New Jersey Semi-Conductor Products, Inc.

20 STERN AVE.
SPRINGFIELD, NEW JERSEY 07081
U.S.A.

TELEPHONE: (973) 376-2922
(212) 227-6005
FAX: (973) 376-8960

MJ16110*
MJW16110*

Designer's™ Data Sheet

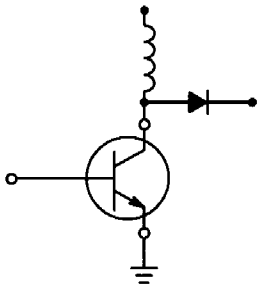
NPN Silicon Power Transistors

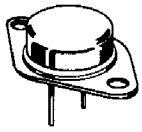
SWITCHMODE Bridge Series

. . . specifically designed for use in half bridge and full bridge off line converters.

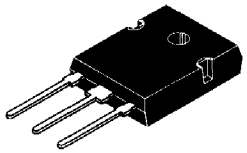
- Excellent Dynamic Saturation Characteristics
- Rugged RBSOA Capability
- Collector–Emitter Sustaining Voltage — $V_{CEO(sus)}$ — 400 V
- Collector–Emitter Breakdown — $V_{(BR)CES}$ — 650 V
- State–of–Art Bipolar Power Transistor Design
- Fast Inductive Switching:
  - t_{fi} = 25 ns (Typ) @ 100°C
  - t_c = 50 ns (Typ) @ 100°C
  - t_{sv} = 1 µs (Typ) @ 100°C
- Ultrafast FBSOA Specified
- 100°C Performance Specified for:
  - RBSOA
  - Inductive Load Switching
  - Saturation Voltages
  - Leakages

POWER TRANSISTORS
15 AMPERES
400 VOLTS
175 AND 135 WATTS





(FORMERLY TO–3)
MJ16110



TO–247AE
MJW16110

MAXIMUM RATINGS

Rating	Symbol	MJ16110	MJW16110	Unit
Collector–Emitter Sustaining Voltage	$V_{CEO(sus)}$	400		Vdc
Collector–Emitter Breakdown Voltage	V_{CES}	650		Vdc
Emitter–Base Voltage	V_{EBO}	6		Vdc
Collector Current — Continuous — Pulsed (1)	I_C I_{CM}	15 20		Adc
Base Current — Continuous — Pulsed (1)	I_B I_{BM}	10 15		Adc
Total Power Dissipation @ T_C = 25°C @ T_C = 100°C Derated above 25°C	P_D	 175 100 1	 135 54 1.09	 Watts W/°C
Operating and Storage Temperature	T_J, T_{stg}	−65 to 200	−55 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance — Junction to Case	$R_{\theta JC}$	1	0.92	°C/W
Maximum Lead Temperature for Soldering Purposes 1/8″ from Case for 5 Seconds	T_L	275		°C

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

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS (1)					
Collector–Emitter Sustaining Voltage (Table 1) (I_C = 20 mAdc, I_B = 0)	$V_{CEO(sus)}$	400	—	—	Vdc
Collector Cutoff Current (V_{CE} = 650 Vdc, $V_{BE(off)}$ = 1.5 V) (V_{CE} = 650 Vdc, $V_{BE(off)}$ = 1.5 V, T_C = 100°C)	I_{CEV}	 — —	 — —	 100 1000	µAdc
Collector Cutoff Current (V_{CE} = 650 Vdc, R_{BE} = 50 Ω, T_C = 100°C)	I_{CER}	—	—	1000	µAdc
Emitter–Base Leakage (V_{EB} = 6 Vdc, I_C = 0)	I_{EBO}	—	—	10	µAdc
ON CHARACTERISTICS (1)					
Collector–Emitter Saturation Voltage (I_C = 5 Adc, I_B = 0.5 Adc) (I_C = 10 Adc, I_B = 1.2 Adc) (I_C = 10 Adc, I_B = 2 Adc) (I_C = 10 Adc, I_B = 2 Adc, T_C = 100°C)	$V_{CE(sat)}$	 — — — —	 0.3 0.7 0.3 0.4	 0.9 2.0 1.0 1.5	Vdc
Base–Emitter Saturation Voltage (I_C = 10 Adc, I_B = 2 Adc) (I_C = 10 Adc, I_B = 2 Adc, T_C = 100°C)	$V_{BE(sat)}$	 — —	 1.2 1.2	 1.5 1.5	Vdc
DC Current Gain (I_C = 15 Adc, V_{CE} = 5 Vdc)	h_{FE}	6	12	20	—
DYNAMIC CHARACTERISTICS					
Dynamic Saturation	$V_{CE(dsat)}$	See Figures 11, 12, and 13			V
Output Capacitance (V_{CE} = 10 Vdc, I_E = 0, f_{test} = 1 kHz)	C_{ob}	—	—	400	pF
SWITCHING CHARACTERISTICS					
Inductive Load (Table 1)					
Storage	I_C = 10 A, I_{B1} = 1 A, $V_{BE(off)}$ = 5 V, $V_{CE(pk)}$ = 250 V; T_J = 25°C	t_{sv}	—	700	1500	ns
Crossover		t_c	—	45	150	
Fall Time		t_{fi}	—	20	75	
Storage	T_J = 100°C	t_{sv}	—	1000	2000	
Crossover		t_c	—	50	200	
Fall Time		t_{fi}	—	25	125	
Resistive Load (Table 2)						
Delay Time	I_C = 10 A, I_{B1} = 1 A, V_{CC} = 250 V, PW = 30 µs, Duty Cycle = ≤ 2%; I_{B2} = 2 A, R_{B2} = 4 Ω	t_d	—	15	—	ns
Rise Time		t_r	—	330	—	
Storage Time		t_s	—	800	—	
Fall Time		t_f	—	110	—	
Storage Time	$V_{BE(off)}$ = 5 V	t_s	—	500	—	
Fall Time		t_f	—	250	—	

(1) Pulse Test: Pulse Width = 300 µs, Duty Cycle ≤ 2%.