UNISONIC TECHNOLOGIES CO., LTD

MJE13003D-P Preliminary *NPN SILICON TRANSISTOR*

# HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

■ **DESCRIPTION**

The UTC **MJE13003D-P** is a NPN Power Transistor. It is intended to be used in applications requiring medium voltage capability and high switching speeds.

■ **FEATURES**

* Fast-Switching And High Voltage Capability
* Dynamic Parameters With Low Spread
* High Reliability
* Integrated Antiparallel Collector-Emitter Diode
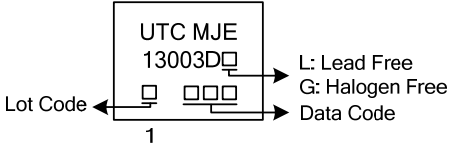

TO-92

■ **INTERNAL SCHEMATIC DIAGRAM**

C (2)

B (1)

E (3)
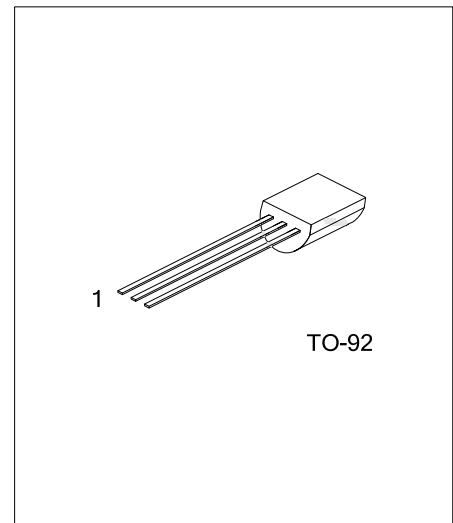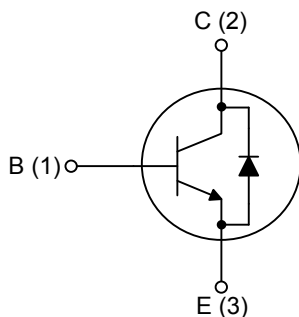
■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
MJE13003DL-P-x-T92-B	MJE13003DG-P-x-T92-B	TO-92	E	C	B	Tape Box
MJE13003DL-P-x-T92-K	MJE13003DG-P-x-T92-K	TO-92	E	C	B	Bulk

Note: Pin Assignment: C: Collector   B: Base   E: Emitter

MJE13003L-P-x-T92-K

—— (1)Packing Type
—— (2)Package Type
—— (3)Rank
—— (4)Green Package

(1) B: Tape Box, K: Bulk

(2) T92: TO-92

(3) x: refer to Classification of h_{FE1}

(4) L: Lead Free, G: Halogen Free and Lead Free

■ **MARKING**

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                UTC MJE
                13003D□ ──────▶ L: Lead Free
                                 G: Halogen Free
Lot Code ◀───   □   □□□  ─────▶ Data Code
                  1
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MJE13003D-P   **Preliminary**   *NPN SILICON TRANSISTOR*

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

PARAMETER		SYMBOL	RATINGS	UNIT
Collector- Emitter Voltage (V_{BE}=0)		V_{CES}	700	V
Collector-Emitter Voltage (I_B=0)		V_{CEO}	400	V
Emitter-Base Voltage (I_C=0, I_B=0.75A, t_P<10µS)		V_{EBO}	9	V
Collector Current		I_C	1.5	A
Collector Peak Current (t_P<5ms)		I_{CM}	3	A
Base Current		I_B	0.75	A
Base Peak Current (t_P<5ms)		I_{BM}	1.5	A
Power Dissipation	T_A=25°C	P_D	1.1	W
	T_C=25°C		1.5	W
Junction Temperature		T_J	150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Note: 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.

■ **ELECTRICAL CHARACTERISTICS** (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Emitter-Base Breakdown Voltage		BV_{EBO}	I_E=10mA, I_C=0	9		18	V
Collector-Emitter Sustaining Voltage (Note)		$V_{CEO(SUS)}$	I_C=10mA, I_B=0	450			V
Collector Cut-Off Current		I_{CES}	V_{CE}=700V, V_{BE}=0			1	mA
Collector-Emitter Saturation Voltage (Note)		$V_{CE(SAT)}$	I_C=0.5 A, I_B=0.1 A			0.5	V
			I_C=1 A, I_B=0.25 A			1	V
			I_C=1.5 A, I_B=0.5 A			3	V
Base-Emitter Saturation Voltage (Note)		$V_{BE(SAT)}$	I_C=0.5 A, I_B=0.1 A			1	V
			I_C=1 A, I_B=0.25 A			1.2	V
DC Current Gain		h_{FE1}	I_C=0.4A, V_{CE}=5 V	14		57	
		h_{FE2}	I_C=1 A, V_{CE}=5 V	5		30	
Resistive Load	Rise Time	t_R	V_{CC}=125 V, I_C=1 A,			1	µs
	Storage Time	t_S	I_{B1}=0.2 A, I_{B2}=-0.2 A			4	µs
	Fall Time	t_F	t_P=25µs			0.7	µs
Inductive Load Storage Time		t_S	I_C=1 A, I_{B1}=0.2 A, V_{BE}=-5 V, L=50mH, V_{CLAMP}=300V		0.8		µs
Diode Forward Voltage		V_F	I_F=0.5 A			1.5	V

Note: Pulse Test: Pulse duration≤300µs, Duty cycle≤2 %

■ **CLASSIFICATION OF h$_{FE1}$**

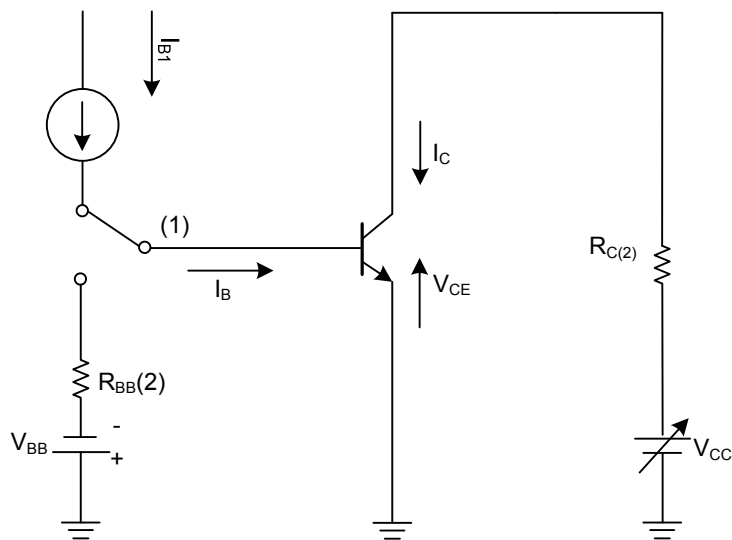| RANK	A	B	C	D	E	F	G	H
RANGE	14 ~ 22	21 ~ 27	26 ~ 32	31 ~ 37	36 ~ 42	41 ~ 47	46 ~ 52	51 ~ 57

■ **TEST CIRCURTS**

Inductive Load Switching Test Circuit
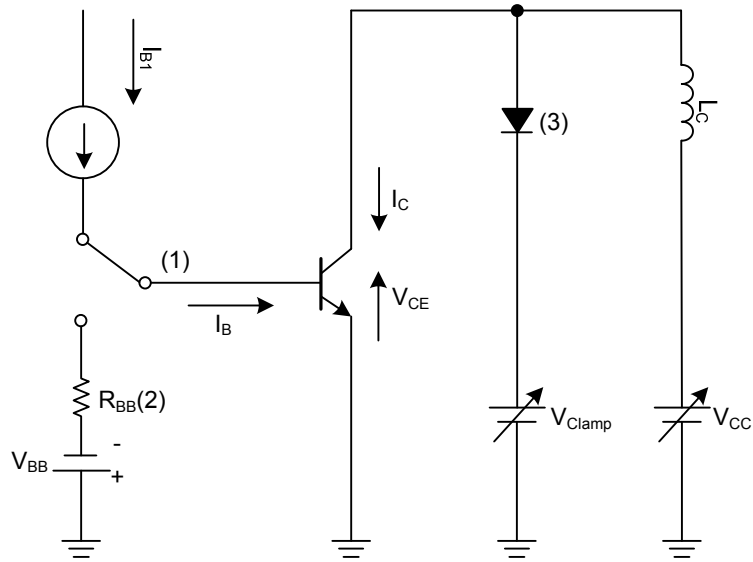
Notes: 1. Fast Electronic Switch
2. Non-Inductive Resistor
3. Fast Recovery Rectifier

Resistive Load Switching Test Circuit

Notes: 1. Fast Electronic Switch
2. Non-Inductive Resistor