

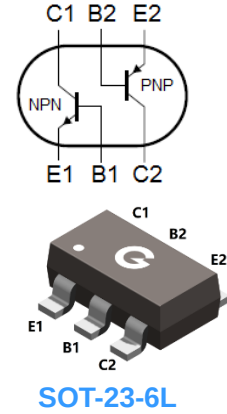
Features

- Epitaxial planar die construction
- Two internal isolated NPN/PNP transistors in one package
- Ultra-small surface mount package

HF

Mechanical Data

- Case: SOT-23-6L
- Molding compound: UL flammability classification rating 94V-0
- Terminals: Tin-plated; solderability per MIL-STD-202, Method 208



Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
MMDT2227-6L	SOT-23-6L	3000 pcs / Tape & Reel	K27

Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter	Symbol	NPN	PNP	Unit
Collector-Base Voltage	V _{CBO}	75	-60	V
Collector-Emitter Voltage	V _{CEO}	40	-60	V
Emitter-Base Voltage	V _{EBO}	6	-5	V
Collector Current (Continuous)	I _C	0.6	-0.6	A
Collector Current (Pulse)	I _{CM}	1.2	-1.2	A

Thermal Characteristics

Parameter	Symbol	Value	Unit
Power Dissipation *1	P _D	300	mW
Thermal Resistance Junction-to-Air *1	R _{θJA}	417	°C/W
Operating Junction Temperature	T _J	-55 ~ +150	°C
Storage Temperature Range	T _{STG}	-55 ~ +150	°C

Electrical Characteristics of NPN Transistor (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 10\mu\text{A}, I_E = 0$	75	-	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 10\text{mA}, I_B = 0$	40	-	-	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}	$V_{CB} = 60\text{V}, I_E = 0$	-	-	10	nA
		$V_{CB} = 60\text{V}, I_E = 0, T_J = 150^\circ\text{C}$	-	-	10	μA
Collector Cut-off Current	I_{CEX}	$V_{CE} = 60\text{V}, V_{EB(OFF)} = 3\text{V}$	-	-	10	nA
Emitter Cut-off Current	I_{EBO}	$V_{EB} = 3\text{V}, I_C = 0$	-	-	10	nA
Base Cut-off Current	I_{BL}	$V_{CE} = 60\text{V}, V_{EB(OFF)} = 3\text{V}$	-	-	20	nA
DC Current Gain	h_{FE}	$V_{CE} = 10\text{V}, I_C = 0.1\text{mA}$	35	-	-	-
		$V_{CE} = 10\text{V}, I_C = 1\text{mA}$	50	-	-	-
		$V_{CE} = 10\text{V}, I_C = 10\text{mA}$	75	-	-	-
		$V_{CE} = 10\text{V}, I_C = 150\text{mA}$	100	-	300	-
		$V_{CE} = 10\text{V}, I_C = 500\text{mA}$	40	-	-	-
		$V_{CE} = 10\text{V}, I_C = 10\text{mA}, T_J = -55^\circ\text{C}$	50	-	-	-
		$V_{CE} = 1\text{V}, I_C = 150\text{mA}$	35	-	-	-
Collector-emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 150\text{mA}, I_B = 15\text{mA}$	-	-	0.3	V
		$I_C = 500\text{mA}, I_B = 50\text{mA}$	-	-	1.0	V
Base-emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 150\text{mA}, I_B = 15\text{mA}$	0.6	-	1.2	V
		$I_C = 500\text{mA}, I_B = 50\text{mA}$	-	-	2.0	V
Transition Frequency	f_T	$V_{CE} = 20\text{V}, I_C = 20\text{mA}, f = 100\text{MHz}$	300	-	-	MHz
Output Capacitance	C_{OBO}	$V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$	-	-	8	pF
Input Capacitance	C_{ibo}	$V_{EB} = 0.5\text{V}, f = 1.0\text{MHz}, I_C = 0$	-	-	25	pF
Noise Figure	NF	$V_{CE} = 10\text{V}, f = 1.0\text{kHz}$ $I_C = 0.1\text{mA}, R_G = 1.0\text{K}\Omega$	-	-	4.0	dB
Delay Time	t_d	$V_{CC} = 30\text{V}, I_C = 150\text{mA}$	-	-	10	ns
Rise Time	t_r	$V_{BE(off)} = -0.5\text{V}, I_{B1} = 15\text{mA}$	-	-	25	ns
Storage Time	t_s	$V_{CC} = 30\text{V}, I_C = 150\text{mA}$	-	-	225	ns
Fall Time	t_f	$I_{B1} = I_{B2} = 15\text{mA}$	-	-	60	ns

Electrical Characteristics of PNP Transistor (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = -10\mu\text{A}, I_E = 0$	-60	-	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = -10\text{mA}, I_B = 0$	-60	-	-	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}	$V_{CB} = -50\text{V}, I_E = 0$	-	-	-10	nA
		$V_{CB} = -50\text{V}, I_E = 0, T_J = 125^\circ\text{C}$	-	-	-10	μA
Collector Cut-off Current	I_{CEX}	$V_{CE} = -30\text{V}, V_{EB(OFF)} = -0.5\text{V}$	-	-	-50	nA
Base Cut-off Current	I_{BL}	$V_{CE} = -30\text{V}, V_{EB(OFF)} = -0.5\text{V}$	-	-	-50	nA
DC Current Gain	h_{FE}	$V_{CE} = -10\text{V}, I_C = -0.1\text{mA}$	75	-	-	-
		$V_{CE} = -10\text{V}, I_C = -1\text{mA}$	100	-	-	-
		$V_{CE} = -10\text{V}, I_C = -10\text{mA}$	100	-	-	-
		$V_{CE} = -10\text{V}, I_C = -150\text{mA}$	100	-	300	-
		$V_{CE} = -10\text{V}, I_C = -500\text{mA}$	50	-	-	-
Collector-emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = -150\text{mA}, I_B = -15\text{mA}$	-	-	-0.4	V
		$I_C = -500\text{mA}, I_B = -50\text{mA}$	-	-	-1.6	V
Base-emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = -150\text{mA}, I_B = -15\text{mA}$	-	-	-1.3	V
		$I_C = -500\text{mA}, I_B = -50\text{mA}$	-	-	-2.6	V
Transition Frequency	f_T	$V_{CE} = -20\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$	200	-	-	MHz
Output Capacitance	C_{OBO}	$V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$	-	-	8	pF
Input Capacitance	C_{ibo}	$V_{EB} = -2\text{V}, f = 1.0\text{MHz}, I_C = 0$	-	-	30	pF
Delay Time	t_d	$V_{CC} = -30\text{V}, I_C = -150\text{mA}$ $I_{B1} = -15\text{mA}$	-	-	10	ns
Rise Time	t_r		-	-	40	ns
Storage Time	t_s	$V_{CC} = -6\text{V}, I_C = -150\text{mA}$ $I_{B1} = I_{B2} = -15\text{mA}$	-	-	80	ns
Fall Time	t_f		-	-	30	ns

Note 1: Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch

Ratings and Characteristic Curves-NPN (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

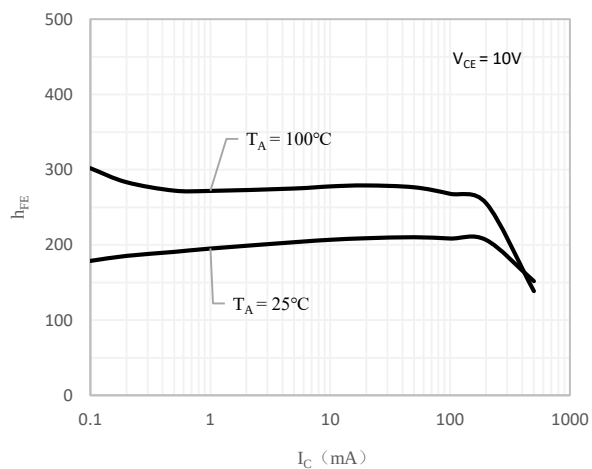


Fig 1 h_{FE} vs. I_C

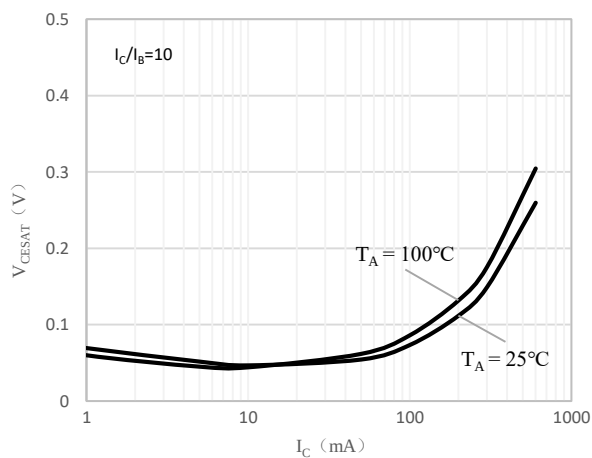


Fig 2 $V_{CE(sat)}$ vs. I_C

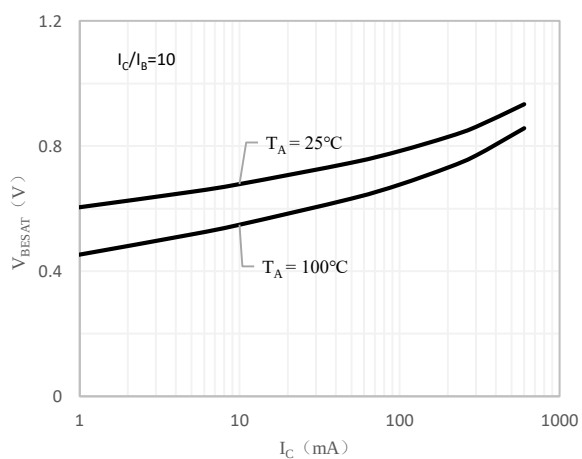


Fig 3 $V_{BE(sat)}$ vs. I_C

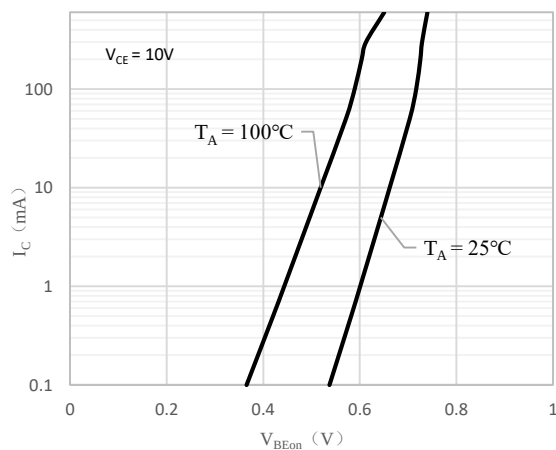


Fig 4 $V_{BE(on)}$ vs. I_C

Ratings and Characteristic Curves-PNP (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

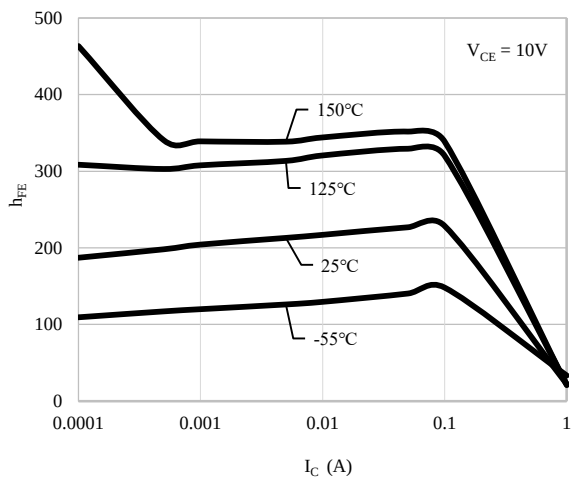


Fig 1 h_{FE} vs. I_C

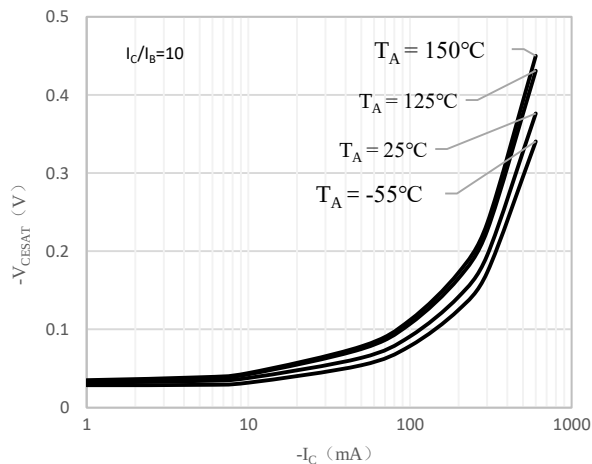


Fig 2 $V_{CE(sat)}$ vs. I_C

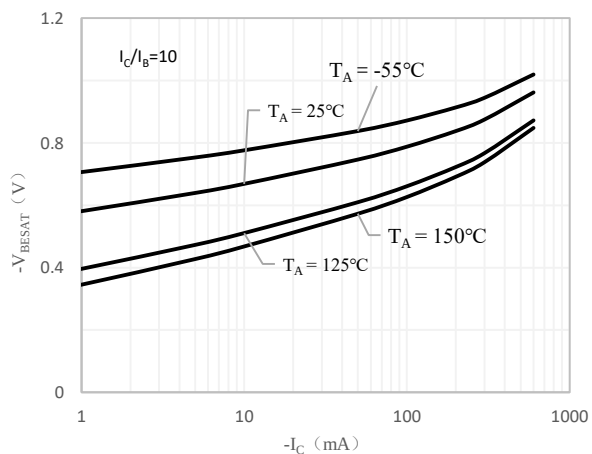


Fig 3 $V_{BE(sat)}$ vs. I_C

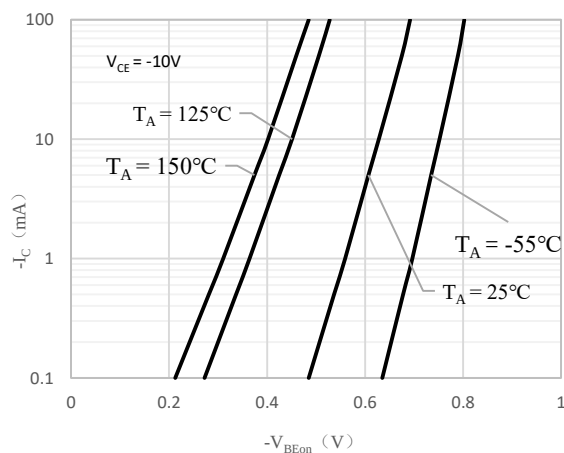
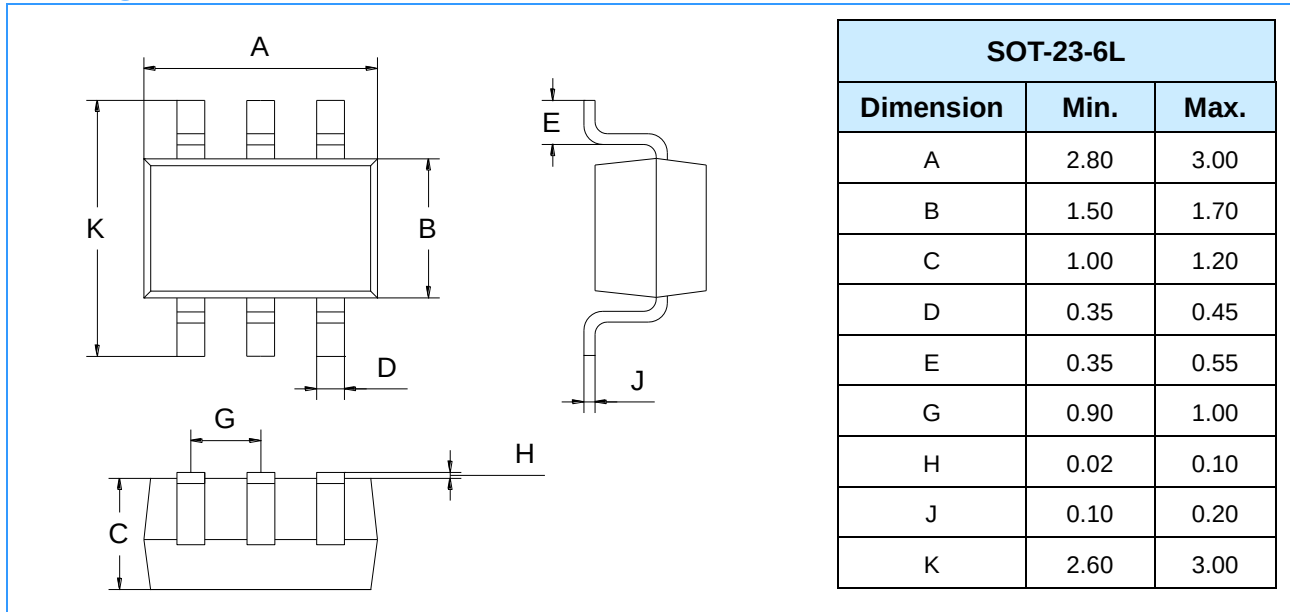
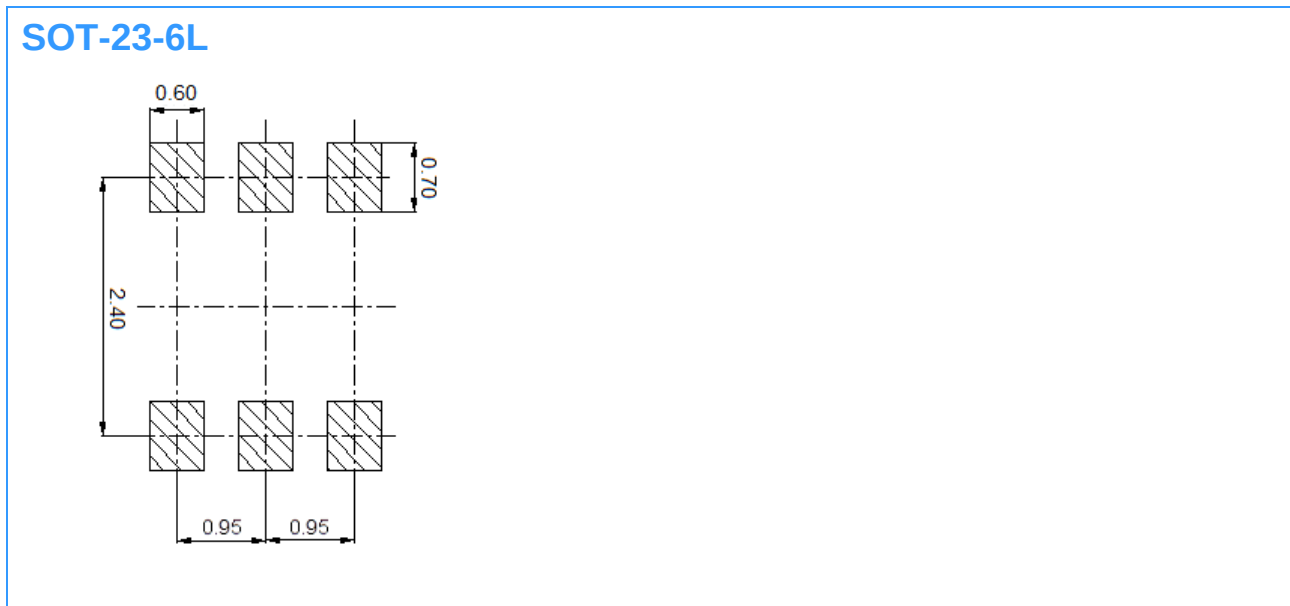


Fig 4 $V_{BE(on)}$ vs. I_C

Package Outline Dimensions (Unit: mm)



Mounting Pad Layout (Unit: mm)



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