

## MJ13333 Silicon NPN Power Transistor

### DESCRIPTION

- Collector-Emitter Sustaining Voltage-  
 :  $V_{CEO(SUS)} = 400V(\text{Min})$
- High Switching Speed

### APPLICATIONS

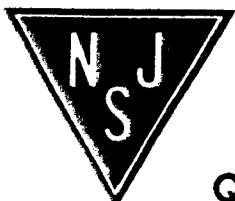
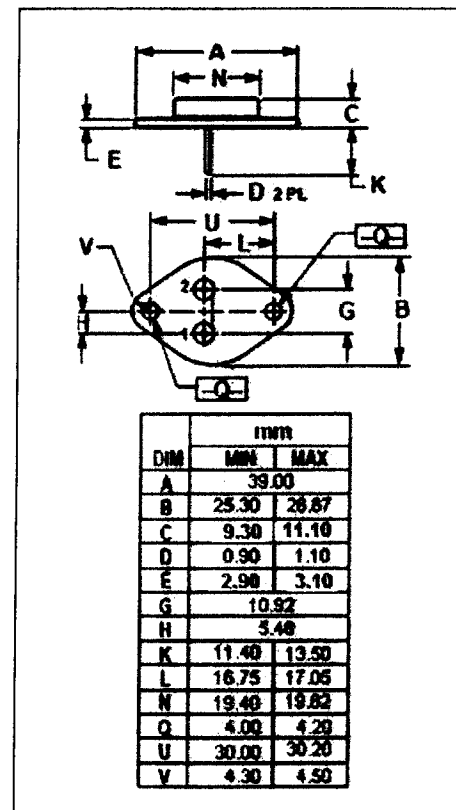
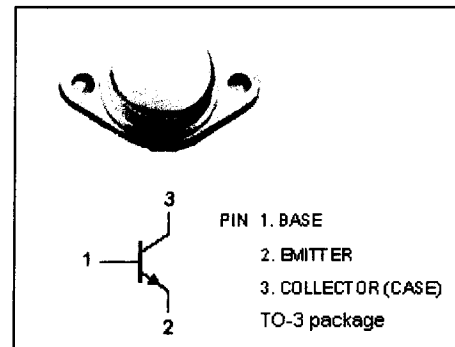
- Designed for high-voltage, high-speed, power switching in inductive circuits where fall time is critical. They are particularly suited for line operated switchmode applications.
- Switching regulators
- Inverters
- Solenoid and relay drivers
- Motor controls
- Deflection circuits

### ABSOLUTE MAXIMUM RATINGS( $T_a=25^\circ\text{C}$ )

SYMBOL	PARAMETER	VALUE	UNIT
$V_{CEV}$	Collector-Emitter Voltage	700	V
$V_{CEO}$	Collector-Emitter Voltage	400	V
$V_{EBO}$	Emitter-Base Voltage	6	V
$I_C$	Collector Current-Continuous	20	A
$I_{CM}$	Collector Current-Peak	30	A
$I_B$	Base Current-Continuous	10	A
$I_{BM}$	Base Current-Peak	15	A
$P_C$	Collector Power Dissipation@ $T_c=25^\circ\text{C}$	175	W
$T_J$	Junction Temperature	200	$^\circ\text{C}$
$T_{stg}$	Storage Temperature	-65~200	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	MAX	UNIT
$R_{th\ j-c}$	Thermal Resistance, Junction to Case	1.0	$^\circ\text{C/W}$



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## ELECTRICAL CHARACTERISTICS

$T_C=25^{\circ}\text{C}$  unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT
$V_{CE0(SUS)}$	Collector-Emitter Sustaining Voltage	$I_C=100\text{mA}; I_B=0$	400			V
$V_{CE(sat)-1}$	Collector-Emitter Saturation Voltage	$I_C=10\text{A}; I_B=2\text{A}$ $I_C=10\text{A}; I_B=2\text{A}, T_C=100^{\circ}\text{C}$			1.8 2.4	V
$V_{CE(sat)-2}$	Collector-Emitter Saturation Voltage	$I_C=20\text{A}; I_B=6.7\text{A}$			5	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=10\text{A}; I_B=2\text{A}$ $I_C=10\text{A}; I_B=2\text{A}, T_C=100^{\circ}\text{C}$			1.8 1.8	V
$I_{CEV}$	Collector Cutoff Current	$V_{CEV}=400\text{V}; V_{BE(off)}=1.5\text{V}$ $V_{CEV}=400\text{V}; V_{BE(off)}=1.5\text{V}; T_C=150^{\circ}\text{C}$			0.25 5.0	mA
$I_{CER}$	Collector Cutoff Current	$V_{CE}=400\text{V}; R_{BE}=50\Omega, T_C=100^{\circ}\text{C}$			5.0	mA
$I_{EBO}$	Emitter Cutoff Current	$V_{EB}=6\text{V}; I_C=0$			1	mA
$h_{FE}$	DC Current Gain	$I_C=5\text{A}; V_{CE}=5\text{V}$	10		60	
$f_T$	Current Gain-Bandwidth Product	$I_C=0.3\text{A}; V_{CE}=10\text{V}; f_{test}=1\text{MHz}$	5		40	MHz
$C_{OB}$	Output Capacitance	$I_E=0; V_{CB}=10\text{V}; f_{test}=1\text{kHz}$	125		500	pF

### Switching times; Resistive Load

$t_d$	Delay Time	$I_C=10\text{A}, V_{CC}=250\text{V}; I_{B1}=2\text{A}$ $V_{BE(off)}=5\text{V}; t_p=10\mu\text{s};$ Duty Cycle $\leq 2.0\%$		0.02	0.1	$\mu\text{s}$
$t_r$	Rise Time			0.3	0.7	$\mu\text{s}$
$t_s$	Storage Time			1.6	4.0	$\mu\text{s}$
$t_f$	Fall Time			0.3	0.7	$\mu\text{s}$