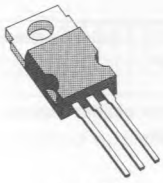
SGS-THOMSON MICROELECTRONICS

MJE13008
MJE13009

HIGH VOLTAGE, HIGH SPEED, POWER SWITCHING

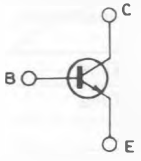
DESCRIPTION

The MJE13008 and MJE13009 are silicon multiepitaxial mesa NPN transistors. They are mounted in Jedec TO-220 plastic package, intended for use in motor controls, switching regulators deflection circuits, etc.



TO-220

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		MJE13008	MJE13009	
V_{CEO}	Collector-emitter Voltage (I_B = 0)	300	400	V
V_{CEV}	Collector-emitter Voltage	600	700	V
V_{EBO}	Emitter-base Voltage (I_C = 0)	9		V
I_C	Collector Current	12		A
I_{CM}	Collector Peak Current ($t_p \leq$ 10ms)	24		A
I_B	Base Current	6		A
I_{BM}	Base Peak Current ($t_p \leq$ 10ms)	12		A
I_E	Emitter Current	18		A
I_{EM}	Emitter Peak Current	36		A
P_{tot}	Total Power Dissipation at $T_{case} \leq$ 25°C	100		W
T_{stg}	Storage Temperature	– 65 to 150		°C
T_j	Junction Temperature	150		°C

THERMAL DATA

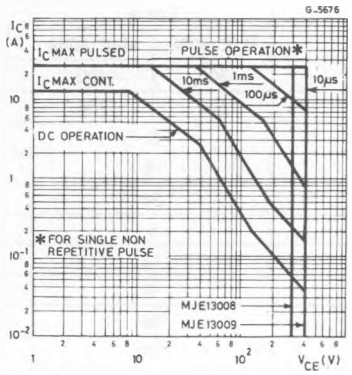
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	1.25	°C/W

ELECTRICAL CHARACTERISTICS (T_{case} = 25°C unless otherwise specified)

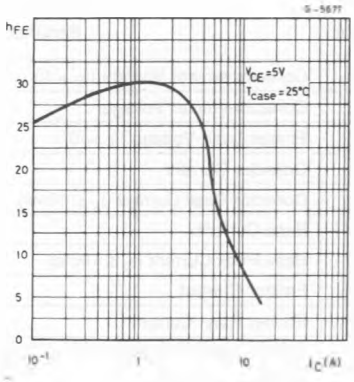
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = 9 V			1	mA
I_{CEV}	Collector Cutoff Current	V_{CEV} = rated value $V_{BE(off)}$ = 1.5V V_{CEV} = rated value $V_{EB(off)}$ = 1.5V T_{case} = 100°C			1 5	mA mA
$V_{CEO(sus)}$*	Collector-Emitter Sustaining Voltage	I_C = 10 mA I_E = 0 for **MJE13008** for **MJE13009**	 300 400		 	 V V
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = 5A I_B = 1A I_C = 8A I_B = 1.6A I_C = 12A I_B = 3A I_C = 8A I_B = 1.6A T_{case} = 100°C			1 1.5 3 2	V V V V
$V_{BE(sat)}$*	Base-emitter Saturation Voltage	I_C = 5A I_B = 1A I_C = 8A I_B = 1.6A I_C = 8A I_B = 1.6A T_{case} = 100°C			1.2 1.6 1.5	V V V
h_{FE}*	DC Current Gain	I_C = 5A V_{CE} = 5V I_C = 8A V_{CE} = 5V	8 6		40 30	
f_T	Transition Frequency	I_C = 500mA V_{CE} = 10V	4			MHz
C_{OB}	Output Capacitance	V_{CB} = 10V I_E = 0 f = 0.1MHz		180		pF
t_{on}	Turn-on Time	RESISTIVE LOAD			1.1	µs
t_s	Storage Time	V_{CC} = 125V I_C = 8A I_{B1} = I_{B2} = 1.6A t_p = 25µs			3	µs
t_f	Fall Time	Duty Cycle ≤ 1%			0.7	µs

* Pulsed : pulse duration = 300µs, duty cycle ≤ 2%.

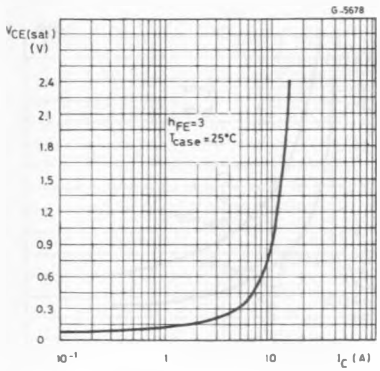
Safe Operating Areas.



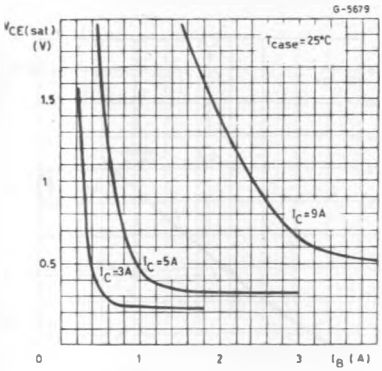
DC Current Gain.



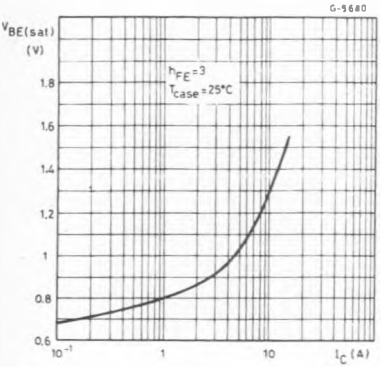
Collector-emitter Saturation Voltage.



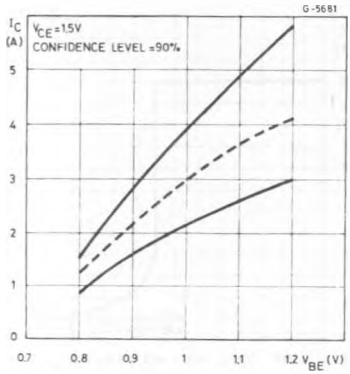
Collector-emitter Saturation Voltage.



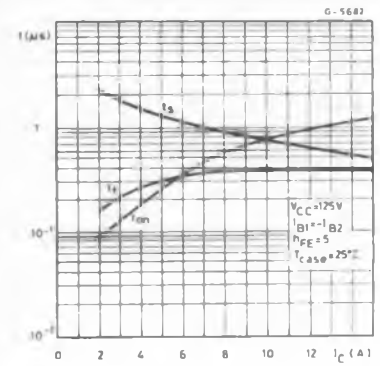
Base-emitter Saturation Voltage.



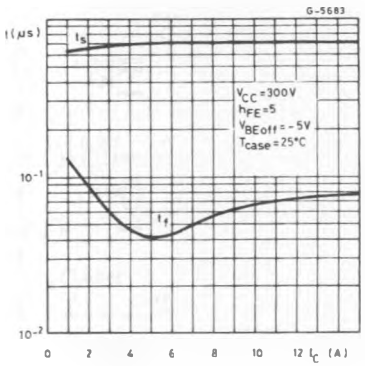
Collector Current Spread vs. Base-emitter Voltage.



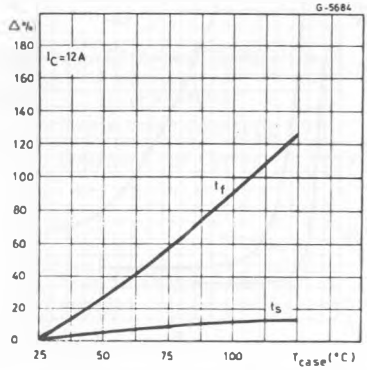
Switching Times Resistive Load (see fig. 2).



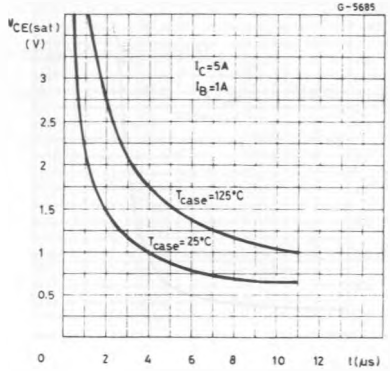
Switching Times Inductive Load (see fig. 1).



Switching Times vs. T_{case} Inductive Load.



Dynamic Collector-emitter Saturation Voltage (see fig. 2).



Clamped Reverse Bias Safe Operating Areas..

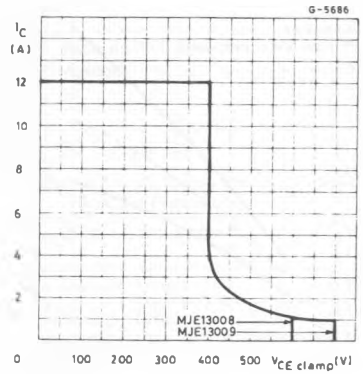
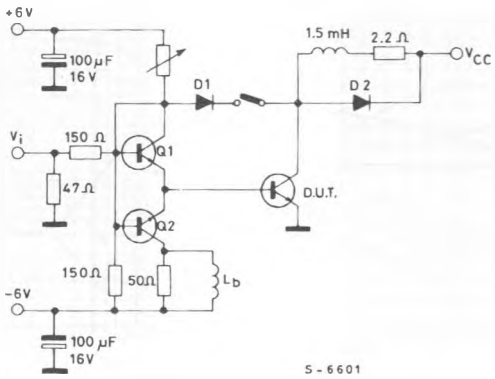


Figure 1 : Switching Times Test Circuit on Inductive Load.



D1, D2 - Fast recovery diodes
Q1, Q2 - Transistors SGS : 2N5191, 2N5195

Figure 2 : Switching Times Test Circuit on Resistive Load and $V_{CE(sat)}$ Dyn. Test Circuit.