

**MJ16018**  
**MJH16018**

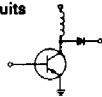
**Designers Data Sheet**

**1.5 kV SWITCHMODE III SERIES  
NPN SILICON POWER TRANSISTORS**

These transistors are 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.

Typical Applications: Features:

- Switching Regulators
- Inverters
- Solenoids
- Relay Drivers
- Motor Controls
- Deflection Circuits
- Collector-Emitter Voltage —  $V_{CEX} = 1500$  Vdc
- Fast Turn-Off Times  
280 ns Inductive Fall Time — 100°C (Typ)  
470 ns Inductive Crossover Time — 100°C (Typ)  
2.6  $\mu$ s Inductive Storage Time — 100°C (Typ)
- 100°C Performance Specified for:  
Reverse-Biased SOA with Inductive Load  
Switching Times with Inductive Loads  
Saturation Voltages  
Leakage Currents



**MAXIMUM RATINGS**

Rating	Symbol	MJ16018	MJH16018	Unit
Collector-Emitter Voltage	$V_{CE0(sus)}$	800		Vdc
Collector-Base Voltage	$V_{CEX}$	1500		Vdc
Emitter-Base Voltage	$V_{EB}$	6.0		Vdc
Collector Current				Adc
— Continuous	$I_C$	10		
— Peak (1)	$I_{CM}$	15		
Base Current				Adc
— Continuous	$I_B$	8.0		
— Peak (1)	$I_{BM}$	12		
Total Device Dissipation	$P_D$			Watts
@ $T_C = 25^\circ C$		175	150	
@ $T_C = 100^\circ C$		100	50	
Derate above 25°C		1.0	1.0	W/°C
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to 200	-55 to 150	°C

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.0	1.0 °C/W
Lead Temperature for Soldering Purposes, 1/8" from Case for 5 Seconds.	$T_L$	275	°C

(1) Pulse Test: Pulse Width  $\leq 5.0 \mu$ s, Duty Cycle  $\geq 10\%$ .

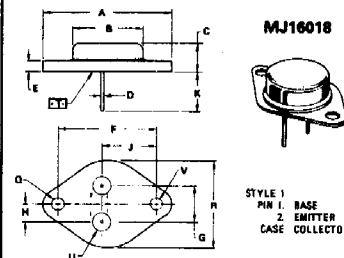
**Designer's Data for "Worst Case" Conditions**

The Designer's Data Sheet permits the design of most circuits entirely from the information presented. Limit Curves — representing boundaries on device characteristics — are given to facilitate "worst case" design.

10 AMPERE

**NPN SILICON  
POWER TRANSISTORS**

800 VOLTS  
150 AND 175 WATTS



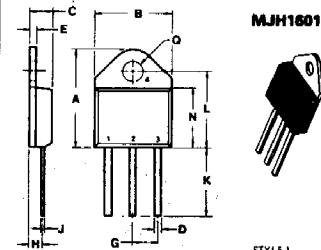
**MJ16018**

STYLE 1  
PIN 1. BASE  
2. EMITTER  
CASE. COLLECTOR

- NOTES:  
1. DIMENSIONS Q AND V ARE DATUMS.  
2. [ ] IS SEATING PLANE AND DATUM.  
3. POSITIONAL TOLERANCE FOR MOUNTING HOLE G:  
 $\phi \pm 0.12 (0.005) \text{ T } | \text{ V } | \text{ U } | \text{ U } |$   
FOR LEADS:  
 $\phi \pm 0.13 (0.005) \text{ T } | \text{ V } | \text{ U } | \text{ U } |$   
4. DIMENSIONS AND TOLERANCES PER ANSI Y14.5, 1973.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	—	20.37	—	1.550
B	—	21.94	—	1.330
C	0.35	2.57	0.250	0.390
D	0.37	1.68	0.034	0.063
E	1.68	1.78	0.066	0.070
F	10.15	8.92	1.117	0.850
G	10.17	8.92	0.430	0.350
H	5.48	8.92	0.215	0.350
J	0.30	0.35	0.012	0.014
K	11.18	12.19	0.440	0.480
L	3.81	4.19	0.151	0.165
M	—	20.37	—	1.550
N	4.83	5.21	0.190	0.210
V	3.81	4.19	0.151	0.165

**TO-204AA  
(TO-3 TYPE)**

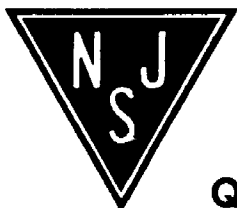


**MJH16018**

STYLE 1  
1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	20.37	21.08	0.800	0.830
B	15.49	15.50	0.610	0.626
C	4.19	5.08	0.165	0.200
D	1.02	1.65	0.040	0.065
E	1.35	1.65	0.053	0.065
G	5.21	5.72	0.205	0.225
H	2.41	3.20	0.095	0.126
J	0.38	0.54	0.015	0.022
K	12.70	15.49	0.500	0.610
L	15.49	16.51	0.625	0.650
M	12.19	12.70	0.480	0.500
N	4.84	4.22	0.190	0.165

**TO-218AC**



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**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit			
<b>OFF CHARACTERISTICS</b>								
Collector-Emitter Sustaining Voltage (Table 2) ( $I_C = 100\text{ mA}$ , $I_B = 0$ )	$V_{CEO(sus)}$	800	—	—	Vdc			
Collector Cutoff Current ( $V_{CEV} = 1500\text{ Vdc}$ , $V_{BE(off)} = 1.5\text{ Vdc}$ ) ( $V_{CEV} = 1500\text{ Vdc}$ , $V_{BE(off)} = 1.5\text{ Vdc}$ , $T_C = 100^\circ\text{C}$ )	$I_{CEV}$	—	—	0.25 1.5	mAdc			
Collector Cutoff Current ( $V_{CE} = 1500\text{ Vdc}$ , $R_{BE} = 50\ \Omega$ , $T_C = 100^\circ\text{C}$ )	$I_{CER}$	—	—	2.5	mAdc			
Emitter Cutoff Current ( $V_{EB} = 6.0\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	—	—	1.0	mAdc			
<b>SECOND BREAKDOWN</b>								
Second Breakdown Collector Current with Base Forward Biased	$I_{S/b}$	See Figure 12						
Clamped Inductive SOA with Base Reverse Biased	RBSOA	See Figure 13						
<b>ON CHARACTERISTICS (1)</b>								
Collector-Emitter Saturation Voltage ( $I_C = 5.0\text{ Adc}$ , $I_B = 1.0\text{ Adc}$ ) ( $I_C = 10\text{ Adc}$ , $I_B = 4.0\text{ Adc}$ ) ( $I_C = 5.0\text{ Adc}$ , $I_B = 1.0\text{ Adc}$ , $T_C = 100^\circ\text{C}$ )	$V_{CE(sat)}$	—	—	1.5 1.5 2.0	Vdc			
Base-Emitter Saturation Voltage ( $I_C = 5.0\text{ Adc}$ , $I_B = 1.0\text{ Adc}$ ) ( $I_C = 5.0\text{ Adc}$ , $I_B = 1.0\text{ Adc}$ , $T_C = 100^\circ\text{C}$ )	$V_{BE(sat)}$	—	—	1.5 1.5	Vdc			
DC Current Gain ( $I_C = 5.0\text{ Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$h_{FE}$	7.0	—	—	—			
<b>DYNAMIC CHARACTERISTICS</b>								
Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f_{test} = 1.0\text{ kHz}$ )	$C_{ob}$	—	—	400	pF			
<b>SWITCHING CHARACTERISTICS</b>								
<b>Resistive Load (Table 1)</b>								
Delay Time	( $I_C = 5.0\text{ Adc}$ , $V_{CC} = 250\text{ Vdc}$ , $I_{B1} = 1.0\text{ Adc}$ , $PW = 30\ \mu\text{s}$ , Duty Cycle $\leq 2.0\%$ )	( $I_{B2} = 2.0\text{ Adc}$ , $R_{B2} = 3.0\ \Omega$ )	$t_d$	—	50	100	ns	
Rise Time			$t_r$	—	300	400		
Storage Time			$t_s$	—	2000	3000		
Fall Time			$t_f$	—	900	1200		
Storage Time			( $V_{BE(off)} = 2.0\text{ Vdc}$ )	$t_s$	—	1600		2400
Fall Time				$t_f$	—	500		650
<b>Inductive Load (Table 2)</b>								
Storage Time	( $I_C = 5.0\text{ Adc}$ , $I_{B1} = 1.0\text{ Adc}$ , $V_{BE(off)} = 2.0\text{ Vdc}$ , $V_{CE(pk)} = 400\text{ Vdc}$ )	$(T_J = 25^\circ\text{C})$	$t_{sv}$	—	2000	3000	ns	
Fall Time			$t_{fi}$	—	200	400		
Crossover Time			$t_c$	—	350	500		
Storage Time			$(T_J = 100^\circ\text{C})$	$t_{sv}$	—	2600		3600
Fall Time				$t_{fi}$	—	280		460
Crossover Time				$t_c$	—	470		620

(1) Pulse Test:  $PW = 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

