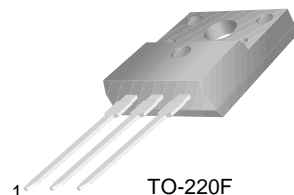


# MJE13009F

## High Voltage Switch Mode Application

- High Speed Switching
- Suitable for Switching Regulator and Motor Control



TO-220F  
1.Base 2.Collector 3.Emitter

## NPN Silicon Transistor

### Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
$V_{CBO}$	Collector-Base Voltage	700	V
$V_{CEO}$	Collector-Emitter Voltage	400	V
$V_{EBO}$	Emitter-Base Voltage	9	V
$I_C$	Collector Current (DC)	12	A
$I_{CP}$	Collector Current (Pulse)	24	A
$I_B$	Base Current	6	A
$P_C$	Collector Dissipation ( $T_C=25^\circ\text{C}$ )	50	W
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature	-65 ~ 150	$^\circ\text{C}$

### Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage	$I_C = 10\text{mA}, I_B = 0$	400			V
$I_{EBO}$	Emitter Cut-off Current	$V_{EB} = 7\text{V}, I_C = 0$			1	mA
$h_{FE}$	DC Current Gain	$V_{CE} = 5\text{V}, I_C = 5\text{A}$ $V_{CE} = 5\text{V}, I_C = 8\text{A}$	8 6		40 30	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 5\text{A}, I_B = 1\text{A}$ $I_C = 8\text{A}, I_B = 1.6\text{A}$ $I_C = 12\text{A}, I_B = 3\text{A}$			1 1.5 3	V V V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 5\text{A}, I_B = 1\text{A}$ $I_C = 8\text{A}, I_B = 1.6\text{A}$			1.2 1.6	V V
$C_{ob}$	Output Capacitance	$V_{CB} = 10\text{V}, f = 0.1\text{MHz}$		180		pF
$f_T$	Current Gain Bandwidth Product	$V_{CE} = 10\text{V}, I_C = 0.5\text{A}$	4			MHz
$t_{ON}$	Turn ON Time	$V_{CC} = 125\text{V}, I_C = 8\text{A}$			1.1	$\mu\text{s}$
$t_{STG}$	Storage Time	$I_{B1} = -I_{B2} = 1.6\text{A}$			3	$\mu\text{s}$
$t_F$	Fall Time	$R_L = 15,6\Omega$			0.7	$\mu\text{s}$

\* Pulse Test:  $PW \leq 300\mu\text{s}$ , Duty Cycles  $\leq 2\%$

# Typical Characteristics

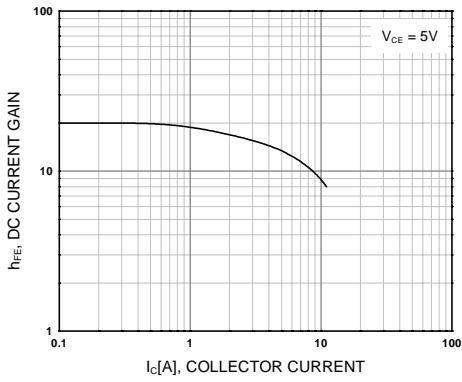


Figure 1. DC current Gain

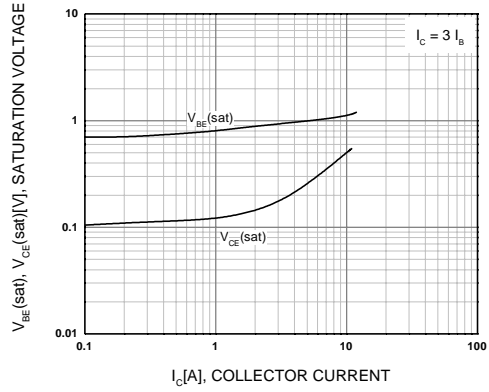


Figure 2. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

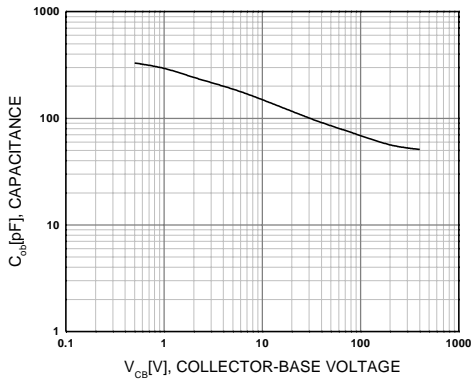


Figure 3. Collector Output Capacitance

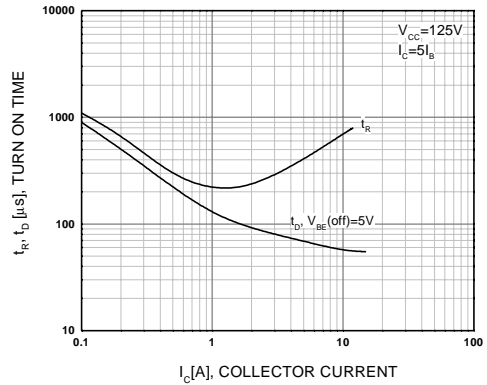


Figure 4. Turn On Time

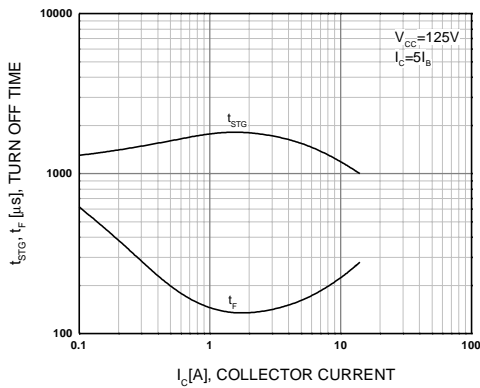


Figure 5. Turn Off Time

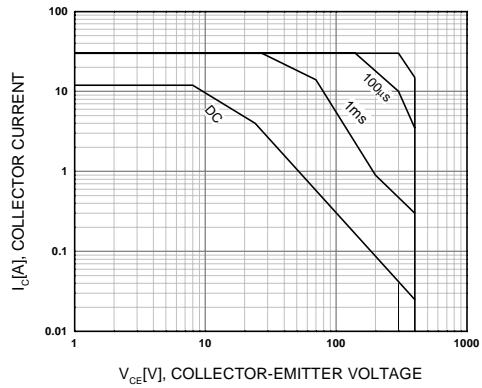


Figure 6. Safe Operating Area

# Typical Characteristics (Continued)

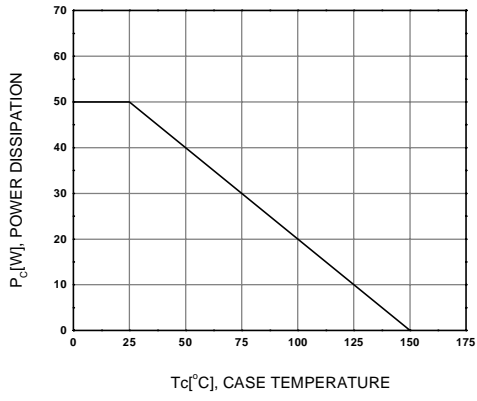
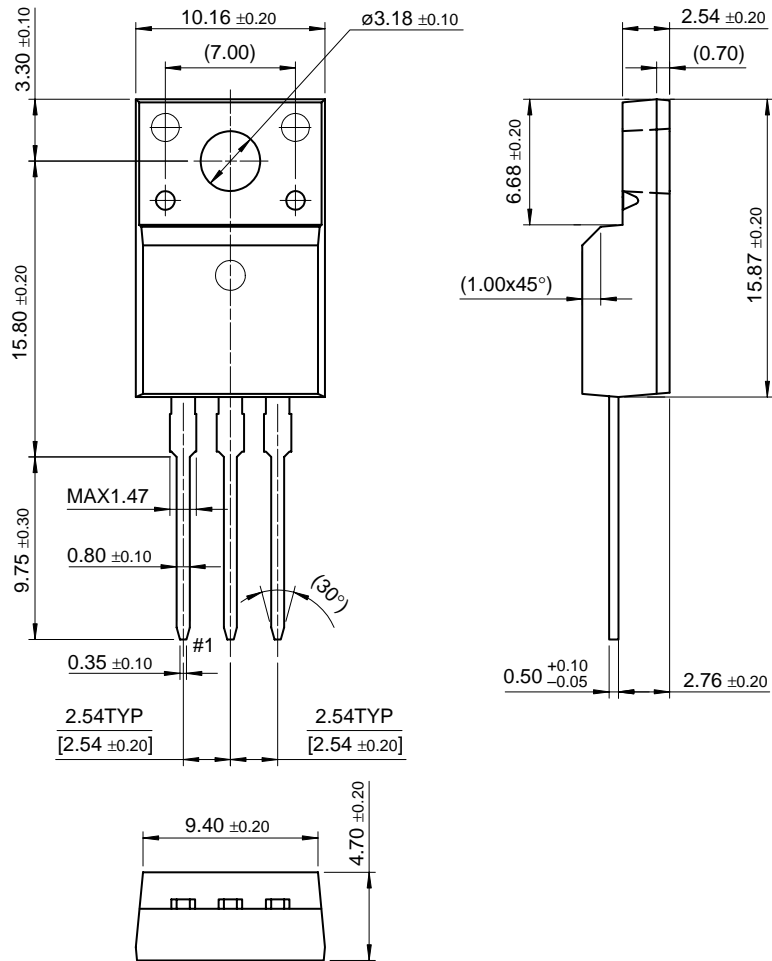


Figure 1. DC current Gain

# Package Dimensions

MJE13009F

## TO-220F



Dimensions in Millimeters

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CROSSVOLT™	HiSeC™	QT Optoelectronics™	UHC™
DOME™	ISOPLANAR™	Quiet Series™	
E <sup>2</sup> CMOS™	MICROWIRE™	LILENT SWITCHER®	
EnSigna™	OPTOLOGIC™	SMART START™	
FACT™	OPTOPLANAR™	SuperSOT™-3	
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