



MJE13003D

NPN SILICON TRANSISTOR

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

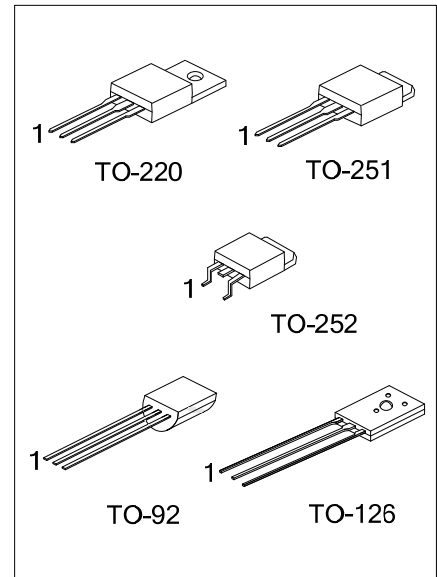
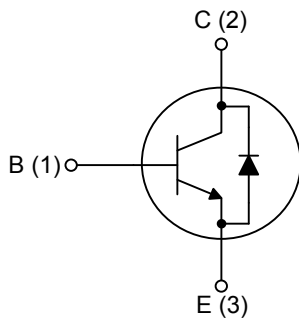
DESCRIPTION

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-x-T60-K	MJE13003DG-x-T60-K	TO-126	B	C	E	Bulk
MJE13003DL-x-TA3-T	MJE13003DG-x-TA3-T	TO-220	B	C	E	Tube
MJE13003DL-x-TM3-T	MJE13003DG-x-TM3-T	TO-251	B	C	E	Tube
MJE13003DL-x-TN3-R	MJE13003DG-x-TN3-R	TO-252	B	C	E	Tape Reel
MJE13003DL-x-T92-B	MJE13003DG-x-T92-B	TO-92	B	C	E	Tape Box
MJE13003DL-x-T92-K	MJE13003DG-x-T92-K	TO-92	B	C	E	Bulk
MJE13003DL-x-T92-A-B	MJE13003DG-x-T92-A-B	TO-92	E	C	B	Tape Box
MJE13003DL-x-T92-A-K	MJE13003DG-x-T92-A-K	TO-92	E	C	B	Bulk

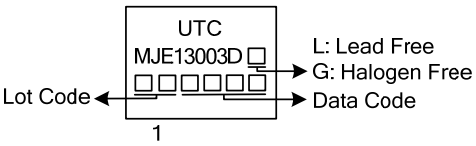
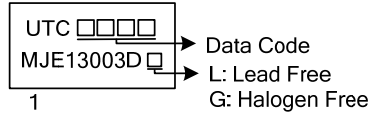
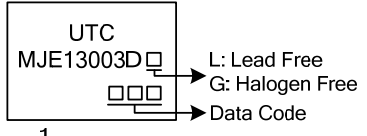
Note: Pin Assignment: E: Emitter B: Base C: Collector

<p>MJE13003DL-x-T92-A-B</p> <p>(1) Packing Type (2) Pin Assignment (3) Package Type (4) Rank (5) Green Package</p>	<p>(1) T: Tube, B: Tape Box, K: Bulk, R: Tape Reel (2) refer to Pin Assignment (for TO-92) (3) TA3: TO-220, TM3: TO-251, TN3: TO-252, T60: TO-126, T92: TO-92 (4) refer to Classification of h_{FE1} (5) L: Lead Free, G: Halogen Free and Lead Free</p>
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NPN SILICON TRANSISTOR

MARKING

PACKAGE	MARKING
TO-220 / TO-251 / TO-252	 <p>UTC MJE13003D Lot Code → [] [] [] [] → Data Code 1</p> <p>L: Lead Free G: Halogen Free</p>
TO-126	 <p>UTC [] [] [] → Data Code MJE13003D → L: Lead Free 1 → G: Halogen Free</p>
TO-92	 <p>UTC MJE13003D → L: Lead Free [] [] → Data Code 1 → G: Halogen Free</p>

■ 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	$T_A=25^\circ\text{C}$	TO-126	P_D	1.4	W
		TO-92		1.1	W
		TO-220		2	W
		TO-251/TO-252		1.56	W
	$T_C=25^\circ\text{C}$	TO-126		20	W
		TO-92		1.5	W
		TO-220		40	W
		TO-251/TO-252		25	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)		$V_{CEO(SUS)}$	$I_C=10\text{mA}, I_B=0$	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_{FE1}	$I_C=0.5\text{A}, V_{CE}=5\text{V}$	14		57	
			$I_C=1\text{A}, V_{CE}=5\text{V}$	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

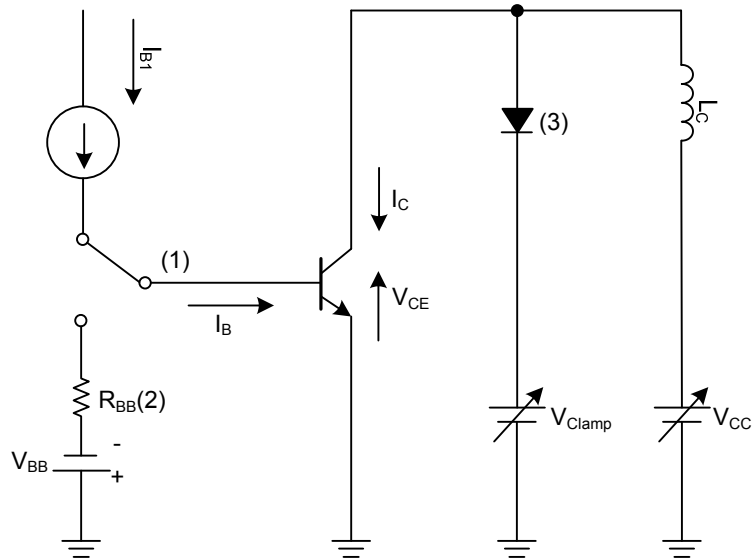
Note: Pulse Test: Pulse duration $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

■ 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

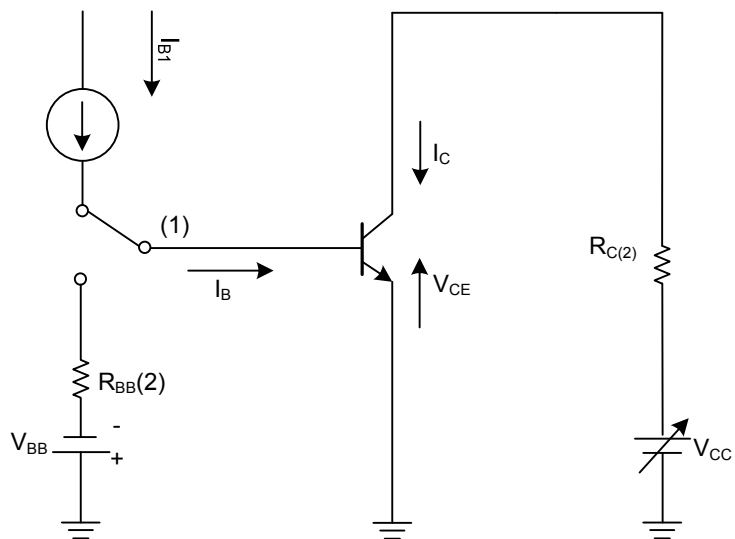
■ TEST CIRCUITS

Inductive Load Switching Test Circuit



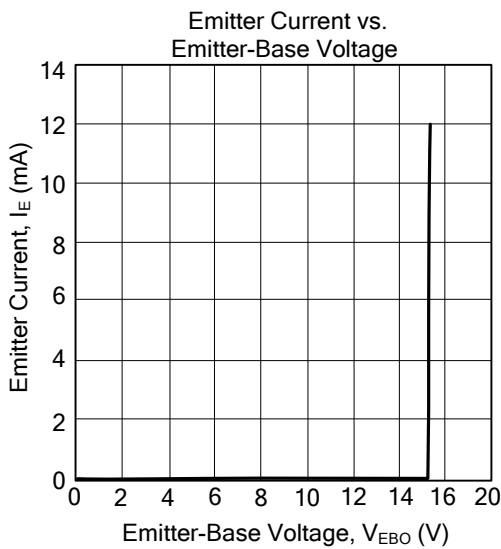
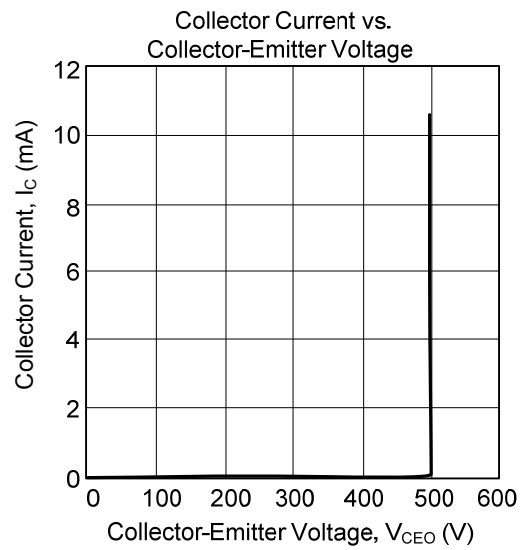
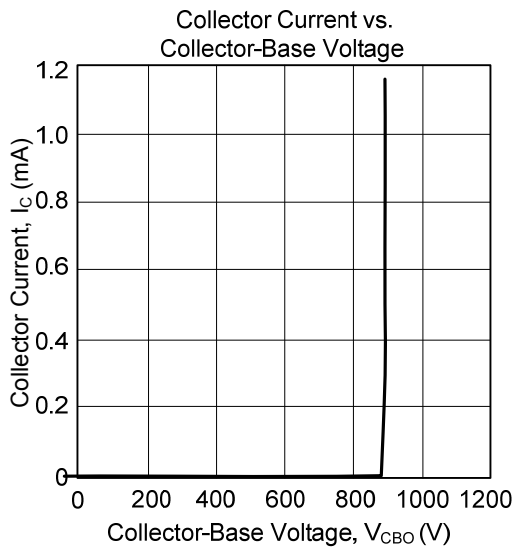
- Notes: 1. Fast Electronic Switch
 2. Non-Inductive Resistor
 3. Fast Recovery Rectifier

Resistive Load Switching Test Circuit



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

TYPICAL CHARACTERISTICS



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