

MOTOROLA SEMICONDUCTOR TECHNICAL DATA

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.

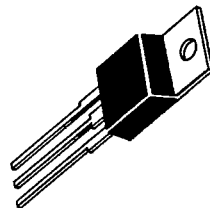
- Fast Switching — $t_f = 90$ ns (Max)
- Key Parameters Specified @ 100°C
- Low Collector-Emitter Saturation Voltage — $V_{CE(sat)} = 1.0$ V (Max) @ 8.0 A
- Complementary Pairs Simplify Circuit Designs

NPN D44VH Series PNP D45VH Series

15 AMPERE

COMPLEMENTARY SILICON POWER TRANSISTORS

30, 45, 60 and 80 VOLTS
83 WATTS



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MAXIMUM RATINGS

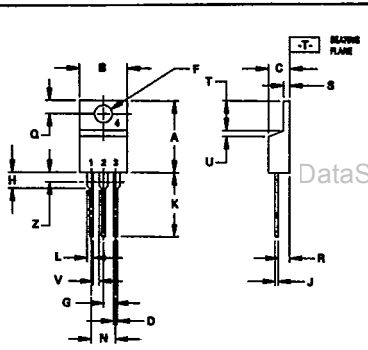
Rating	Symbol	D44VH or D45VH				Unit
		1	4	7	10	
Collector-Emitter Voltage	V_{CEO}	30	45	60	80	Vdc
Collector-Emitter Voltage	V_{CEV}	50	70	80	100	Vdc
Emitter Base Voltage	V_{EB}	7.0				Vdc
Collector Current — Continuous	I_C	15				Adc
Collector Current — Peak (1)	I_{CM}	20				
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	83				Watts
		1.67				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 ≤ 6.0 ms, Duty Cycle $\leq 50\%$.

Note 1: All polarities are shown for NPN transistors. For PNP transistors, reverse polarities.
Note 2: See MJE5220/5230 Series data sheet for characteristic curves.



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIM Z DEFINES 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	9.86	10.28	0.390	0.405
C	4.07	4.82	0.160	0.190
D	0.64	0.96	0.025	0.035
F	3.81	3.73	0.150	0.147
G	2.42	2.66	0.095	0.105
H	2.80	3.93	0.110	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	0.051
M	4.83	5.33	0.190	0.210
O	2.54	3.04	0.100	0.120
R	2.04	2.79	0.080	0.110
S	1.15	1.39	0.045	0.055
T	5.57	6.47	0.220	0.255
U	0.50	1.27	0.020	0.050
V	1.15	—	0.045	—
Z	—	2.04	—	0.080

- STYLE 1:
PH 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
OFF CHARACTERISTICS					
Collector-Emitter Sustaining Voltage (1) ($I_C = 25\text{ mA}$, $I_B = 0$)	D44VH1, D45VH1 D44VH4, D45VH4 D44VH7, D45VH7 D44VH10, D45VH10	$V_{CEO(sus)}$	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}	— —	— —	μA dc
Emitter Base Cutoff Current ($V_{EB} = 7.0\text{ Vdc}$, $I_C = 0$)		I_{EBO}	—	—	μA dc

ON CHARACTERISTICS (1)

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

DYNAMIC CHARACTERISTICS

Current Gain Bandwidth Product ($I_C = 0.1\text{ A}$ dc, $V_{CE} = 10\text{ Vdc}$, $f = 20\text{ MHz}$)		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 Vdc, I _C = 8.0 A, I _{B1} = I _{B2} = 0.8 A)	t_d	—	—	50	ns
Rise Time		t_r	—	—	250	
Storage Time		t_s	—	—	700	
Fall Time		t_f	—	—	90	

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