Preferred Devices

Complementary Power Transistors

For Isolated Package Applications

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 -

 $V_{CE(sat)} = 1.0 \text{ V (Max)} @ 8.0 \text{ A}$

- 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

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.



ON Semiconductor®

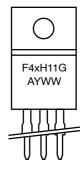
http://onsemi.com

SILICON POWER TRANSISTORS 10 AMPERES 80 VOLTS, 36 WATTS



ISOLATED TO-220 CASE 221D STYLE 2

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

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

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

Characteristic	Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS		1	I	ı	
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) MJF44H1 MJF45H1		_ _	130 230	_ _	pF
Gain Bandwidth Product (I _C = 0.5 Adc, V _{CE} = 10 Vdc, f = 20 MHz) MJF44H1 MJF45H1		_ _	50 40	_ _	MHz
SWITCHING TIMES	•	•	•		
Delay and Rise Times (I _C = 5 Adc, I _{B1} = 0.5 Adc) MJF44H1 MJF45H1		- -	300 135	- -	ns
Storage Time (I _C = 5 Adc, I _{B1} = I _{B2} = 0.5 Adc) MJF44H1 MJF45H1			500 500	- -	ns
Fall Time (I _C = 5 Adc, I _{B1} = I _{B2} = 0.5 Adc) MJF44H1 MJF45H1		- -	140 100	- -	ns

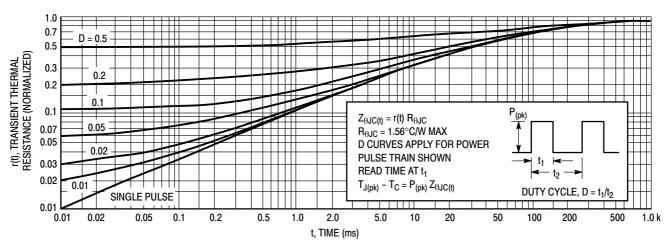


Figure 1. Thermal Response

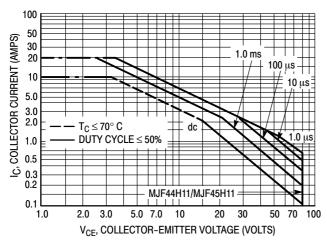


Figure 2. Maximum Rated Forward Bias Safe Operating Area

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.

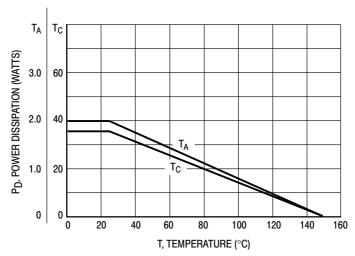


Figure 3. Power Derating

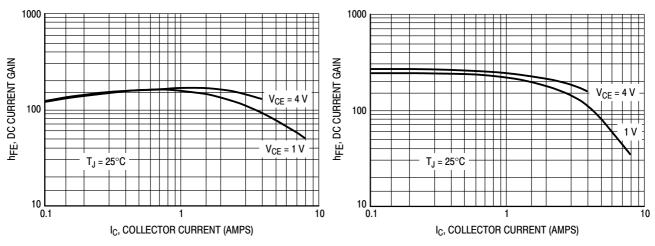


Figure 4. MJF44H11 DC Current Gain

Figure 5. MJF45H11 DC Current Gain

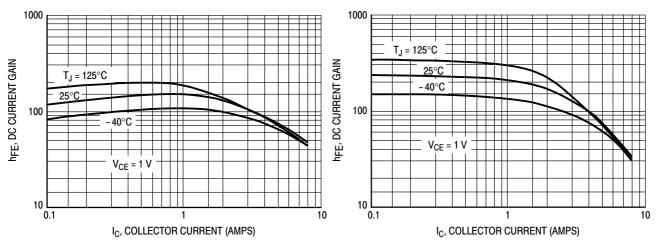


Figure 6. MJF44H11 Current Gain versus Temperature

Figure 7. MJF45H11 Current Gain versus Temperature

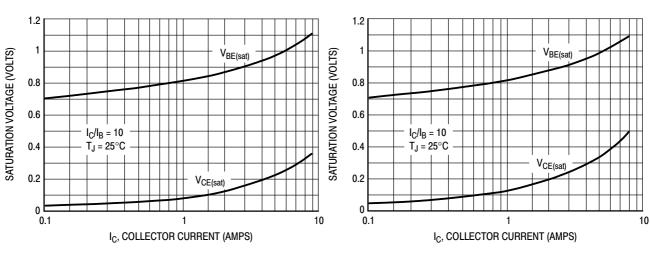


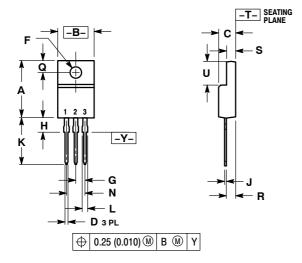
Figure 8. MJF44H11 On-Voltages

Figure 9. MJF45H11 On-Voltages

PACKAGE DIMENSIONS

TO-220 FULLPAK

CASE 221D-03 **ISSUE J**



NOTES:

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

	INCHES		MILLIMETERS	
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

STYLE 2:

COLLECTOR
 EMITTER

PIN 1. BASE

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