

MJF44H11 (NPN), MJF45H11 (PNP)

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 @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	36 0.288	W W/ $^\circ\text{C}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	2.0 0.016	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to 150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

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

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.

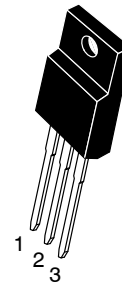
*For additional information on our Pb–Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



ON Semiconductor®

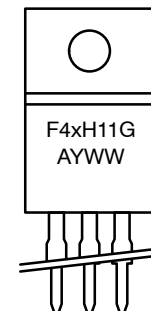
<http://onsemi.com>

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.

MJF44H11 (NPN), MJF45H11 (PNP)

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

Characteristic	Symbol	Min	Typ	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	μA
Emitter Cutoff Current (V _{EB} = 5 Vdc)	I _{EBO}	-	-	10	μA

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 Adc, V _{CE} = 10 Vdc, f = 20 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 Adc, I _{B1} = I _{B2} = 0.5 Adc)	MJF44H11 MJF45H11	t _s	- -	500 500	- -	ns
Fall Time (I _C = 5 Adc, I _{B1} = I _{B2} = 0.5 Adc)	MJF44H11 MJF45H11	t _f	- -	140 100	- -	ns

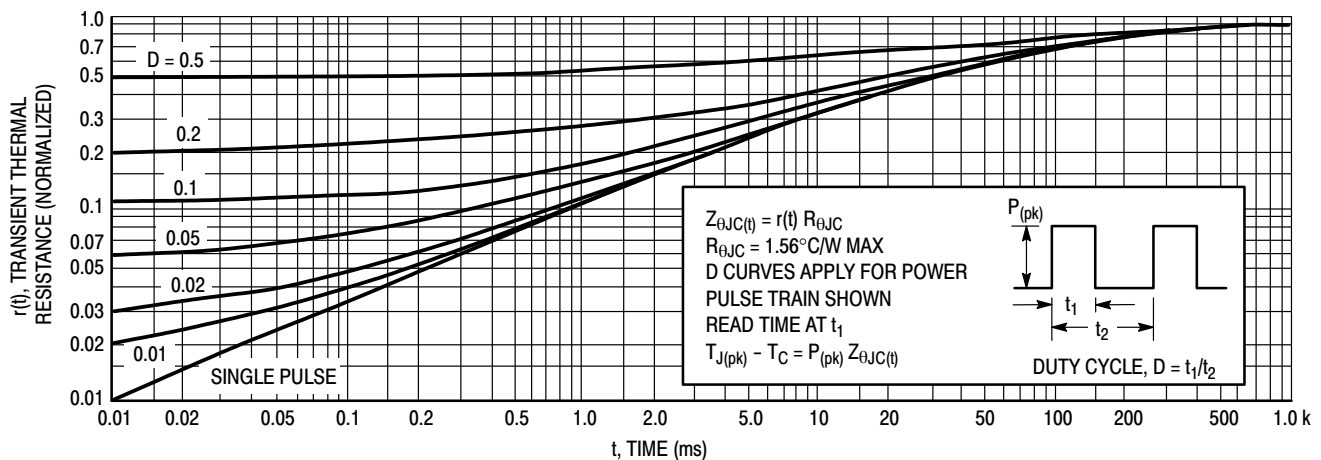


Figure 1. Thermal Response

MJF44H11 (NPN), MJF45H11 (PNP)

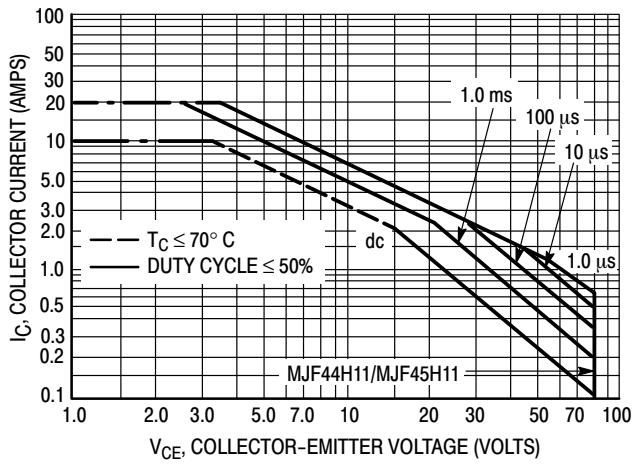


Figure 2. Maximum Rated Forward Bias Safe Operating Area

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 $T_{J(pk)} = 150^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$. $T_{J(pk)}$ 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.

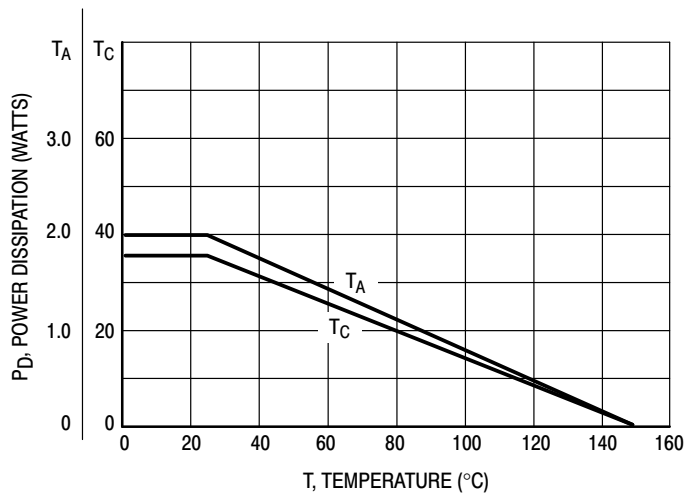


Figure 3. Power Derating

MJF44H11 (NPN), MJF45H11 (PNP)

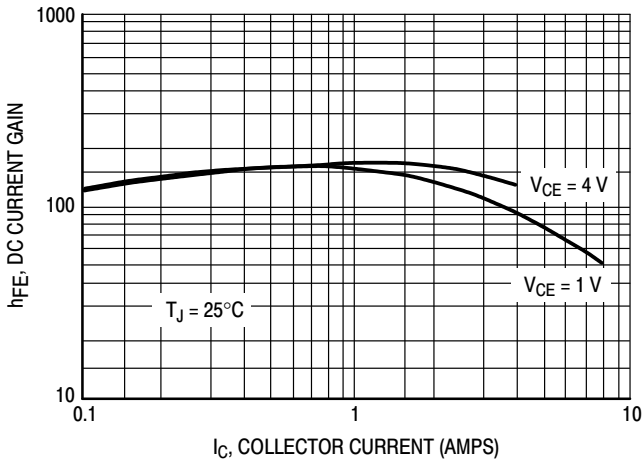


Figure 4. MJF44H11 DC Current Gain

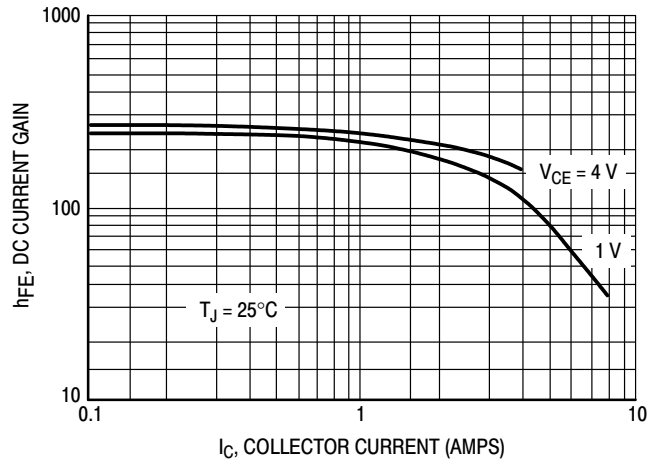


Figure 5. MJF45H11 DC Current Gain

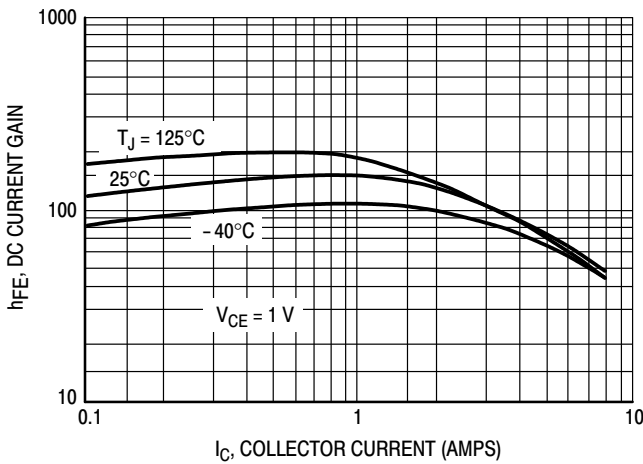


Figure 6. MJF44H11 Current Gain versus Temperature

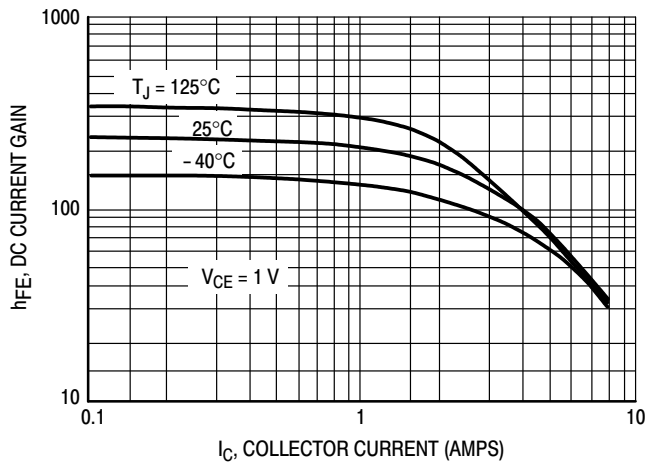


Figure 7. MJF45H11 Current Gain versus Temperature

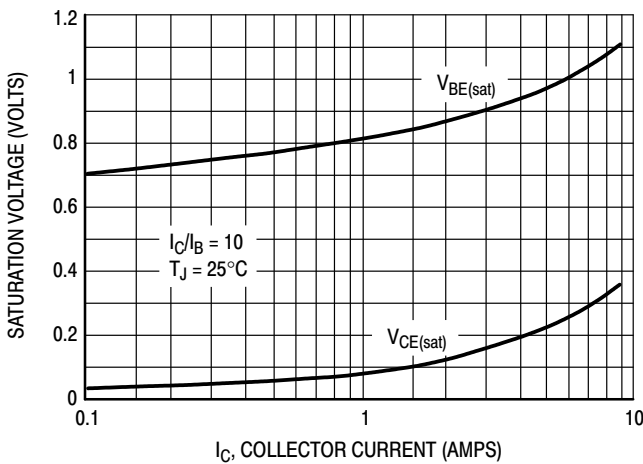


Figure 8. MJF44H11 On-Voltages

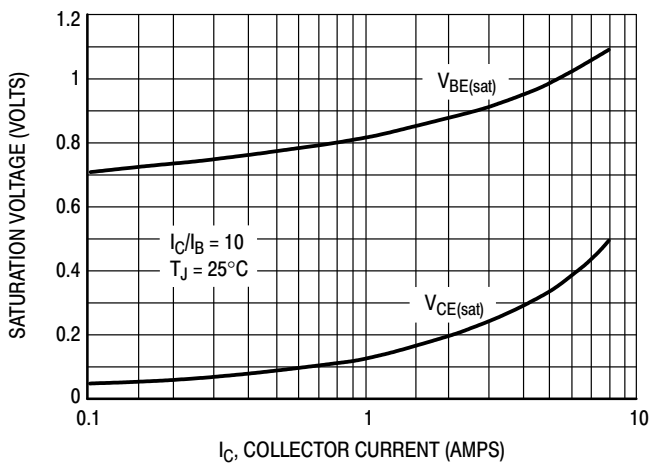
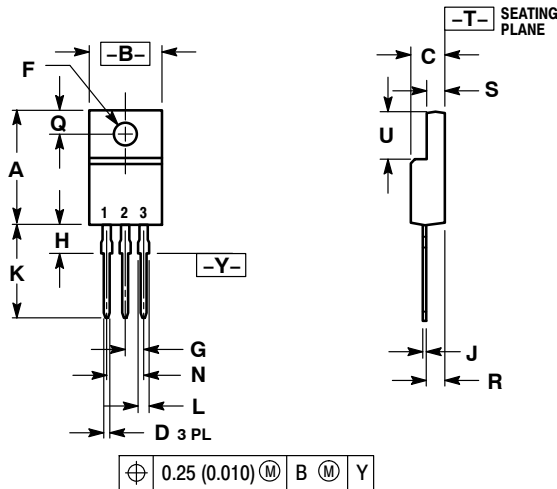


Figure 9. MJF45H11 On-Voltages

MJF44H11 (NPN), MJF45H11 (PNP)

PACKAGE DIMENSIONS

TO-220 FULLPAK CASE 221D-03 ISSUE J



⊕ 0.25 (0.010) (M) B (M) Y

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH
3. 221D-01 THRU 221D-02 OBSOLETE, NEW STANDARD 221D-03.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.617	0.635	15.67	16.12
B	0.392	0.419	9.96	10.63
C	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	
H	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:

- PIN 1. BASE
- COLLECTOR
- EMITTER

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5773-3850

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative