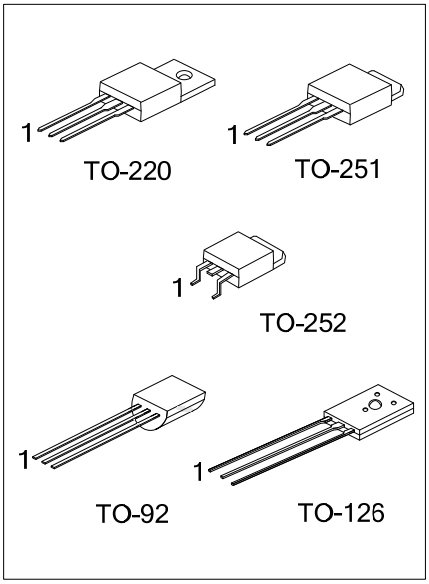
MJE13003D

NPN SILICON TRANSISTOR

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR



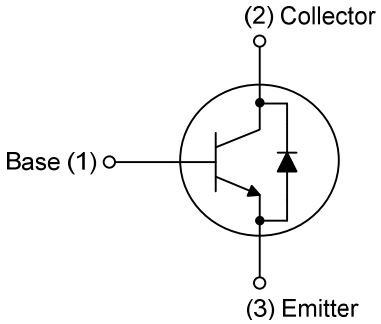
■ DESCRIPTION

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

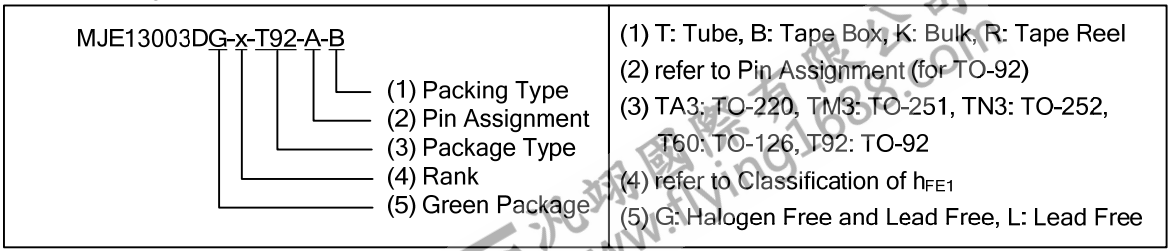
■ INTERNAL SCHEMATIC DIAGRAM



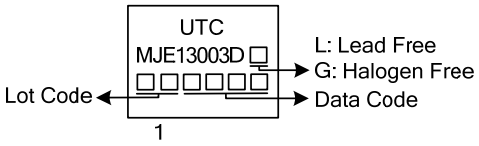
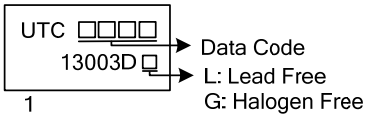
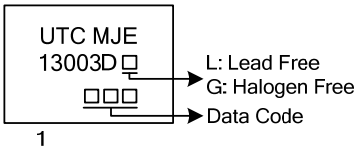
■ ORDERING INFORMATION

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



■ MARKING

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

■ ABSOLUTE MAXIMUM RATINGS (T_A=25°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<10μS)			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°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°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	°C
Storage Temperature			T_{STG}	-55 ~ +150	°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	°C/W
	TO-251		80.13	°C/W
	TO-126		89.29	°C/W
	TO-92		113.64	°C/W
Junction to Case	TO-220	θ_{JC}	0.63	°C/W
	TO-251		1.0	°C/W
	TO-126		1.25	°C/W
	TO-92		16.67	°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

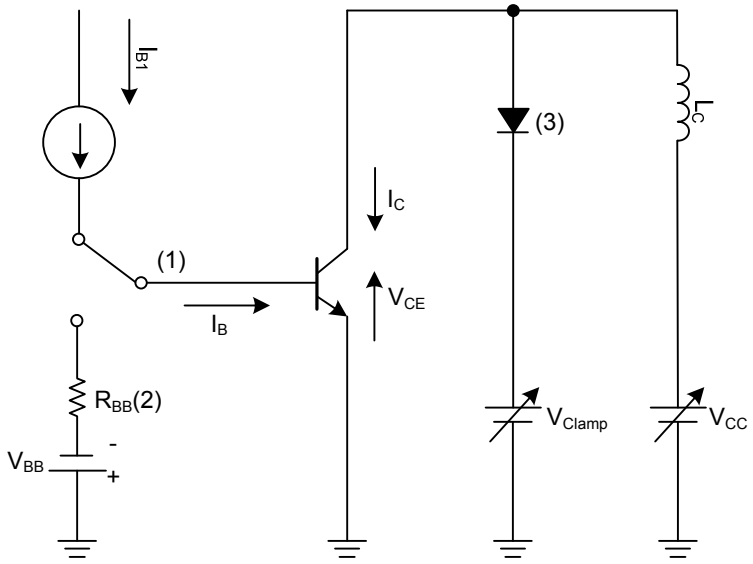
Note: Pulse Test: Pulse duration ≤ 300μs, Duty cycle ≤ 2%.

■ 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

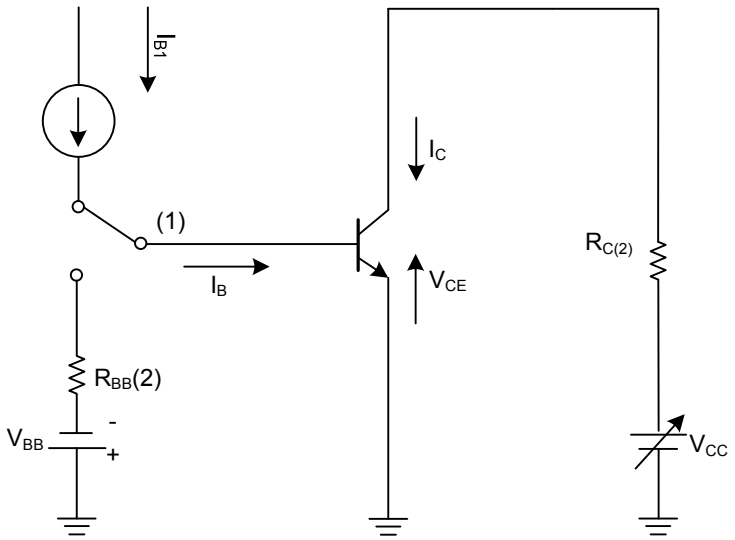
■ TEST CIRCURTS

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