

## MJE13007

### SILICON NPN SWITCHING TRANSISTOR

- SGS-THOMSON PREFERRED SALESTYPE
- NPN TRANSISTOR
- HIGH CURRENT CAPABILITY

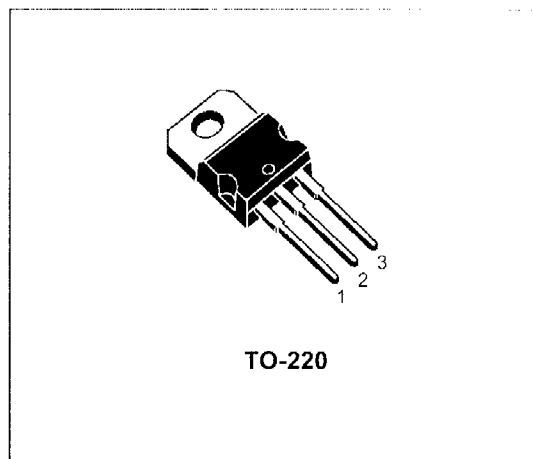
#### APPLICATIONS

- SWITCHING REGULATORS
- MOTOR CONTROL

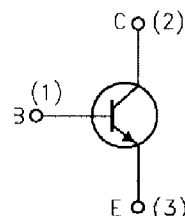
#### DESCRIPTION

The MJE13007 is a silicon multiepitaxial mesa NPN power transistor mounted in Jedec TO-220 plastic package.

It is intended for use in motor control, switching regulators etc.



#### INTERNAL SCHEMATIC DIAGRAM



#### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CEV}$	Collector-Emitter Voltage ( $V_{BE} = -1.5V$ )	700	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	400	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	9	V
$I_C$	Collector Current	8	A
$I_{CM}$	Collector Peak Current	16	A
$I_B$	Base Current	4	A
$I_{BM}$	Base Peak Current	8	A
$I_E$	Emitter Current	12	A
$I_{EM}$	Emitter Peak Current	24	A
$P_{tot}$	Total Dissipation at $T_c \leq 25^\circ C$	80	W
$T_{stg}$	Storage Temperature	-65 to 150	$^\circ C$
$T_j$	Max. Operating Junction Temperature	150	$^\circ C$

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### THERMAL DATA

$R_{th(j-case)}$	Thermal Resistance Junction-case	Max	1.56	$^{\circ}\text{C/W}$
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### ELECTRICAL CHARACTERISTICS ( $T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CEV}$	Collector Cut-off Current ( $V_{BE} = -1.5\text{V}$ )	$V_{CE} = \text{rated } V_{CEV}$			1	mA
		$V_{CE} = \text{rated } V_{CEV}$ $T_c = 100^{\circ}\text{C}$			5	mA
$I_{EBO}$	Emitter Cut-off Current ( $I_C = 0$ )	$V_{EB} = 9\text{V}$			1	mA
$V_{CEO(sus)}^*$	Collector-Emitter Sustaining Voltage	$I_C = 10\text{mA}$	400			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 2\text{A}$ $I_B = 0.4\text{A}$			1	V
		$I_C = 5\text{A}$ $I_B = 1\text{A}$			1.5	V
		$I_C = 8\text{A}$ $I_B = 2\text{A}$			3	V
		$I_C = 5\text{A}$ $I_B = 1\text{A}$ $T_c = 100^{\circ}\text{C}$			2	V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 2\text{A}$ $I_B = 0.4\text{A}$			1.2	V
		$I_C = 5\text{A}$ $I_B = 1\text{A}$			1.6	V
		$I_C = 5\text{A}$ $I_B = 1\text{A}$ $T_c = 100^{\circ}\text{C}$			1.5	V
$h_{FE}^*$	DC Current Gain	$I_C = 2\text{A}$ $V_{CE} = 5\text{V}$	8		40	
		$I_C = 5\text{A}$ $V_{CE} = 5\text{V}$	6		30	
$f_T$	Transition Frequency	$I_C = 0.5\text{A}$ $V_{CE} = 10\text{V}$ $f = 1\text{MHz}$	4			MHz
$C_{cbo}$	Output Capacitance	$I_E = 0$ $V_{CB} = 10\text{V}$ $f = 0.1\text{MHz}$		110		pF

### RESISTIVE LOAD

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{on}$	Turn-on Time	$V_{CC} = 125\text{V}$ $I_C = 5\text{A}$ $I_{B1} = -I_{B2} = 1\text{A}$ $t_p = 25\mu\text{s}$ Duty Cycle < 1%			0.7	$\mu\text{s}$
$t_s$	Storage Time				3	ms
$t_f$	Fall Time				0.7	ms

### INDUCTIVE LOAD

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_f$	Fall Time	$V_{CC} = 125\text{V}$ $I_C = 5\text{A}$ $I_{B1} = 1\text{A}$ $t_p = 25\mu\text{s}$ Duty Cycle < 1%			0.3	$\mu\text{s}$
$t_f$	Fall Time	$V_{CC} = 125\text{V}$ $I_C = 5\text{A}$ $I_{B1} = 1\text{A}$ $t_p = 25\mu\text{s}$ Duty Cycle < 1% $T_c = 100^{\circ}\text{C}$			0.6	$\mu\text{s}$

\* Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 2 %