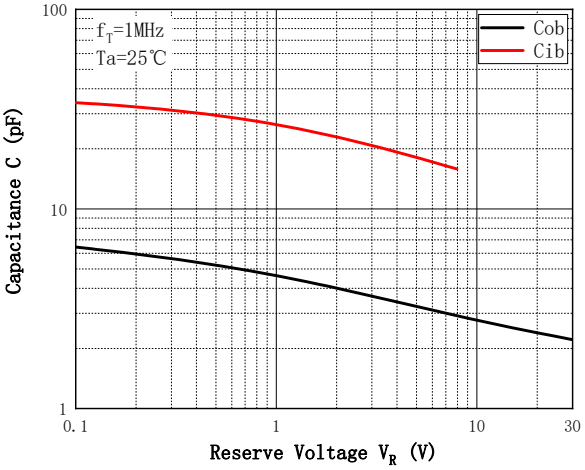
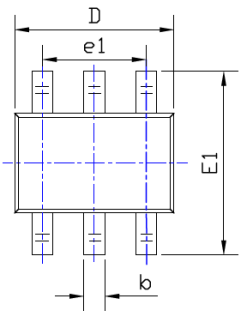


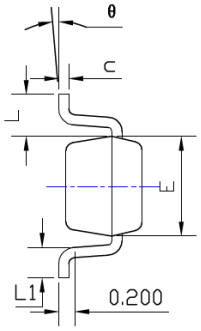
Fig. 6 - Cob/Cib—V_{CB}/V_{EB}



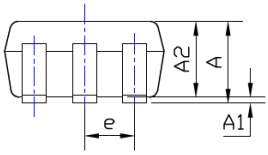
■SOT-363 Package Outline Dimensions & Suggested Pad Layout



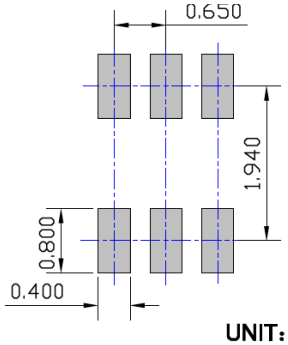
TOP VIEW



SIDE VIEW



SIDE VIEW



UNIT：mm

SUGGESTED SOLDER PAD LAYOUT

SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.035	0.043	0.900	1.100
A1	0.000	0.004	0.000	0.100
A2	0.035	0.039	0.900	1.000
b	0.006	0.014	0.150	0.350
c	0.004	0.010	0.100	0.250
D	0.071	0.087	1.800	2.200
E	0.045	0.053	1.150	1.350
E1	0.085	0.096	2.150	2.450
e	0.026TYP		0.650TYP	
e1	0.047	0.055	1.200	1.400
L	0.021REF		0.525REF	
L1	0.010	0.018	0.260	0.460
θ	0°	8°	0°	8°

NOTE:
1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.

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