



## MJE13003D-P

Preliminary

**NPN SILICON TRANSISTOR**

### HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

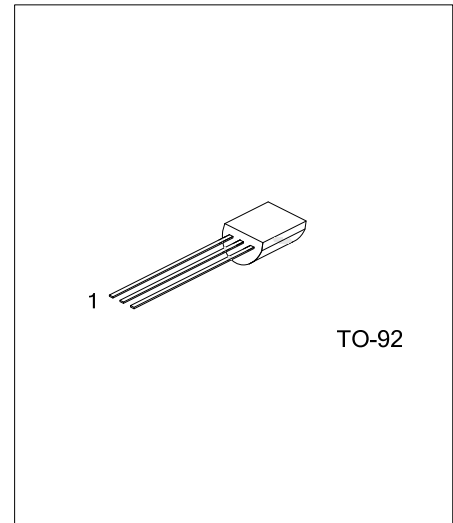
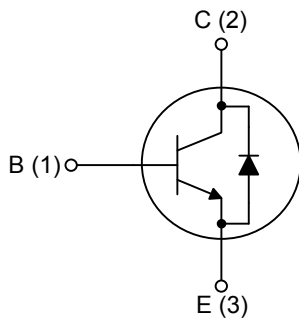
#### DESCRIPTION

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

#### INTERNAL SCHEMATIC DIAGRAM



#### 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
MJE13003DL-P-x-T92-R	MJE13003DG-P-x-T92-R	TO-92	E	C	B	Tape Reel

<p>MJE13003L-P-x-T92-K</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Rank</li> <li>(4) Lead Free</li> </ul>	<ul style="list-style-type: none"> <li>(1) B: Tape Box, K: Bulk, R: Tape Reel</li> <li>(2) T92: TO-92</li> <li>(3) x: refer to Classification of <math>h_{FE1}</math></li> <li>(4) L: Lead Free, G: Halogen Free</li> </ul>
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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	$P_D$	$T_A=25^\circ\text{C}$	1.1	W
		$T_C=25^\circ\text{C}$	1.5	W
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)	$V_{CEO(SUS)}$	$I_C=10\text{mA}, I_B=0$	450			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	$h_{FE1}$	$I_C=0.4\text{A}, V_{CE}=5\text{V}$	14		57	
	$h_{FE2}$	$I_C=1\text{A}, V_{CE}=5\text{V}$	5		30	
Resistive Load	Rise Time	$V_{CC}=125\text{V}, I_C=1\text{A}, I_{B1}=0.2\text{A}, I_{B2}=-0.2\text{A}, t_P=25\mu\text{s}$			1	$\mu\text{s}$
	Storage Time				4	$\mu\text{s}$
	Fall Time				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

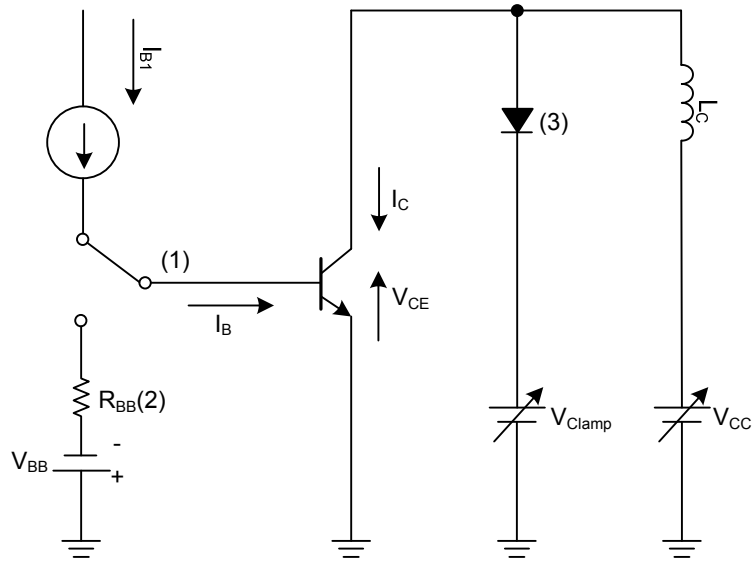
Note: Pulse Test: Pulse duration $\leq 300\mu\text{s}$ , Duty cycle $\leq 2\%$

■ 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

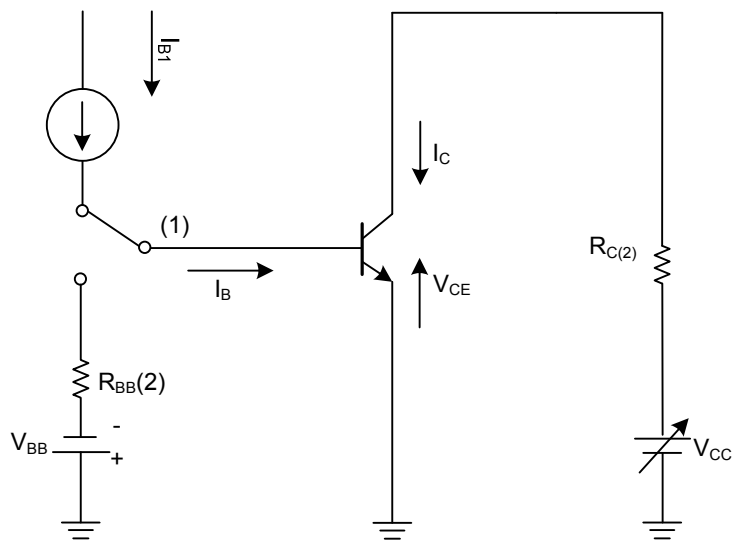
■ TEST CIRCUITS

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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