



MJE13003D

NPN SILICON TRANSISTOR

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

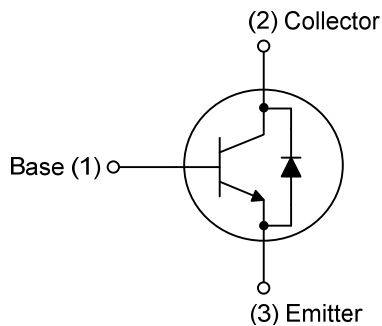
DESCRIPTION

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

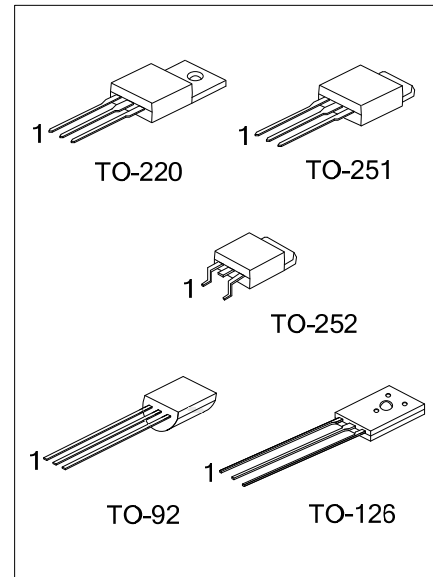


ORDERING INFORMATION

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

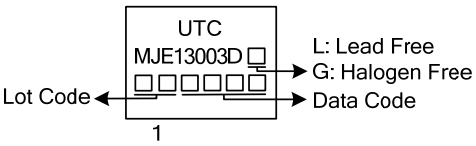
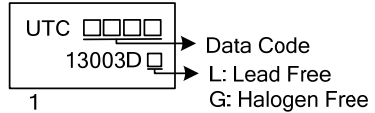
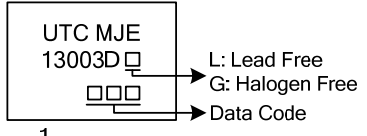
<p>MJE13003DG-x-T92-A-B</p> <ul style="list-style-type: none"> (1) Packing Type (2) Pin Assignment (3) Package Type (4) Rank (5) Green Package 	<ul style="list-style-type: none"> (1) T: Tube, B: Tape Box, K: Bulk, R: Tape Reel (2) refer to Pin Assignment (for TO-92) (3) TA3: TO-220, TM3: TO-251, TN3: TO-252, T60: TO-126, T92: TO-92 (4) refer to Classification of h_{FE1} (5) G: Halogen Free and Lead Free, L: Lead Free
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MJE13003D

NPN SILICON TRANSISTOR

MARKING

PACKAGE	MARKING
TO-220 / TO-251 / TO-252	
TO-126	
TO-92	

■ 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	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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	$^\circ\text{C/W}$
	TO-251		80.13	$^\circ\text{C/W}$
	TO-126		89.29	$^\circ\text{C/W}$
	TO-92		113.64	$^\circ\text{C/W}$
Junction to Case	TO-220	θ_{JC}	0.63	$^\circ\text{C/W}$
	TO-251		1.0	$^\circ\text{C/W}$
	TO-126		1.25	$^\circ\text{C/W}$
	TO-92		16.67	$^\circ\text{C/W}$

■ 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	400			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 =0.5A, 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, I _{B1} =0.2 A, I _{B2} =-0.2 A, t _p =25μs			1	μs
	Storage Time	t _S				4	μs
	Fall Time	t _F				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

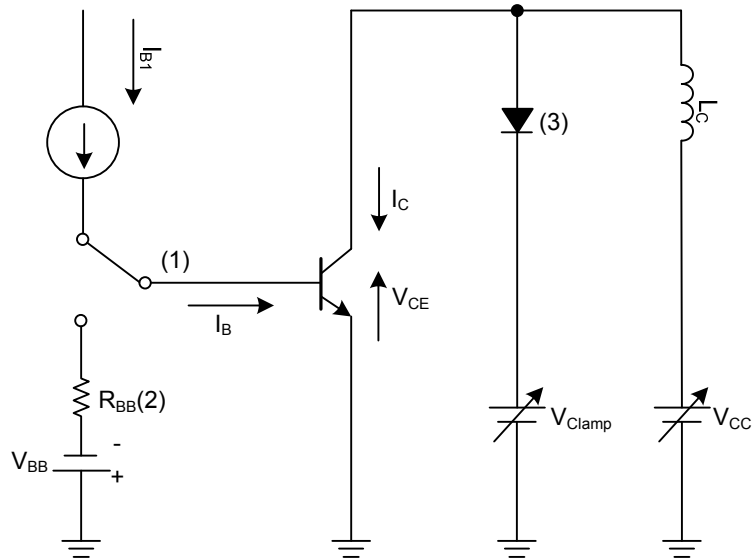
Note: Pulse Test: Pulse duration ≤ 300μs, Duty cycle ≤ 2%.

■ 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

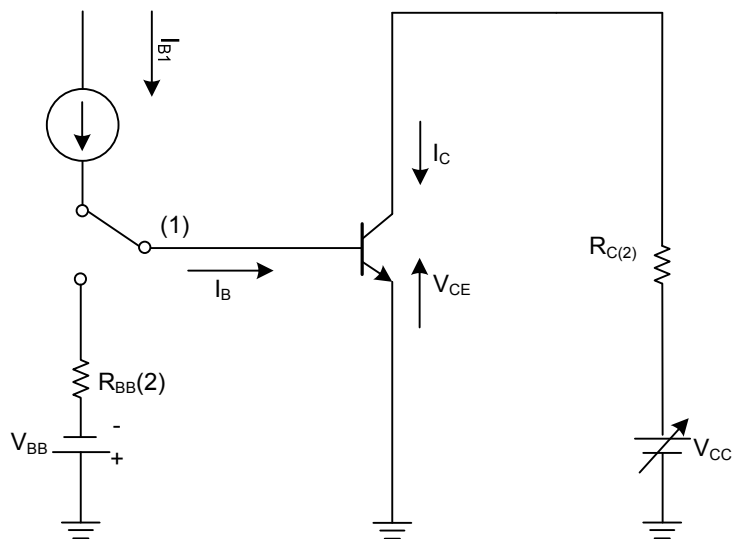
■ TEST CIRCUITS

Inductive Load Switching Test Circuit



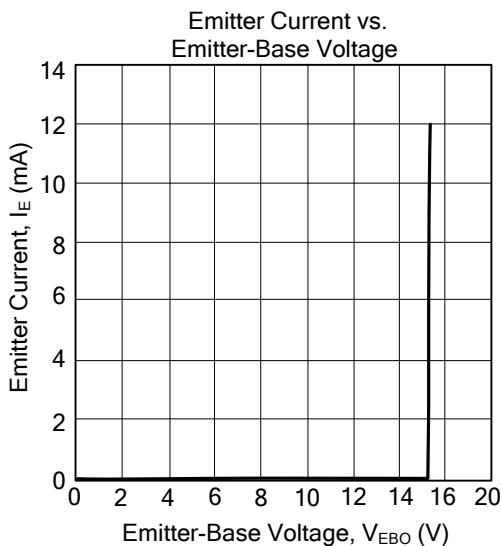
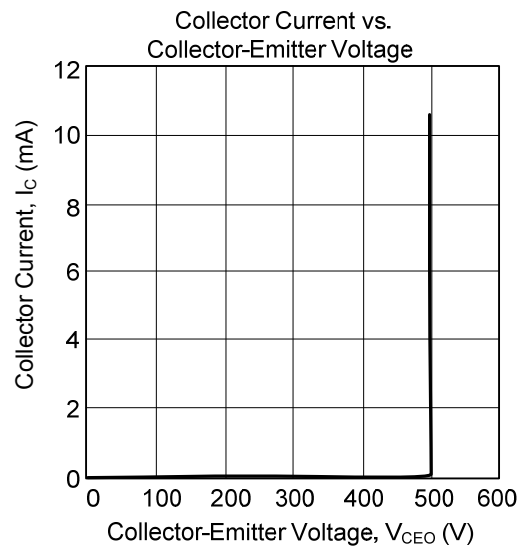
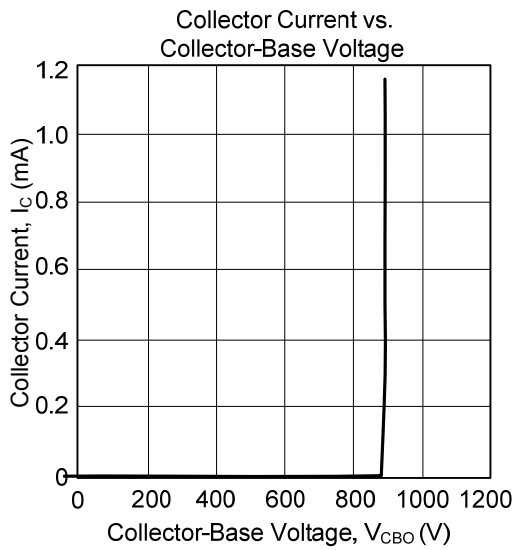
- Notes: 1. Fast Electronic Switch
 2. Non-Inductive Resistor
 3. Fast Recovery Rectifier

Resistive Load Switching Test Circuit



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

TYPICAL CHARACTERISTICS



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