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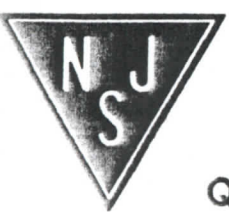
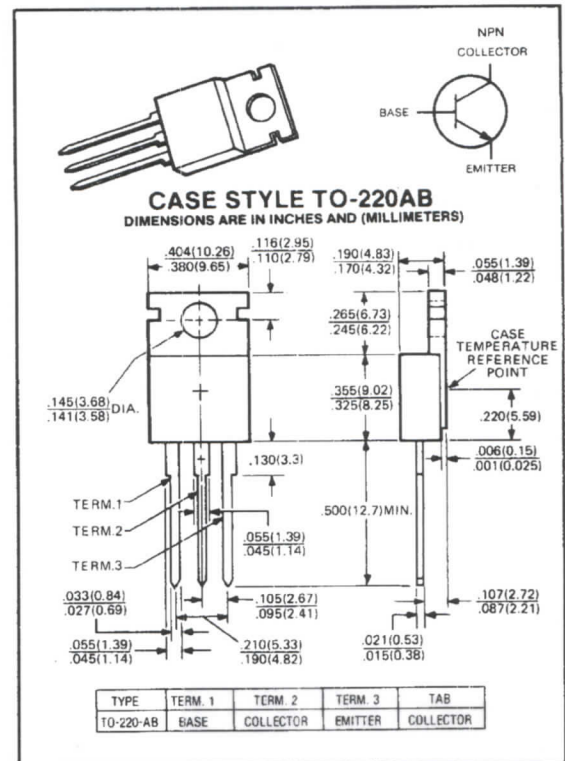
**D44VH Series**  
 30-80 VOLTS  
 15 AMP, 83 WATTS

**VERY HIGH SPEED  
 NPN POWER TRANSISTORS**  
 COMPLEMENTARY TO THE D45VH SERIES

The D44VH is an NPN power transistor especially designed for use in switching circuits such as switching regulators, high-frequency inverters/converters and other applications where very fast switching and low-saturation voltages are necessary. This device complements the D45VH PNP power transistor and is characterized with performance information which relates directly to switching.

**Features:**

- Fast Switching  $t_s \leq 700$  ns resistive  
 $t_f \leq 200$  ns
- Low  $V_{CE(sat)} \leq 0.4V @ I_C = 8A$



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**Quality Semi-Conductors**

maximum ratings ( $T_A = 25^\circ\text{C}$ ) (unless otherwise specified)

RATING	SYMBOL	D44VH1	D44VH4	D44VH7	D44VH10	UNIT
Collector-Emitter Voltage	$V_{CEO(sus)}$	30	45	60	80	V
Collector-Emitter Voltage	$V_{CEX}$	40	55	70	90	V
Collector-Emitter Voltage	$V_{CEV}$	50	65	80	100	V
Emitter Base Voltage	$V_{EB}$		7			V
Collector Current — Continuous	$I_C$		15			A
— Peak (1)	$I_{CM}$		20			
Base Current — Continuous	$I_B$		5			A
— Peak (1)	$I_{BM}$		10			
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	$P_D$		83			Watts
Derate above $25^\circ\text{C}$			33			W/ $^\circ\text{C}$
			.67			
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$		-55 to +150			$^\circ\text{C}$

### thermal characteristics

CHARACTERISTICS	SYMBOL	MAX	UNIT
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.5	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	74	$^\circ\text{C}/\text{W}$
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	$T_L$	235	$^\circ\text{C}$

(1) Pulse measurement condition  $PW \leq 6.0$  ms, See Figure 14.

electrical characteristics ( $T_C = 25^\circ\text{C}$ ) (unless otherwise specified)

CHARACTERISTICS	SYMBOL	MIN	MAX	UNIT
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### off characteristics<sup>(1)</sup>

Collector-Emitter Sustaining Voltage <sup>(1)</sup> ( $I_C = 100\text{mA}, I_B = 0$ )	$V_{CEO(sus)}$	30	—	V
D44VH1		45	—	
D44VH4		60	—	
D44VH7		80	—	
D44VH10				
Collector-Emitter Voltage <sup>(2)</sup> ( $I_C = 1\text{A}, V_{CLAMP} = \text{Rated } V_{CEX}, T_C = 100^\circ\text{C}$ )	$V_{CEX}$	40	—	V
D44VH1		55	—	
D44VH4		65	—	
D44VH7		90	—	
D44VH10				
Collector Cutoff Current ( $V_{CEV} = \text{Rated Value}, V_{BE(off)} = 4.0\text{V}$ )	$I_{CEV}$	—	10	$\mu\text{A}$
( $V_{CEV} = \text{Rated Value}, V_{BE(off)} = 4.0\text{V}, T_C = 100^\circ\text{C}$ )		—	100	
Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CEV}, R_{BE} = 50 \Omega, T_C = 100^\circ\text{C}$ )	$I_{CER}$	—	100	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = 7\text{V}, I_C = 0$ )	$I_{EBO}$	—	10	$\mu\text{A}$

## second breakdown

Second Breakdown with Base Forward Biased	FBSOA	SEE FIGURE 7
Second Breakdown with Base Reverse Biased	RBSOA	SEE FIGURE 8

## on characteristics<sup>(1)</sup>

DC Current Gain ( $I_C = 2\text{ A}$ , $V_{CE} = 1\text{ V}$ ) ( $I_C = 4\text{ A}$ , $V_{CE} = 1\text{ V}$ )	$h_{FE}$	35 20	-- --	--
Collector-Emitter Saturation Voltage ( $I_C = 8\text{ A}$ , $I_B = 0.4\text{ A}$ ) ( $I_C = 8\text{ A}$ , $I_B = 0.4\text{ A}$ , $T_C = 100^\circ\text{C}$ ) ( $I_C = 15\text{ A}$ , $I_B = 3.0\text{ A}$ , $T_C = 100^\circ\text{C}$ )	$V_{CE(sat)}$	-- -- --	0.4 0.5 0.8	V
Base-Emitter Saturation Voltage ( $I_C = 8\text{ A}$ , $I_B = 0.4\text{ A}$ ) ( $I_C = 8\text{ A}$ , $I_B = 0.4\text{ A}$ , $T_C = 100^\circ\text{C}$ )	$V_{BE(sat)}$	-- --	1.2 1.1	V

## dynamic characteristics

Typical

Current-Gain — Bandwidth Product ( $I_C = 0.1\text{ A}$ , $V_{CE} = 10\text{ V}$ , $f_{test} = 1\text{ MHz}$ )	$f_T$	50	MHz
Output Capacitance ( $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f_{test} = 1\text{ MHz}$ )	$C_{OB}$	120	PF

## switching characteristics

Maximum

Resistive Load (See Figure 16 for Test Circuit)		$T_C$	25°C	100°C		
Delay Time	$V_{CC} = 20\text{ V}$ , $I_C = 8\text{ A}$ $I_{B1} = I_{B2} = 0.8\text{ A}$ $t_p = 25\ \mu\text{sec}$	$t_d$	50	--	nsec	
Rise Time		$t_r$	250	--	nsec	
Storage Time		$t_s$	700	--	nsec	
Fall Time		$t_f$	200	--	nsec	
Inductive Load, Clamped (See Figure 15 for Test Circuit)						
Storage Time	$V_{CC} = 20\text{ V}$ , $I_C = 8\text{ A}$ $V_{CLAMP} = \text{Rated } V_{CEX}$ $I_{B1} = 0.8\text{ A}$ , $V_{BE(off)} = -5\text{ V}$ $L = 200\ \mu\text{h}$	$t_s$	800	--	nsec	
Fall Time		$t_f$	180	400	nsec	
		Typical				
Storage Time		$t_s$	280	370	nsec	
Fall Time	$t_f$	130	150	nsec		

(1) Pulse Duration = 300  $\mu\text{sec}$ , Duty Factor  $\leq 2\%$ .

(2) See Figure 15 for Test Circuit.