



MJE13003D

Preliminary

NPN SILICON TRANSISTOR

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

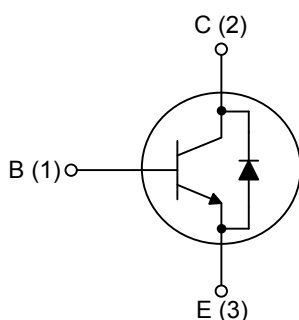
■ DESCRIPTION

The UTC **MJE13003D** 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

■ INTERNAL SCHEMATIC DIAGRAM



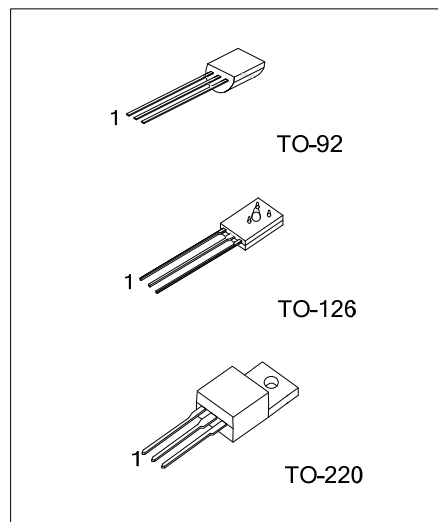
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
MJE13003DL-T60-K	MJE13003DG-T60-K	TO-126	B	C	E	Bulk
MJE13003DL-T92-B	MJE13003DG-T92-B	TO-92	B	C	E	Tape Box
MJE13003DL-T92-K	MJE13003DG-T92-K	TO-92	B	C	E	Bulk
MJE13003DL-T92-R	MJE13003DG-T92-R	TO-92	B	C	E	Tape Reel
MJE13003DL-TA3-T	MJE13003DG-TA3-T	TO-220	B	C	E	Tube

MJE13003DL-T60-K

- (1) Packing Type
- (2) Package Type
- (3) Lead Free

- (1) B: Tape Box, K: Bulk, R: Tape Reel, T: Tube
- (2) T60: TO-126, T92: TO-92, TA3: TO-220
- (3) G: Halogen Free, L: Lead Free



■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$, 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 ($I_C=0$, $I_B=0.75\text{A}$, $t_P<10\mu\text{S}$)		V_{EBO}	9	V
Collector Current		I_C	1.5	A
Collector Peak Current ($t_P<5\text{ms}$)		I_{CM}	3	A
Base Current		I_B	0.75	A
Base Peak Current ($t_P<5\text{ms}$)		I_{BM}	1.5	A
Power Dissipation ($T_C=25^\circ\text{C}$)	TO-126	P_D	40	W
	TO-92		30	
	TO-220		70	
Junction Temperature		T_J	150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^\circ\text{C}$

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.

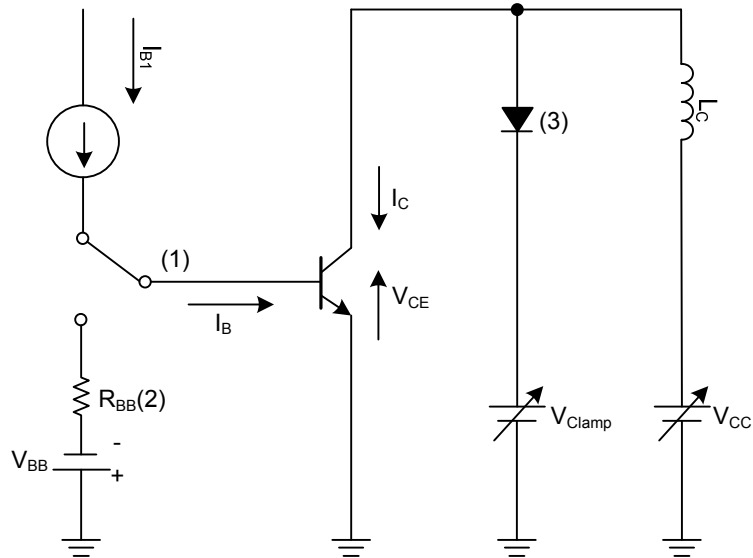
■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Emitter-Base Breakdown Voltage		BV_{EBO}	$I_E=10\text{mA}$, $I_C=0$	9		18	V
Collector-Emitter Sustaining Voltage (Note)		$V_{CEO(SUS)}$	$I_C=10\text{mA}$, $I_B=0$	400			V
Collector Cut-Off Current		I_{CES}	$V_{CE}=700\text{V}$, $V_{BE}=0$			1	mA
Collector-Emitter Saturation Voltage (Note)	$V_{CE(SAT)}$		$I_C=0.5\text{A}$, $I_B=0.1\text{A}$			0.5	V
			$I_C=1\text{A}$, $I_B=0.25\text{A}$			1	V
			$I_C=1.5\text{A}$, $I_B=0.5\text{A}$			3	V
Base-Emitter Saturation Voltage (Note)	$V_{BE(SAT)}$		$I_C=0.5\text{A}$, $I_B=0.1\text{A}$			1	V
			$I_C=1\text{A}$, $I_B=0.25\text{A}$			1.2	V
DC Current Gain	h_{FE}		$I_C=0.5\text{A}$, $V_{CE}=5\text{V}$	8		51	
			$I_C=1\text{A}$, $V_{CE}=5\text{V}$	5		30	
Resistive Load	Rise Time	t_R	$V_{CC}=125\text{V}$, $I_C=1\text{A}$, $I_{B1}=0.2\text{A}$, $I_{B2}=-0.2\text{A}$ $t_P=25\mu\text{s}$			1	μs
	Storage Time	t_S				4	μs
	Fall Time	t_F				0.7	μs
Inductive Load Storage Time		t_S	$I_C=1\text{A}$, $I_{B1}=0.2\text{A}$, $V_{BE}=-5\text{V}$, $L=50\text{mH}$, $V_{CLAMP}=300\text{V}$		0.8		μs
Diode Forward Voltage		V_F	$I_F=0.5\text{A}$			1.5	V

Note: Pulse Test: Pulse duration $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

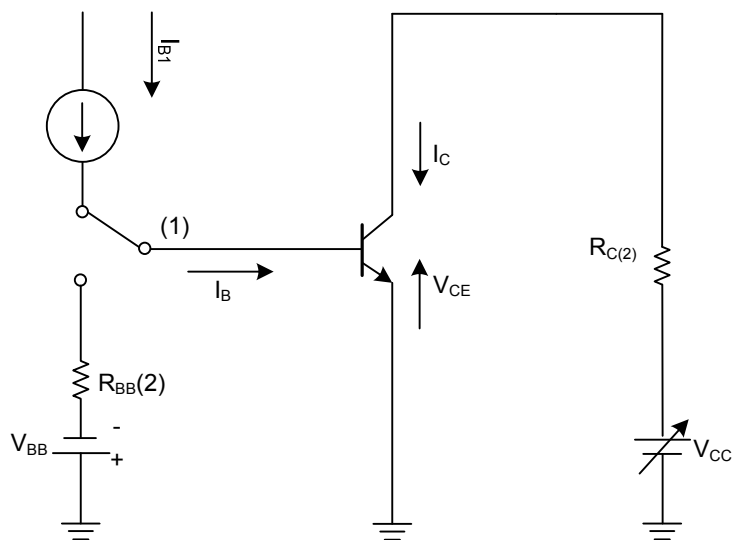
■ TEST CIRCUITS

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

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