



## MJE13003D

Preliminary

**NPN SILICON TRANSISTOR**

### HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

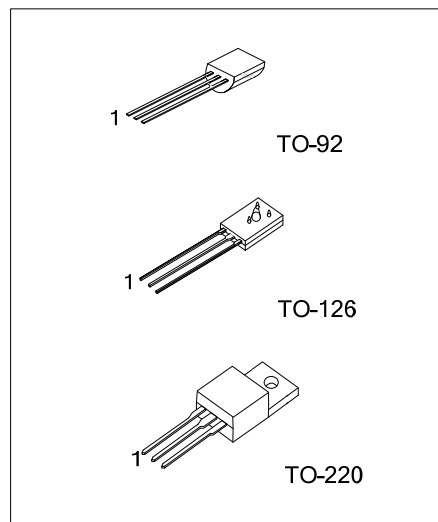
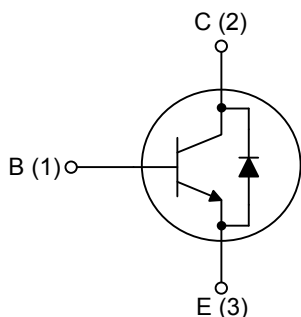
#### DESCRIPTION

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

<p>MJE13003DL-T60-K</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p>	<p>(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</p>
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■ 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.

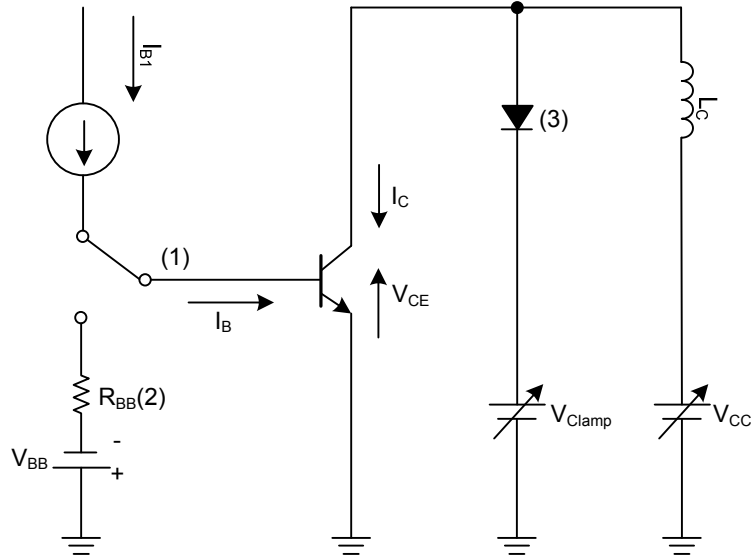
■ ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Emitter-Base Breakdown Voltage		$V_{EBO}$	$I_E=10\text{mA}, I_C=0$	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	$t_R$	$V_{CC}=125\text{V}, I_C=1\text{A}, I_{B1}=0.2\text{A}, I_{B2}=-0.2\text{A}$			1	$\mu\text{s}$
	Storage Time	$t_S$				4	$\mu\text{s}$
	Fall Time	$t_F$				0.7	$\mu\text{s}$
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		$\mu\text{s}$
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 $\leq 2\%$

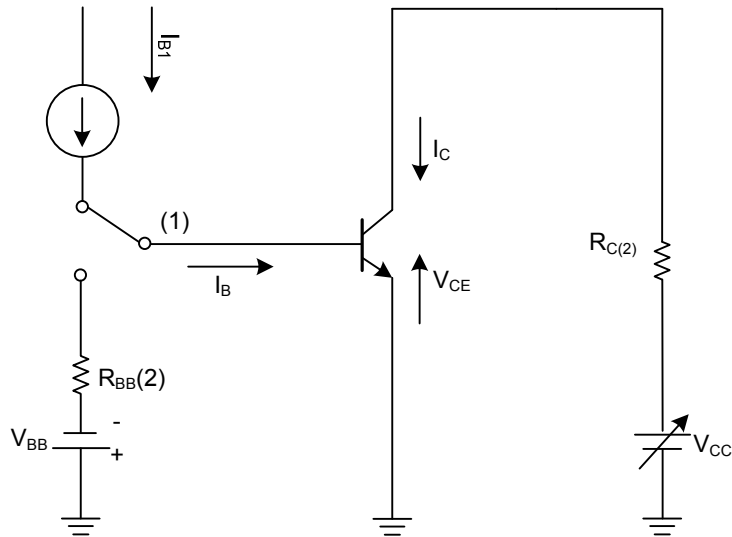
■ TEST CIRCUITS

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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