

D45C12 (PNP), D44C12 (NPN)

Complementary Silicon Power Transistor

The D45C12 and D44C12 are for general purpose driver or medium power output stages in CW or switching applications.

Features

- Low Collector-Emitter Saturation Voltage – 0.5 V (Max)
- High f_t for Good Frequency Response
- Low Leakage Current
- Pb-Free Packages are Available*

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	80	Vdc
Collector-Emitter Voltage	V_{CES}	90	Vdc
Emitter Base Voltage	V_{EB}	5.0	Vdc
Collector Current – Continuous Peak (Note 1)	I_C	4.0 6.0	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ @ $T_A = 25^\circ\text{C}$	P_D	30 1.67	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	4.2	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	75	$^\circ\text{C/W}$
Maximum Lead Temperature for Soldering Purposes: 1/8 in from Case for 5 Sec	T_L	275	$^\circ\text{C}$

1. Pulse Width ≤ 6.0 ms, Duty Cycle $\leq 50\%$.

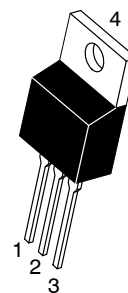
*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



ON Semiconductor®

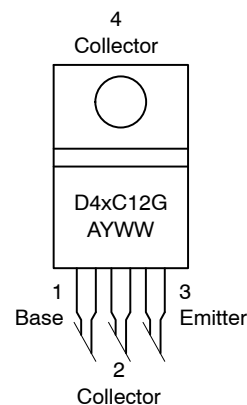
<http://onsemi.com>

4.0 AMPERE COMPLEMENTARY SILICON POWER TRANSISTORS 80 VOLTS



TO-220AB
CASE 221A
STYLE 1

MARKING DIAGRAM & PIN ASSIGNMENT



x = 4 or 5
A = Assembly Location
Y = Year
WW = Work Week
G = Pb-Free Package

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

D45C12 (PNP), D44C12 (NPN)

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

Characteristic	Symbol	Min	Max	Unit
DC Current Gain ($V_{CE} = 1.0\text{ Vdc}$, $I_C = 0.2\text{ Adc}$) ($V_{CE} = 1.0\text{ Vdc}$, $I_C = 1.0\text{ Adc}$) ($V_{CE} = 1.0\text{ Vdc}$, $I_C = 2.0\text{ Adc}$)	h_{FE}	40 20 20	120 – –	–

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

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS

Collector Cutoff Current ($V_{CE} = \text{Rated } V_{CES}$, $V_{BE} = 0$)	I_{CES}	–	–	0.1	μA
Emitter Cutoff Current ($V_{EB} = 5.0\text{ Vdc}$)	I_{EBO}	–	–	10	μA

ON CHARACTERISTICS

Collector–Emitter Saturation Voltage ($I_C = 1.0\text{ Adc}$, $I_B = 50\text{ mAdc}$)	$V_{CE(sat)}$	–	0.135	0.5	Vdc
Base–Emitter Saturation Voltage ($I_C = 1.0\text{ Adc}$, $I_B = 100\text{ mAdc}$)	$V_{BE(sat)}$	–	0.85	1.3	Vdc

DYNAMIC CHARACTERISTICS

Collector Capacitance ($V_{CB} = 10\text{ Vdc}$, $f = 1.0\text{ MHz}$)	C_{cb}	–	125	–	pF
Gain Bandwidth Product ($I_C = 20\text{ mA}$, $V_{CE} = 4.0\text{ Vdc}$, $f = 20\text{ MHz}$)	f_T	–	40	–	MHz

SWITCHING TIMES

Delay and Rise Times ($I_C = 1.0\text{ Adc}$, $I_{B1} = 0.1\text{ Adc}$)	$t_d + t_r$	–	50	75	ns
Storage Time ($I_C = 1.0\text{ Adc}$, $I_{B1} = I_{B2} = 0.1\text{ Adc}$)	t_s	–	350	550	ns
Fall Time ($I_C = 1.0\text{ Adc}$, $I_{B1} = I_{B2} = 0.1\text{ Adc}$)	t_f	–	50	75	ns

ORDERING INFORMATION

Device	Package	Shipping†
D45C12	TO–220AB	50 Units / Rail
D45C12G	TO–220AB (Pb–Free)	
D44C12	TO–220AB	
D44C12G	TO–220AB (Pb–Free)	

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

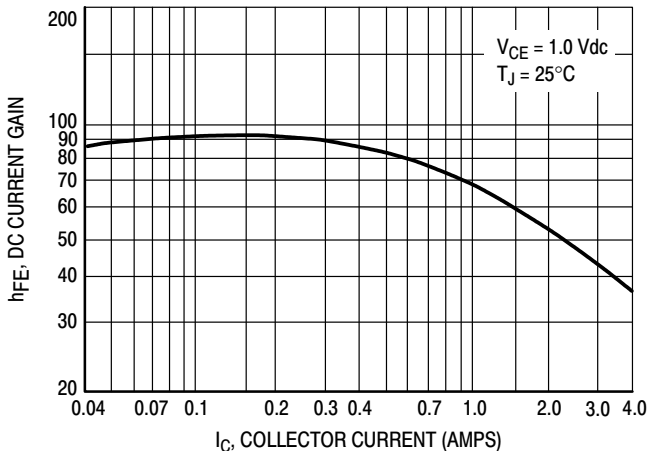


Figure 1. Typical DC Current Gain

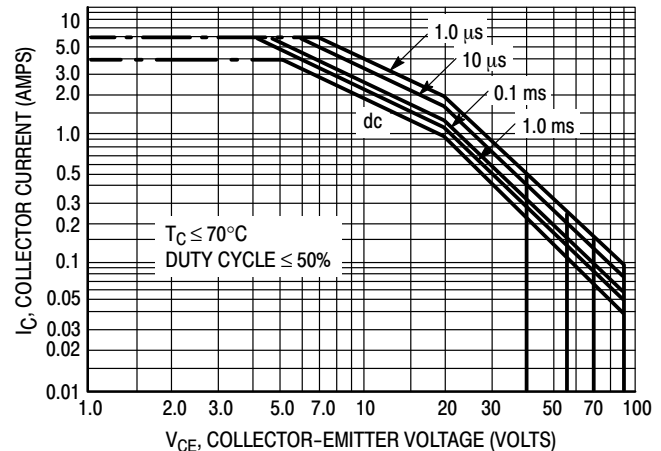


Figure 2. Maximum Rated Forward Bias Safe Operating Area

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** 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. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** 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. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** 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 **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales