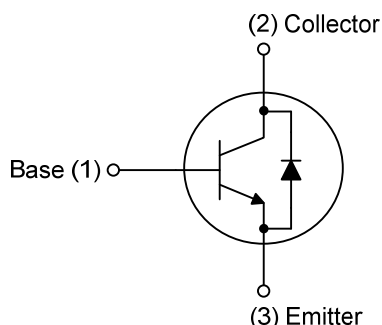


**MJE13003D****NPN SILICON TRANSISTOR****HIGH VOLTAGE
FAST-SWITCHING NPN
POWER TRANSISTOR****DESCRIPTION**

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

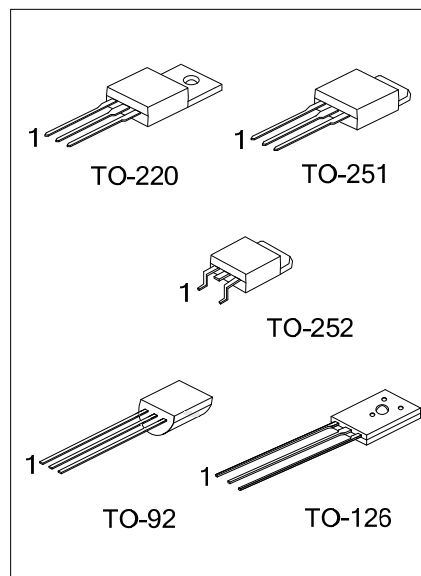
- * Fast-Switching And High Voltage Capability
- * Dynamic Parameters With Low Spread
- * High Reliability
- * Integrated Antiparallel Collector-Emitter Diode

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

	(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



MJE13003D

NPN SILICON TRANSISTOR

MARKING

PACKAGE	MARKING
TO-220 / TO-251 / TO-252	UTC MJE13003D [][][][][] 1 Lot Code ← [] → Data Code L: Lead Free G: Halogen Free
TO-126	UTC [][][] 13003D [] 1 → Data Code → L: Lead Free → G: Halogen Free
TO-92	UTC MJE 13003D [] [][] 1 → L: Lead Free → G: Halogen Free → Data Code

■ 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 ($I_C=0$, $I_B=0.75A$, $t_P<10\mu S$)			V_{EBO}	9	V
Collector Current			I_C	1.5	A
Collector Peak Current ($t_P<5ms$)			I_{CM}	3	A
Base Current			I_B	0.75	A
Base Peak Current ($t_P<5ms$)			I_{BM}	1.5	A
Power Dissipation	$T_A=25^{\circ}C$	TO-126	P_D	1.4	W
		TO-92		1.1	W
		TO-220		2	W
		TO-251/TO-252		1.56	W
	$T_C=25^{\circ}C$	TO-126		20	W
		TO-92		1.5	W
		TO-220		40	W
		TO-251/TO-252		25	W
Junction Temperature			T_J	150	$^{\circ}C$
Storage Temperature			T_{STG}	-55 ~ +150	$^{\circ}C$

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

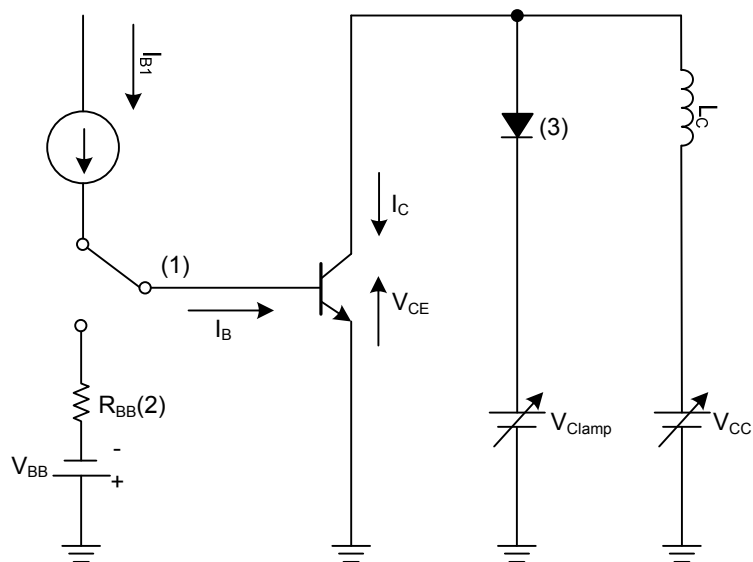
Note: Pulse Test: Pulse duration ≤ 300μs, Duty cycle ≤ 2%.

■ 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

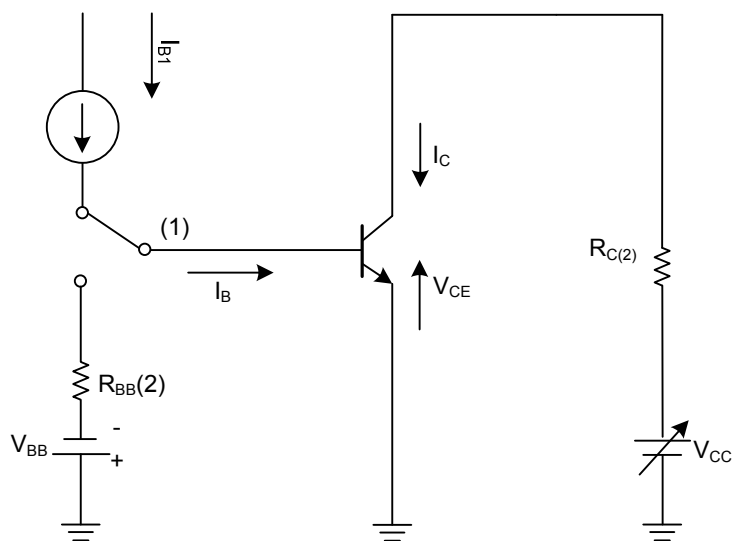
■ TEST CIRCURTS

Inductive Load Switching Test Circuit



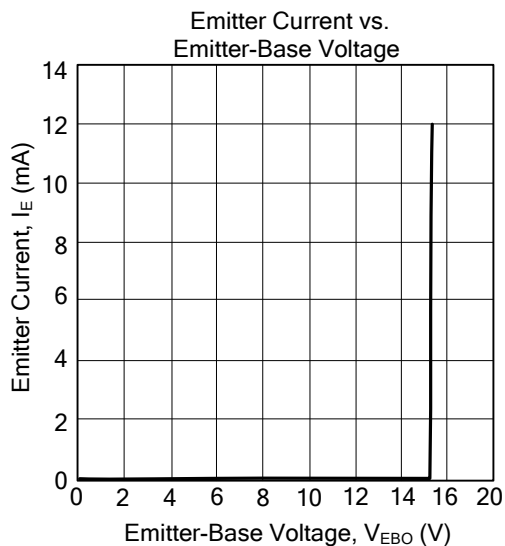
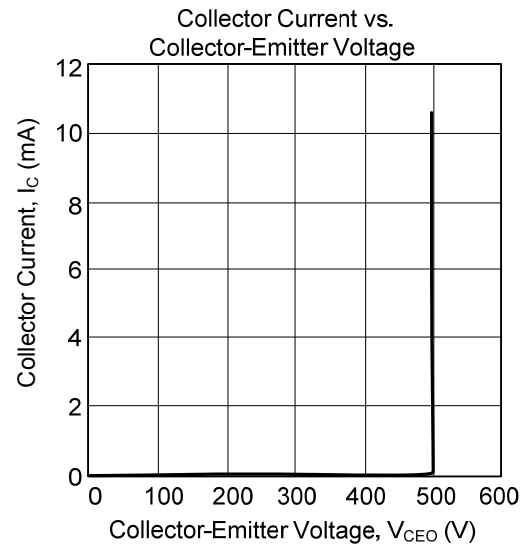
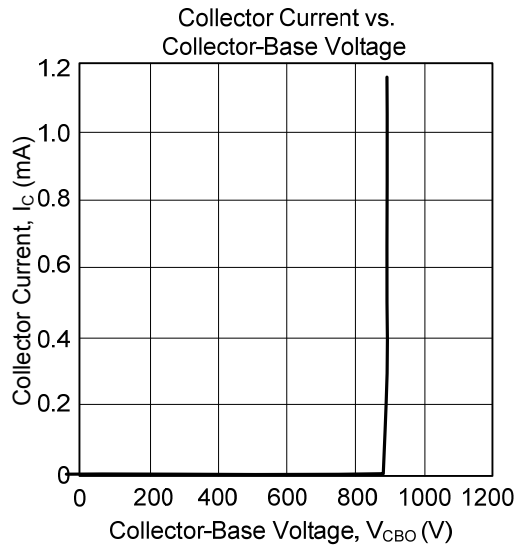
Notes: 1. Fast Electronic Switch
2. Non-Inductive Resistor
3. Fast Recovery Rectifier

Resistive Load Switching Test Circuit



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

■ TYPICAL CHARACTERISTICS



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