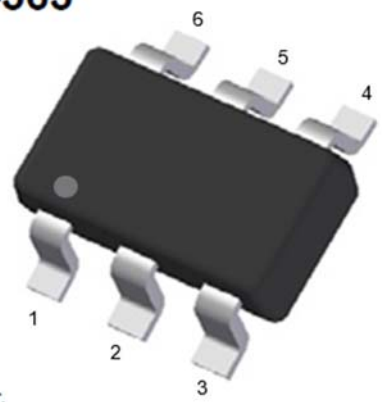
Dual NPN+PNP Small Signal Transistor

SOT-363



1、 Emitter.
2、 base.
3、 collector
4、 Emitter
5、 base
6、 collector

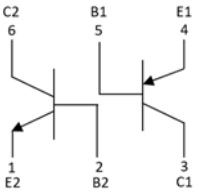
Features

- Epoxy meets UL-94 V-0 flammability rating
- Surface mount package ideally Suited for Automatic Insertion
- Moisture Sensitivity Level 1
- Part no. with suffix “Q” means AEC-Q101 qualified

Mechanical Data

- **Package:** SOT-363
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Marking:** K46

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
MMDT3946Q	F2	Approximate 0.009g	3000	30000	120000	7” reel

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

ITEM	SYMBOL	UNIT	CONDITIONS	VALUE
Collector-Base Voltage	V_{CBO}	V	I_C = -10μA, I_E = 0	-40
Collector-Emitter Voltage	V_{CEO}	V	I_C = -1mA, I_B = 0	-40
Emitter-Base Voltage	V_{EBO}	V	I_E = -10μA, I_C = 0	-5
Collector Current	I_C	mA		-200
Collector Power Dissipation	P_C	mW		200
Thermal Resistance Junction to Ambient	R_{thJA} (*)	℃/W		625
Junction Temperature	T_j	℃		-55 to +150
Storage Temperature	T_{stg}	℃		-55 to +150

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

ITEM	SYMBOL	UNIT	CONDITIONS	VALUE
Collector-Base Voltage	V_{CBO}	V	I_C = 10μA, I_E = 0	60
Collector-Emitter Voltage	V_{CEO}	V	I_C = 1mA, I_B = 0	40
Emitter-Base Voltage	V_{EBO}	V	I_E = 10μA, I_C = 0	6
Collector Current	I_C	mA		200
Collector Power Dissipation	P_C	mW		200
Thermal Resistance Junction to Ambient	R_{thJA} (*)	℃/W		625
Junction Temperature	T_j	℃		-55 to +150
Storage Temperature	T_{stg}	℃		-55 to +150

■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 = -10μA, I_E = 0	-40		
Collector-emitter breakdown voltage	V_{CEO}	V	I_C = -1mA, I_B = 0	-40		
Emitter-base breakdown voltage	V_{EBO}	V	I_E = -10μA, I_C = 0	-5		
Collector-base cut-off current	I_{CBO}	nA	V_{CB} = -30V, I_E = 0			-100
Emitter-base cut-off current	I_{EBO}	nA	V_{EB} = -3V, I_C = 0			-100
DC current gain	$h_{FE}1$		V_{CE} = -1V, I_C = -0.1mA	40		
	$h_{FE}2$		V_{CE} = -1V, I_C = -1mA	70		
	$h_{FE}3$		V_{CE} = -1V, I_C = -10mA	100		300
	$h_{FE}4$		V_{CE} = -1V, I_C = -50mA	60		
	$h_{FE}5$		V_{CE} = -1V, I_C = -100mA	30		
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	I_C = -10mA, I_B = -1mA			-0.25
			I_C = -50mA, I_B = -5mA			-0.4
Baser-emitter saturation voltage	$V_{BE(sat)}$	V	I_C = -10mA, I_B = -1mA	-0.65		-0.85
			I_C = -50mA, I_B = -5mA			-0.95
Transition frequency	f_T	MHz	V_{CE} = -20V, I_C = -10mA, f = 100MHz	250		
Delay time	t_d	ns	V_{CC} = -3V, I_C = -10mA, V_{BE} = -0.5V, I_{B1} = -1mA			35
Rise time	t_r	ns				35
Storage time	t_s	ns	V_{CC} = -3V, I_C = -10mA, I_{B1} = -I_{B2} = -1mA			225
Fall time	t_f	ns				75

■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 = 10μA, I_E = 0	60		
Collector-emitter breakdown voltage	V_{CEO}	V	I_C = 1mA, I_B = 0	40		
Emitter-base breakdown voltage	V_{EBO}	V	I_E = 10μA, I_C = 0	6		
Collector-base cut-off current	I_{CBO}	nA	V_{CB} = 30V, I_E = 0			100
Collector cut-off current	I_{CEX}	nA	V_{CE} = 30V, V_{EB} = 3V			50
Emitter-base cut-off current	I_{EBO}	nA	V_{EB} = 3V, I_C = 0			100
DC current gain	$h_{FE}1$		V_{CE} = 1V, I_C = 0.1mA	40		
	$h_{FE}2$		V_{CE} = 1V, I_C = 1mA	70		
	$h_{FE}3$		V_{CE} = 1V, I_C = 10mA	100		300
	$h_{FE}4$		V_{CE} = 1V, I_C = 50mA	60		
	$h_{FE}5$		V_{CE} = 1V, I_C = 100mA	30		
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	I_C = 10mA, I_B = 1mA			0.2
			I_C = 50mA, I_B = 5mA			0.3
Baser-emitter saturation voltage	$V_{BE(sat)}$	V	I_C = 10mA, I_B = 1mA	0.65		0.85
			I_C = 50mA, I_B = 5mA			0.95
Transition frequency	f_T	MHz	V_{CE} = 20V, I_C = 10mA, f = 100MHz	250		
Delay time	t_d	ns	V_{CC} = 3V, I_C = 10mA, V_{BE} = 0.5V, I_{B1} = 1mA			35
Rise time	t_r	ns				35
Storage time	t_s	ns	V_{CC} = 3V, I_C = 10mA, I_{B1} = - I_{B2} = 1mA			200
Fall time	t_f	ns				50

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

Fig.1 - Static Characteristic

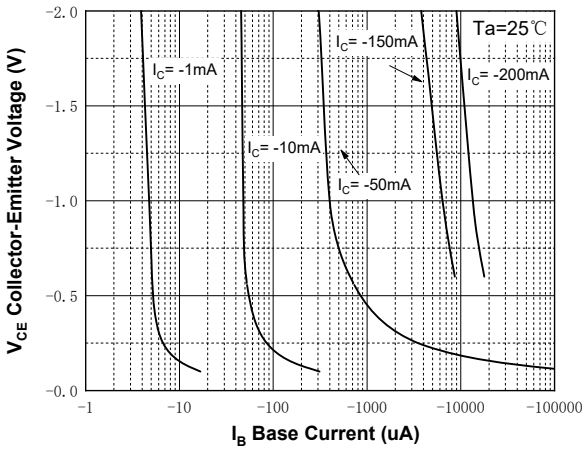


Fig.2 - DC Current Gain

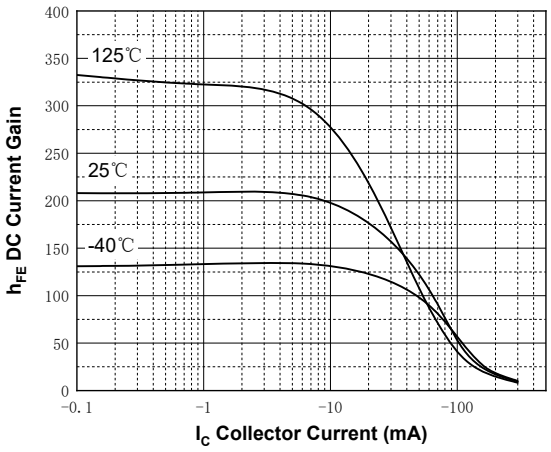


Fig.3 - Collector-Emitter Saturation Voltage

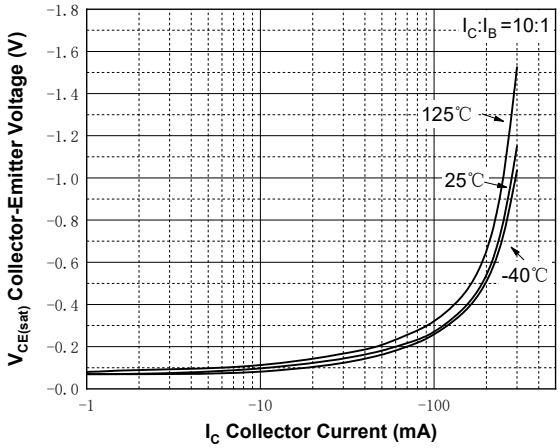


Fig.4 - Base-Emitter Saturation Voltage

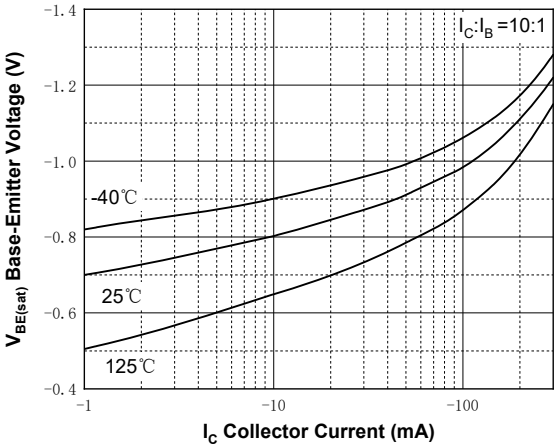
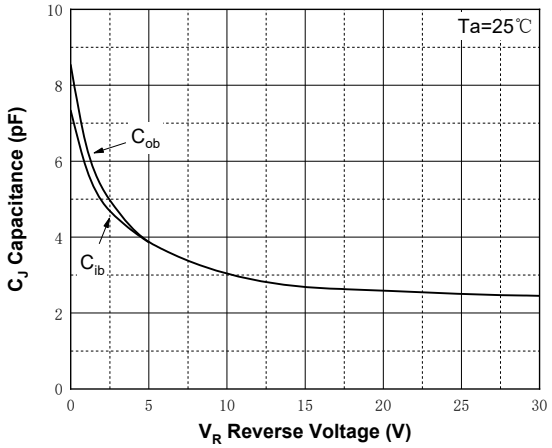


Fig.5 - Capacitance



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

Fig.1 - Static Characteristic

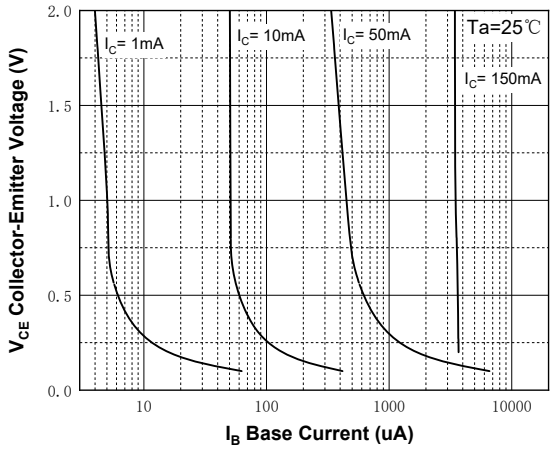


Fig.2 - DC Current Gain

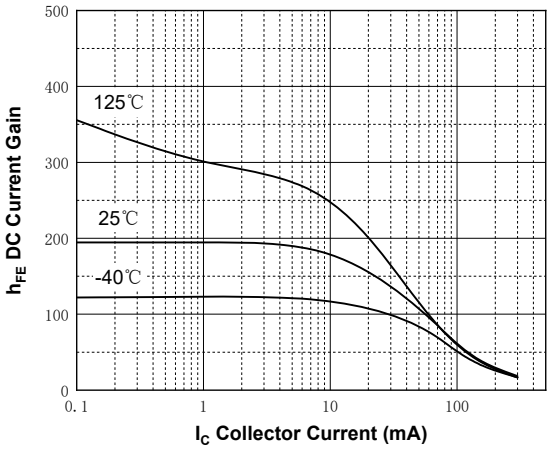


Fig.3 - Collector-Emitter Saturation Voltage

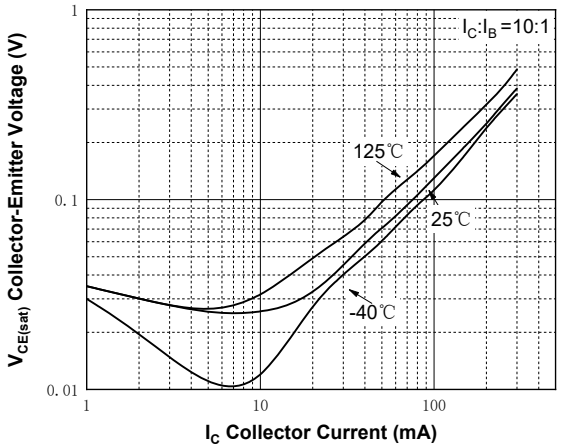


Fig.4 - Base-Emitter Saturation Voltage

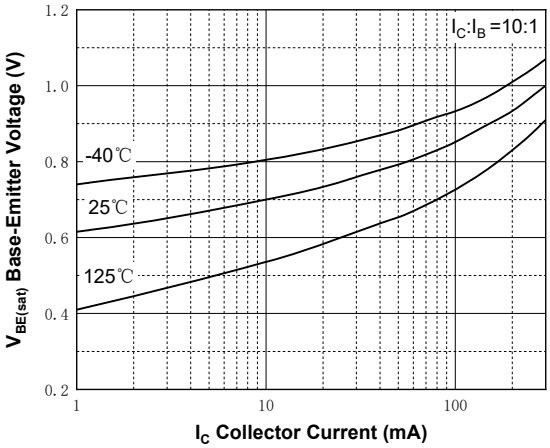
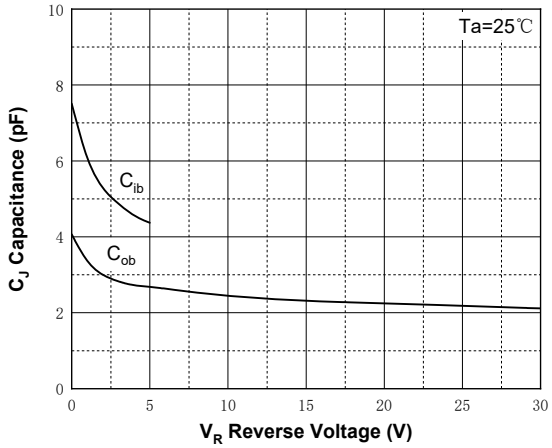
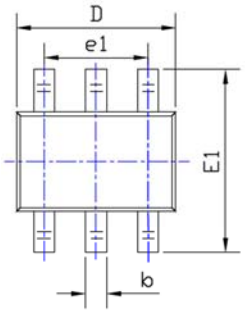


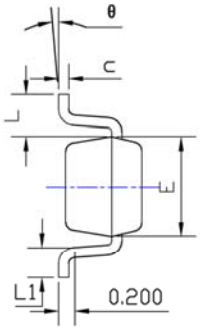
Fig.5 - Capacitance



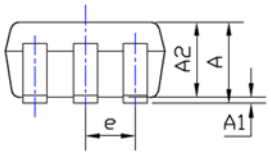
■SOT-363 Package Outline Dimensions & Soldering Footprint



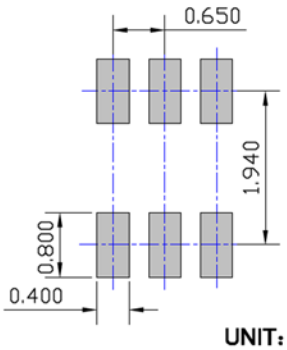
TOP VIEW



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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