

SILICON NPN SWITCHING TRANSISTOR

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

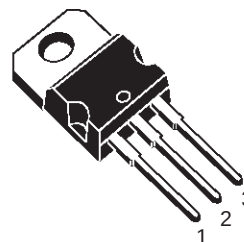
APPLICATIONS

- SWITCHING REGULATORS
- MOTOR CONTROL

DESCRIPTION

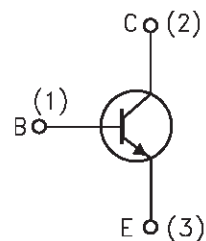
The MJE13007 is a silicon multiepitaxial mesa NPN power transistor mounted in Jedec TO-220 plastic package.

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



TO-220

INTERNAL SCHEMATIC DIAGRAM



SC06960

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	$^\circ C$

THERMAL DATA

$R_{thj-case}$	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 ($V_{BE} = -1.5\text{V}$)	$V_{CE} = \text{rated } V_{CEV}$ $V_{CE} = \text{rated } V_{CEV} \quad T_c = 100^{\circ}\text{C}$			1 5	mA 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	$I_C = 2\text{ A} \quad I_B = 0.4\text{ A}$ $I_C = 5\text{ A} \quad I_B = 1\text{ A}$ $I_C = 8\text{ A} \quad I_B = 2\text{ A}$ $I_C = 5\text{ A} \quad I_B = 1\text{ A} \quad T_c = 100^{\circ}\text{C}$			1 1.5 3 2	V V V V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 2\text{ A} \quad I_B = 0.4\text{ A}$ $I_C = 5\text{ A} \quad I_B = 1\text{ A}$ $I_C = 5\text{ A} \quad I_B = 1\text{ A} \quad T_c = 100^{\circ}\text{C}$			1.2 1.6 1.5	V V V
h_{FE}^*	DC Current Gain	$I_C = 2\text{ A} \quad V_{CE} = 5\text{ V}$ $I_C = 5\text{ A} \quad V_{CE} = 5\text{ V}$	8 6		40 30	
f_T	Transition Frequency	$I_C = 0.5\text{ A} \quad V_{CE} = 10\text{ V} \quad f = 1\text{ MHz}$	4			MHz
C_{CBO}	Output Capacitance	$I_E = 0 \quad V_{CB} = 10\text{ V} \quad f = 0.1\text{ MHz}$		110		pF

RESISTIVE LOAD

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

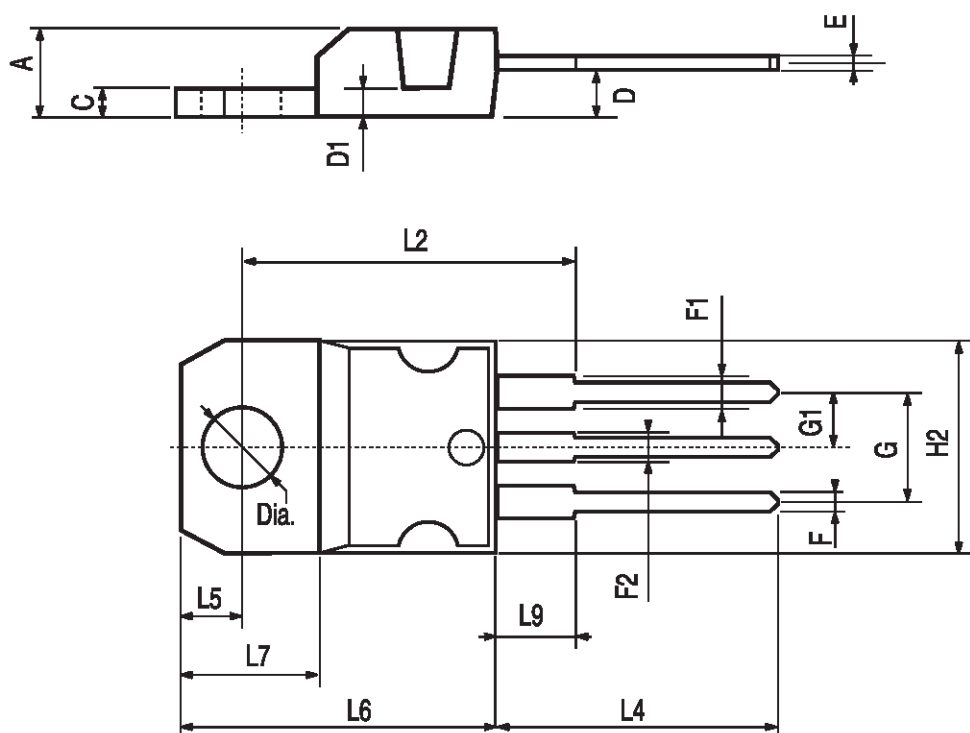
INDUCTIVE LOAD

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

* Pulsed: Pulse duration = 300 μs , duty cycle 2 %

TO-220 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



P011C