

# MOTOROLA SEMICONDUCTOR

## TECHNICAL DATA

### NPN D44VH Series PNP D45VH Series

#### 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

15 AMPERE

#### COMPLEMENTARY SILICON POWER TRANSISTORS

30, 45, 60 and 80 VOLTS  
83 WATTS

#### MAXIMUM RATINGS

Rating	Symbol	D44VH or D45VH				Unit
		1	4	7	10	
Collector-Emitter Voltage	$V_{CEO}$	30	45	60	80	Vdc
Collector-Emitter Voltage	$V_{CEV}$	60	70	80	100	Vdc
Emitter Base Voltage	$V_{EB}$	7.0				Vdc
Collector Current — Continuous Peak (1)	$I_{CM}$	15 20				Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	$P_D$	83 1.67				Watts W/°C
Operating and Storage Junction Temperature Range	$T_J$ , $T_{stg}$	-55 to 150				°C

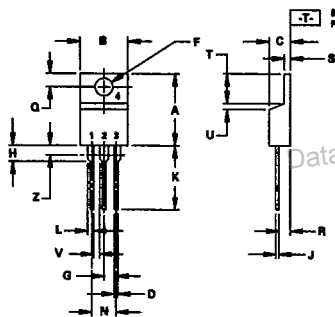
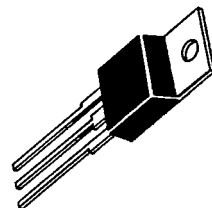
DataSheet4U.com

#### 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 1: All polarities are shown for NPN transistors. For PNP transistors, reverse polarities.  
Note 2: See MJE6220/5230 Series data sheet for characteristic curves.



NOTES:

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

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	14.48	15.75	0.570	0.620
B	9.66	10.28	0.380	0.405
C	4.07	4.82	0.160	0.190
D	0.64	0.86	0.025	0.035
F	3.61	3.73	0.142	0.147
G	2.42	2.66	0.095	0.105
H	2.86	3.65	0.115	0.155
J	0.46	0.71	0.018	0.028
K	12.70	14.27	0.500	0.562
L	1.15	1.29	0.045	0.055
N	4.83	5.33	0.190	0.210
Q	2.56	3.04	0.100	0.120
R	2.04	2.79	0.080	0.110
S	1.15	1.29	0.045	0.055
T	5.97	6.47	0.235	0.255
U	0.00	1.27	0.000	0.050
V	1.15	—	0.045	—
Z	—	2.04	—	0.080

STYLE 1.

1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

CASE 221A-04  
TO-220AB

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

Characteristic	Symbol	Min	Typ	Max	Unit	
<b>OFF CHARACTERISTICS</b>						
Collector-Emitter Sustaining Voltage (1) ( $I_C = 25\text{ mA}$ , $I_B = 0$ )	D44VH1, D45VH1 D44VH4, D45VH4 D44VH7, D45VH7 D44VH10, D45VH10	$V_{CE(sus)}$	30 45 60 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	$\mu\text{A}$
Emitter Base Cutoff Current ( $V_{EB} = 7.0\text{ Vdc}$ , $I_C = 0$ )		$I_{EBO}$	—	—	10	$\mu\text{A}$

**ON CHARACTERISTICS (1)**

DC Current Gain ( $I_C = 2.0\text{ A}$ , $V_{CE} = 1.0\text{ Vdc}$ ) ( $I_C = 4.0\text{ A}$ , $V_{CE} = 1.0\text{ Vdc}$ )		$h_{FE}$	35 20	— —	— —	—
Collector-Emitter Saturation Voltage ( $I_C = 8.0\text{ A}$ , $I_B = 0.4\text{ A}$ ) ( $I_C = 8.0\text{ A}$ , $I_B = 0.8\text{ A}$ ) ( $I_C = 15\text{ A}$ , $I_B = 3.0\text{ A}$ , $T_C = 100^\circ\text{C}$ )	D44VH Series D45VH Series D44VH Series D45VH Series	$V_{CE(sat)}$	— — — —	— — — —	0.4 1.0 0.8 1.5	Vdc
Base-Emitter Saturation Voltage ( $I_C = 8.0\text{ A}$ , $I_B = 0.4\text{ A}$ ) ( $I_C = 8.0\text{ A}$ , $I_B = 0.8\text{ A}$ ) ( $I_C = 8.0\text{ A}$ , $I_B = 0.4\text{ A}$ , $T_C = 100^\circ\text{C}$ ) ( $I_C = 8.0\text{ A}$ , $I_B = 0.8\text{ A}$ , $T_C = 100^\circ\text{C}$ )	D44VH Series D45VH Series D44VH Series D45VH Series	$V_{BE(sat)}$	— — — —	— — — —	1.2 1.0 1.1 1.5	Vdc

**DYNAMIC CHARACTERISTICS**

Current Gain Bandwidth Product ( $I_C = 0.1\text{ A}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 20\text{ MHz}$ )		$f_T$	—	50	—	MHz
Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_C = 0$ , $f_{test} = 1.0\text{ MHz}$ )	D44VH Series D45VH Series	$C_{cb}$	— —	120 275	— —	pF

**SWITCHING CHARACTERISTICS**

Delay Time	$(V_{CC} = 20\text{ Vdc}$ , $I_C = 8.0\text{ A}$ , $I_{B1} = I_{B2} = 0.8\text{ A}$ )	$t_d$	—	—	80	ns
Rise Time		$t_r$	—	—	250	
Storage Time		$t_s$	—	—	700	
Fall Time		$t_f$	—	—	90	

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