

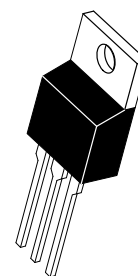
## Complementary Silicon Power Transistors

These complementary silicon power transistors are designed for high-speed switching applications, such as switching regulators and high frequency inverters. The devices are also well-suited for drivers for high power switching circuits.

- Fast Switching —  $t_f = 90$  ns (Max)
- Key Parameters Specified @ 100°C
- Low Collector-Emitter Saturation Voltage —  
 $V_{CE(sat)} = 1.0$  V (Max) @ 8.0 A
- Complementary Pairs Simplify Circuit Designs

**NPN  
D44VH  
PNP  
D45VH**

**15 AMPERE  
COMPLEMENTARY  
SILICON  
POWER TRANSISTORS  
80 VOLTS  
83 WATTS**



**CASE 221A-06  
TO-220AB**

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	80	Vdc
Collector-Emitter Voltage	$V_{CEV}$	100	Vdc
Emitter Base Voltage	$V_{EB}$	7.0	Vdc
Collector Current — Continuous	$I_C$	15	Adc
— Peak (1)	$I_{CM}$	20	
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	83 0.67	Watts 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	$R_{\theta JC}$	1.5	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	°C/W
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	$T_L$	275	°C

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

NOTE: All polarities are shown for NPN transistors. For PNP transistors, reverse polarities.

**D44VH D45VH****ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

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

**OFF CHARACTERISTICS**

Collector–Emitter Sustaining Voltage (1) ( $I_C = 25\text{ mA}$ , $I_B = 0$ )	$V_{CEO(sus)}$	80	—	—	Vdc
Collector–Emitter Cutoff Current ( $V_{CE} = \text{Rated } V_{CEV}$ , $V_{BE(off)} = 4.0\text{ Vdc}$ ) ( $V_{CE} = \text{Rated } V_{CEV}$ , $V_{BE(off)} = 4.0\text{ Vdc}$ , $T_C = 100^\circ\text{C}$ )	$I_{CEV}$	— —	— —	10 100	$\mu\text{Adc}$
Emitter Base Cutoff Current ( $V_{EB} = 7.0\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	—	—	10	$\mu\text{Adc}$

**ON CHARACTERISTICS (1)**

DC Current Gain ( $I_C = 2.0\text{ Adc}$ , $V_{CE} = 1.0\text{ Vdc}$ ) ( $I_C = 4.0\text{ Adc}$ , $V_{CE} = 1.0\text{ Vdc}$ )	$h_{FE}$	35 20	— —	— —	—
Collector–Emitter Saturation Voltage ( $I_C = 8.0\text{ Adc}$ , $I_B = 0.4\text{ Adc}$ ) ( $I_C = 8.0\text{ Adc}$ , $I_B = 0.8\text{ Adc}$ ) ( $I_C = 15\text{ Adc}$ , $I_B = 3.0\text{ Adc}$ , $T_C = 100^\circ\text{C}$ )	$V_{CE(sat)}$	— — — —	— — — —	0.4 1.0 0.8 1.5	Vdc
Base–Emitter Saturation Voltage ( $I_C = 8.0\text{ Adc}$ , $I_B = 0.4\text{ Adc}$ ) ( $I_C = 8.0\text{ Adc}$ , $I_B = 0.8\text{ Adc}$ ) ( $I_C = 8.0\text{ Adc}$ , $I_B = 0.4\text{ Adc}$ , $T_C = 100^\circ\text{C}$ ) ( $I_C = 8.0\text{ Adc}$ , $I_B = 0.8\text{ Adc}$ , $T_C = 100^\circ\text{C}$ )	$V_{BE(sat)}$	— — — —	— — — —	1.2 1.0 1.1 1.5	Vdc

**DYNAMIC CHARACTERISTICS**

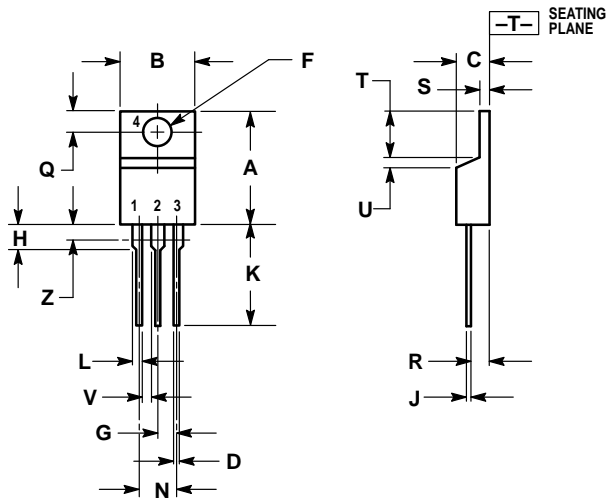
Current Gain Bandwidth Product ( $I_C = 0.1\text{ Adc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 20\text{ MHz}$ )	$f_T$	—	50	—	MHz
Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_C = 0$ , $f_{test} = 1.0\text{ MHz}$ )	$C_{ob}$	— —	120 275	— —	pF

**SWITCHING CHARACTERISTICS**

Delay Time	$(V_{CC} = 20\text{ Vdc}$ , $I_C = 8.0\text{ Adc}$ , $I_{B1} = I_{B2} = 0.8\text{ Adc})$	$t_d$	—	—	50	ns
Rise Time		$t_r$	—	—	250	
Storage Time		$t_s$	—	—	700	
Fall Time		$t_f$	—	—	90	

(1) Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

## PACKAGE DIMENSIONS



## NOTES:


1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
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	1.39
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

CASE 221A-06  
 TO-220AB  
 ISSUE Y

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola 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 consequential or incidental damages. "Typical" parameters can and do vary in different applications. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola 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 Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola 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 Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

**How to reach us:**

**USA / EUROPE:** Motorola Literature Distribution;  
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447

**MFAX:** RMFAX0@email.sps.mot.com – TOUCHTONE (602) 244-6609  
**INTERNET:** <http://Design-NET.com>

**JAPAN:** Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, Toshikatsu Otsuki,  
6F Seibu-Butsuryu-Center, 3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-3521-8315

**HONG KONG:** Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,  
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

**MOTOROLA****D44VH/D**