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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*

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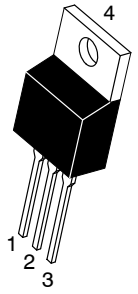
4.0 AMPERE COMPLEMENTARY SILICON POWER TRANSISTORS 80 VOLTS



TO−220AB
CASE 221A
STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector−Emitter Voltage	V_{CEO}	80	Vdc
Collector−Emitter Voltage	VCES	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°C @ T_A = 25°C	P_D	30 1.67	W W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to 150	°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.

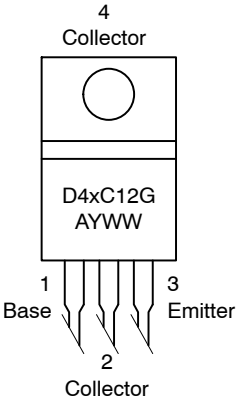
THERMAL CHARACTERISTICS

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

1. Pulse Width ≤ 6.0 ms, Duty Cycle ≤ 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.

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.

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

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

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector Cutoff Current (V_{CE} = Rated V_{CES}, V_{BE} = 0)	I_{CES}	–	–	0.1	μA
Emitter Cutoff Current (V_{EB} = 5.0 Vdc)	I_{EBO}	–	–	10	μA
ON CHARACTERISTICS					
Collector–Emitter Saturation Voltage (I_C = 1.0 Adc, I_B = 50 mAdc)	$V_{CE(sat)}$	–	0.135	0.5	Vdc
Base–Emitter Saturation Voltage (I_C = 1.0 Adc, I_B = 100 mAdc)	$V_{BE(sat)}$	–	0.85	1.3	Vdc
DYNAMIC CHARACTERISTICS					
Collector Capacitance (V_{CB} = 10 Vdc, f = 1.0 MHz)	C_{cb}	–	125	–	pF
Gain Bandwidth Product (I_C = 20 mA, V_{CE} = 4.0 Vdc, f = 20 MHz)	f_T	–	40	–	MHz
SWITCHING TIMES					
Delay and Rise Times (I_C = 1.0 Adc, I_{B1} = 0.1 Adc)	$t_d + t_r$	–	50	75	ns
Storage Time (I_C = 1.0 Adc, I_{B1} = I_{B2} = 0.1 Adc)	t_s	–	350	550	ns
Fall Time (I_C = 1.0 Adc, I_{B1} = I_{B2} = 0.1 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.

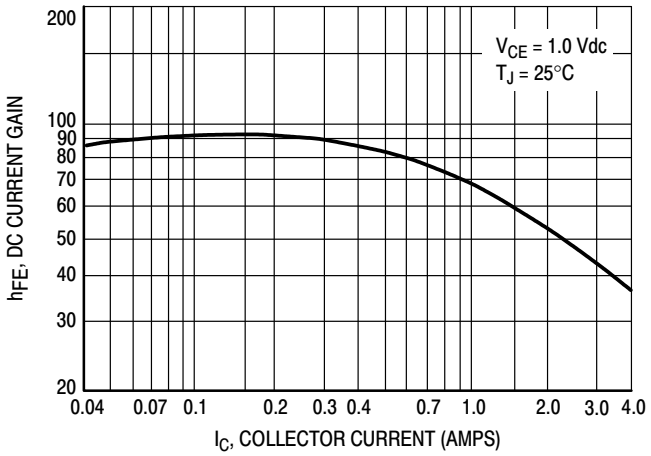


Figure 1. Typical DC Current Gain

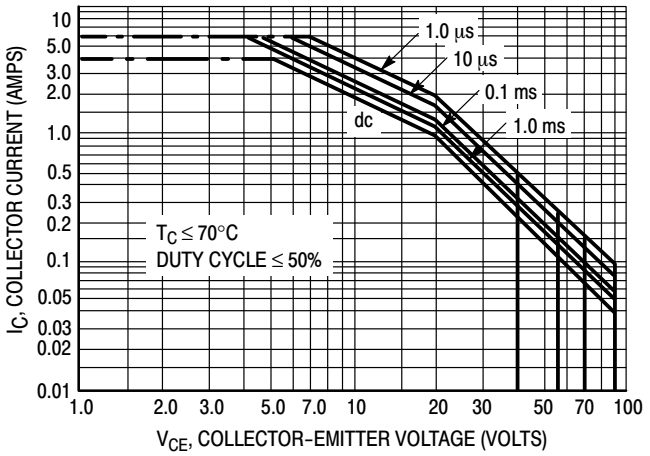


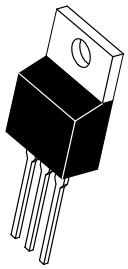
Figure 2. Maximum Rated Forward Bias Safe Operating Area

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

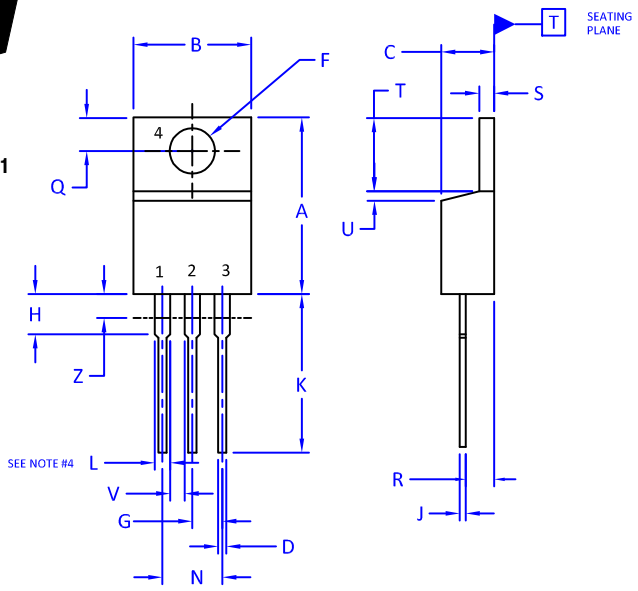
ON Semiconductor®

TO−220
CASE 221A−09
ISSUE AJ

DATE 05 NOV 2019



SCALE 1:1



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 2009.
2. CONTROLLING DIMENSION: INCHES
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.
4. MAX WIDTH FOR F102 DEVICE = 1.35MM

	INCHES		MILLIMETERS	
DIM	MIN.	MAX.	MIN.	MAX.
A	0.570	0.620	14.48	15.75
B	0.380	0.415	9.66	10.53
C	0.160	0.190	4.07	4.83
D	0.025	0.038	0.64	0.96
F	0.142	0.161	3.60	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.024	0.36	0.61
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.41
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	----	1.15	---
Z	----	0.080	---	2.04

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 2:
PIN 1. BASE
2. EMITTER
3. COLLECTOR
4. EMITTER

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

STYLE 4:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. MAIN TERMINAL 2

STYLE 5:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

STYLE 6:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

STYLE 7:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. ANODE

STYLE 8:
PIN 1. CATHODE
2. ANODE
3. EXTERNAL TRIP/DELAY
4. ANODE

STYLE 9:
PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 10:
PIN 1. GATE
2. SOURCE
3. DRAIN
4. SOURCE

STYLE 11:
PIN 1. DRAIN
2. SOURCE
3. GATE
4. SOURCE

STYLE 12:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. NOT CONNECTED

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PUBLICATION ORDERING INFORMATION

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