



MJE13009-XS

NPN SILICON TRANSISTOR

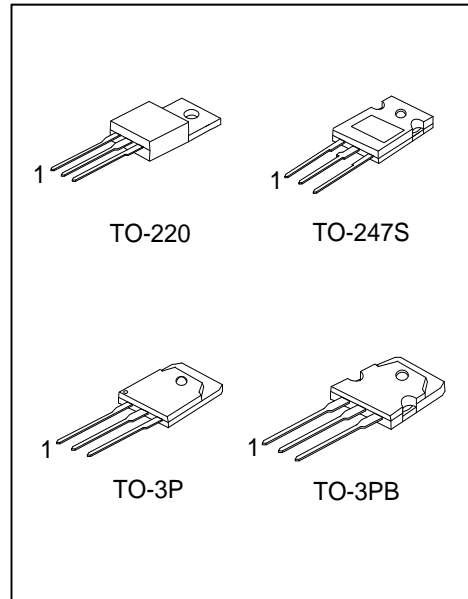
SWITCHMODE SERIES NPN SILICON POWER TRANSISTORS

■ **DESCRIPTION**

The **MJE13009-XS** is designed for high-voltage, high-speed power switching inductive circuits where fall time is critical. They are particularly suited for 115 and 220V switch mode applications such as Switching Regulators, Inverters, Motor Controls, Solenoid/Relay drivers and Deflection circuits.

■ **FEATURES**

- * V_{CE0} 400V and 300 V
- * 700 V Blocking Capability



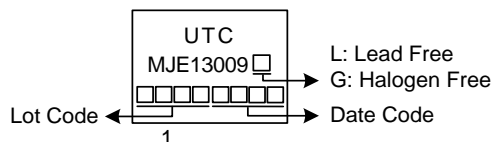
■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
MJE13009L-XS-TA3-T	MJE13009G-XS-TA3-T	TO-220	B	C	E	Tube
MJE13009L-XS-T3P-T	MJE13009G-XS-T3P-T	TO-3P	B	C	E	Tube
MJE13009L-XS-T3B-T	MJE13009G-XS-T3B-T	TO-3PB	B	C	E	Tube
MJE13009L-XS-T47S-T	MJE13009G-XS-T47S-T	TO-247S	B	C	E	Tube

Note: Pin Assignment: B: Base C: Collector E: Emitter

<p>MJE13009G-XS-TA3-T</p>	<p>(1) T: Tube (2) TA3: TO-220, T3P: TO-3P, T3B: TO-3PB T47S: TO-247S (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ **MARKING**



■ ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage		V _{CEO}	400	V
Collector-Emitter Voltage (V _{BE} =-1.5V)		V _{CEV}	700	V
Emitter Base Voltage		V _{EBO}	9	V
Collector Current	Continuous	I _C	8	A
	Peak (Note 3)	I _{CM}	16	
Power Dissipation	TO-220	P _D	2	W
	TO-3P/TO-3PB		5.8	W
	TO-247S		4.2	W
Derate above 25°C	TO-220		16	mW/°C
	TO-3P/TO-3PB		47	mW/°C
	TO-247S		33	mW/°C
Junction Temperature		T _J	+150	°C
Storage Temperature		T _{STG}	-40 ~ +150	°C

Note: 1. Pulse Test: Pulse Width = 5ms, Duty Cycle ≤ 10%

2. 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.

3. Pulse Test: Pulse Width = 300μs, Duty Cycle = 2%

■ THERMAL DATA

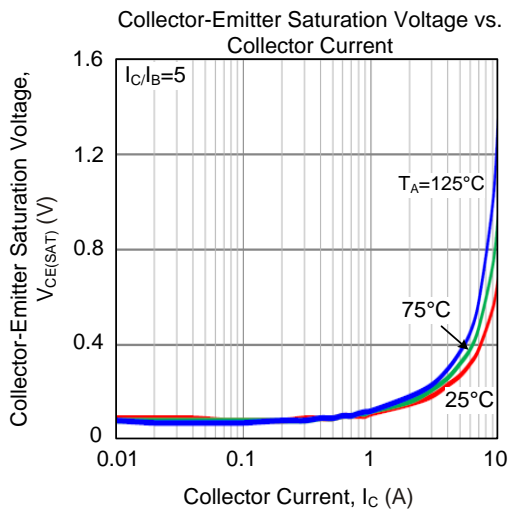
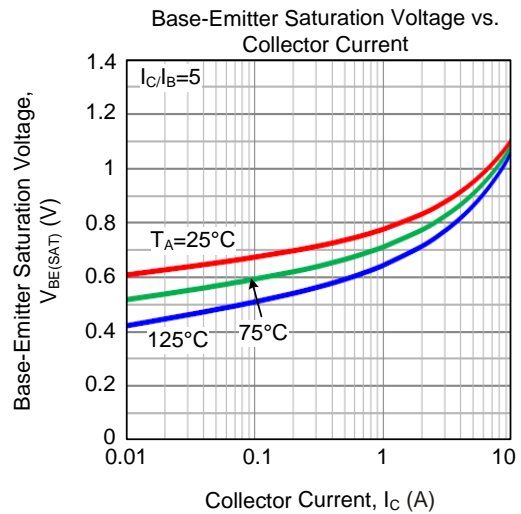
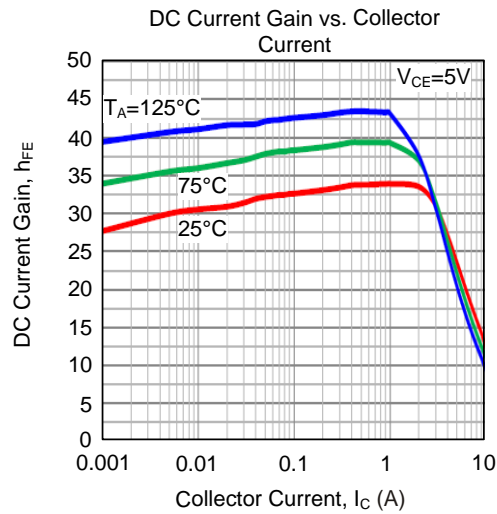
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ _{JA}	62.5	°C/W
	TO-3P/TO-3PB		21	°C/W
	TO-247S		30	°C/W
Junction to Case	TO-220	θ _{JC}	1.25	°C/W
	TO-3P/TO-3PB		0.6	°C/W
	TO-247S		0.625	°C/W

■ ELECTRICAL CHARACTERISTICS (T_C = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS (Note)						
Collector- Emitter Sustaining Voltage	V _{CEO}	I _C = 10mA, I _B = 0	400			V
Collector Cutoff Current V _{CB0} =Rated Value	I _{CEV}	V _{BE(OFF)} = 1.5V _{DC} V _{BE(OFF)} = 1.5V _{DC} , T _C = 100°C			1 5	mA
Emitter Cutoff Current	I _{EBO}	V _{EB} = 9V _{DC} , I _C = 0			1	mA
ON CHARACTERISTICS (Note)						
DC Current Gain	h _{FE1}	I _C = 3A, V _{CE} = 5V	8		40	
	h _{FE2}	I _C = 8A, V _{CE} = 5V			30	
Current-Emitter Saturation Voltage	V _{CE(SAT)}	I _C = 5A, I _B = 1A			1	V
Base-Emitter Saturation Voltage	V _{BE(SAT)}	I _C = 5A, I _B = 1A			1.2	V
DYNAMIC CHARACTERISTICS						
Output Capacitance	C _{OB}	V _{CB} = 10V, I _E = 0, f = 0.1MHz		100		pF
SWITCHING CHARACTERISTICS (Resistive Load, Table 1)						
Delay Time	t _{DLY}	V _{CC} = 125Vdc, I _C = 8A I _{B1} = I _{B2} = 1.6A, t _P = 25μs Duty Cycle ≤ 1%		0.06	0.1	μs
Rise Time	t _R			0.45	1	μs
Storage Time	t _S			1.3	3	μs
Fall Time	t _F			0.2	0.7	μs
Inductive Load, Clamped (Table 1, Fig. 13)						
Voltage Storage Time	t _S	I _C =8A, V _{CLAMP} =300V, I _{B1} =1.6A		0.92	2.3	μs
Crossover Time	t _C	V _{BE(OFF)} = 5V, T _C = 100°C		0.12	0.7	μs

Note: Pulse Test: Pulse Width = 300μs, Duty Cycle = 2%.

TYPICAL CHARACTERISTICS



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