

Complementary Power Transistors

For Isolated Package Applications

MJF44H11 (NPN), MJF45H11 (PNP)

Complementary power transistors are for general purpose power amplification and switching such as output or driver stages in applications such as switching regulators, converters and power amplifiers.

Features

- Low Collector–Emitter Saturation Voltage –
 V_{CE(sat)} = 1.0 V (Max) @ 8.0 A
- Fast Switching Speeds
- Complementary Pairs Simplifies Designs
- Pb-Free Packages are Available*

MAXIMUM RATINGS

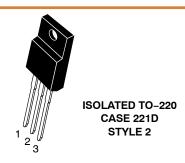
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	80	Vdc
Emitter-Base Voltage	V _{EB}	5	Vdc
Collector Current – Continuous – Peak	I _C	10 20	Adc
Total Power Dissipation @ T _C = 25°C Derate above 25°C	P _D	36 0.288	W W/°C
Total Power Dissipation @ T _A = 25°C Derate above 25°C	P _D	2.0 0.016	W W/°C
Operating and Storage Junction Temperature Range	T _J , T _{stg}	-55 to 150	°C

THERMAL CHARACTERISTICS

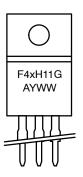
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.5	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	°C/W

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

SILICON POWER TRANSISTORS 10 AMPERES 80 VOLTS, 36 WATTS



MARKING DIAGRAM



F4xH11 = Specific Device Code

x = 4 or 5

G = Pb-Free Package A = Assembly Location

Y = Year WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping
MJF44H11	TO-220 FULLPACK	50 Units/Rail
MJF44H11G	TO-220 FULLPACK (Pb-Free)	50 Units/Rail
MJF45H11	TO-220 FULLPACK	50 Units/Rail
MJF45H11G	TO-220 FULLPACK (Pb-Free)	50 Units/Rail

Preferred devices are recommended choices for future use and best overall value.

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^{*}For additional information on our Pb-Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

MJF44H11 (NPN), MJF45H11 (PNP)

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

Characteristic		Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Sustaining Voltage (I _C = 30 mA, I _B = 0)		V _{CEO(sus)}	80	_	_	Vdc
Collector Cutoff Current (V_{CE} = Rated V_{CEO} , V_{BE} = 0)		I _{CES}	-	_	1.0	μΑ
Emitter Cutoff Current (V _{EB} = 5 Vdc)		I _{EBO}	-	_	10	μΑ
ON CHARACTERISTICS				•	•	•
Collector-Emitter Saturation Voltage (I _C = 8 Adc, I _B = 0.4 Adc)		V _{CE(sat)}	-	_	1.0	Vdc
Base–Emitter Saturation Voltage (I _C = 8 Adc, I _B = 0.8 Adc)		V _{BE(sat)}	-	_	1.5	Vdc
DC Current Gain (V _{CE} = 1 Vdc, I _C = 2 Adc)		h _{FE}	60	-	_	-
DC Current Gain (V _{CE} = 1 Vdc, I _C = 4 Adc)			40	-	_	
DYNAMIC CHARACTERISTICS				•	-	•
Collector Capacitance (V _{CB} = 10 Vdc, f _{test} = 1 MHz)	MJF44H11 MJF45H11	C _{cb}	_ _	130 230	_ _	pF
Gain Bandwidth Product ($I_C = 0.5 \text{ Adc}, V_{CE} = 10 \text{ Vdc}, f = 20 \text{ MHz}$)	MJF44H11 MJF45H11	f _T	- -	50 40	- -	MHz
SWITCHING TIMES						
Delay and Rise Times (I _C = 5 Adc, I _{B1} = 0.5 Adc)	MJF44H11 MJF45H11	t _d + t _r	- -	300 135	- -	ns
Storage Time $(I_C = 5 \text{ Adc}, I_{B1} = I_{B2} = 0.5 \text{ Adc})$	MJF44H11 MJF45H11	t _s	- -	500 500	- -	ns
Fall Time ($I_C = 5 \text{ Adc}$, $I_{B1} = I_{B2} = 0.5 \text{ Adc}$)	MJF44H11 MJF45H11	t _f	_ _	140 100	- -	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

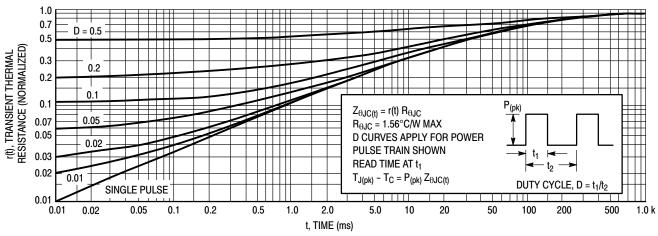


Figure 1. Thermal Response

MJF44H11 (NPN), MJF45H11 (PNP)

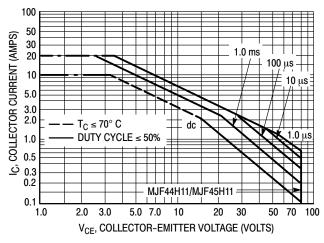


Figure 2. Maximum Rated Forward Bias Safe Operating Area

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate I_C – V_{CE} limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 2 is based on $T_{J(pk)} = 150^{\circ}C$; T_{C} is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^{\circ}C$. $T_{J(pk)}$ may be calculated from the data in Figure 1. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

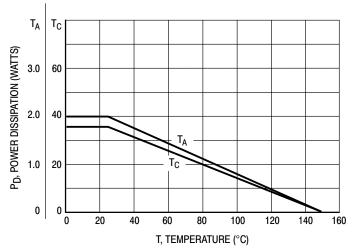


Figure 3. Power Derating

MJF44H11 (NPN), MJF45H11 (PNP)

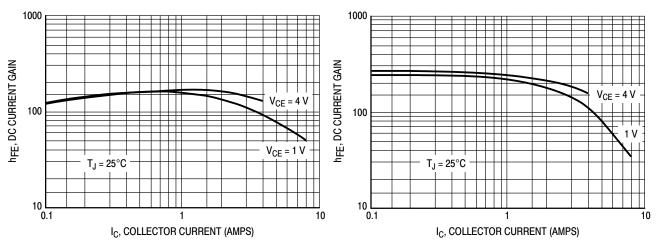


Figure 4. MJF44H11 DC Current Gain

Figure 5. MJF45H11 DC Current Gain

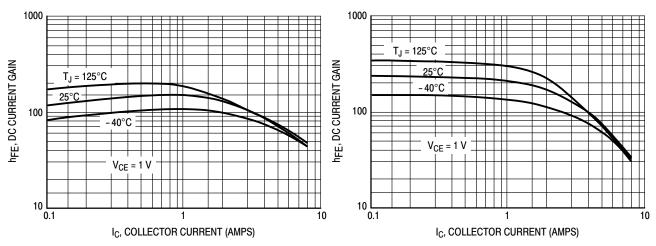


Figure 6. MJF44H11 Current Gain versus Temperature

Figure 7. MJF45H11 Current Gain versus Temperature

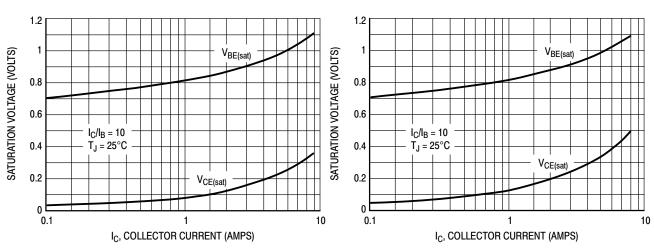


Figure 8. MJF44H11 On-Voltages

Figure 9. MJF45H11 On-Voltages





SCALE 1:1

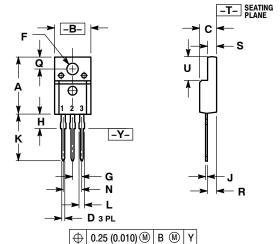
TO-220 FULLPAK CASE 221D-03 ISSUE K

DATE 27 FEB 2009

- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982. 2. CONTROLLING DIMENSION: INCH
- 221D-01 THRU 221D-02 OBSOLETE, NEW STANDARD 221D-03.

	INCHES		MILLIN	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.617	0.635	15.67	16.12
В	0.392	0.419	9.96	10.63
С	0.177	0.193	4.50	4.90
D	0.024	0.039	0.60	1.00
F	0.116	0.129	2.95	3.28
G	0.100 BSC		2.54 BSC	
Н	0.118	0.135	3.00	3.43
J	0.018	0.025	0.45	0.63
K	0.503	0.541	12.78	13.73
L	0.048	0.058	1.23	1.47
N	0.200 BSC		5.08	BSC
Q	0.122	0.138	3.10	3.50
R	0.099	0.117	2.51	2.96
S	0.092	0.113	2.34	2.87
U	0.239	0.271	6.06	6.88

MARKING DIAGRAMS



CATHODE
 ANODE

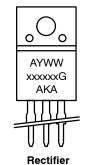
STYLE 1: PIN 1. GATE STYLE 2: PIN 1. BASE STYLE 3: PIN 1. ANODE 2. COLLECTOR 3. EMITTER 2. DRAIN 2. 3. SOURCE STYLE 6: PIN 1. MT 1 2. MT 2 3. GATE STYLE 4: PIN 1. CATHODE

STYLE 5: PIN 1. CATHODE 2. ANODE 3. GATE ANODE 3. CATHODE

O xxxxxxG **AYWW**

Bipolar xxxxxx = Specific Device Code G = Pb-Free Package

Α = Assembly Location Υ = Year = Work Week WW



= Assembly Location

= Polarity Designator

Υ = Year = Work Week WW XXXXXX = Device Code = Pb-Free Package G

AKA

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