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D64VS3,4,5

300-400 VOLTS
15 AMP, 195 WATTS

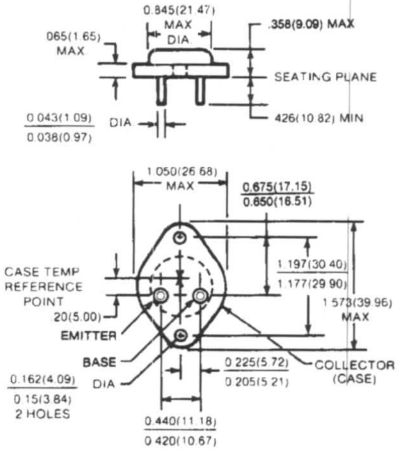
The D64VS series of NPN power transistors is designed for use in power switching applications requiring high-voltage capability, fast switching speeds and low-saturation voltages. These devices are optimized to provide a unique combination of ultra-low switching losses and high safe-operating area (SOA), ideally suited for off-line switching power supplies, converter circuits and pulse width modulated regulators.

Features:

- Performance information tailored for switching
- 100°C maximum limits specified for:
  - Switching times
  - Saturation voltages
  - Leakage currents
- RBSOA (V_{CEX} = 300 to 400V) at rated I_C continuous.
- Very fast turn-off, $t_f < 100$ nsec (typ.) @ 15A — Inductive Load

CASE STYLE TO-204AA (TO-3)

DIMENSIONS ARE IN INCHES AND (MILLIMETERS)



maximum ratings

RATING	SYMBOL	D64VS3	D64VS4	D64VS5	UNITS
Collector-Emitter Voltage	V_{CEO}	300	350	400	Volts
Collector-Emitter Voltage	V_{CEX}	300	350	400	Volts
Collector-Emitter Voltage	V_{CEV}	450	500	550	Volts
Emitter Base Voltage	V_{EBO}	7	7	7	Volts
Collector Current — Continuous Peak(1)	I_C I_{CM}	15 30	15 30	15 30	A
Base Current — Continuous Peak(1)	I_B I_{BM}	5 10	5 10	5 10	A
Emitter Current — Continuous Peak(1)	I_E I_{EM}	20 35	20 35	20 35	A
Total Power Dissipation @ Tc = 25°C @ Tc = 100°C Derate above 25°C	P_D	195 111 1.11	195 111 1.11	195 111 1.11	Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +200	-65 to +200	-65 to +200	°C

thermal characteristics

Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.9	0.9	0.9	°C/W
Maximum Lead Temperature for Soldering Purpose: ⅛" from Case for 5 Seconds	T_L	235	235	235	°C

(1) Pulse condition, $t_p \leq 5$msec.

NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

Quality Semi-Conductors

electrical characteristics (T_C = 25° C) (unless otherwise specified)

CHARACTERISTIC		SYMBOL	MIN	MAX	UNIT

off characteristics

Collector-Emitter Sustaining Voltage(1) (I_C = 100mA)	D64VS3 D64VS4 D64VS5	$V_{CEO(sus)}$	300 350 400	— — —	Volts
Collector-Emitter Voltage (I_C = 15A, I_{B1} = 2.5A, I_{B2} = 3.0A) ($V_{BE(OFF)}$ = -6V, L = 200 μh)	D64VS3 D64VS4 D64VS5	V_{CEX}	300 350 400	— — —	Volts
Collector Cutoff Current (V_{CEV} = Rated Value, $V_{BE(OFF)}$ = -1.5V) (V_{CEV} = Rated Value, $V_{BE(OFF)}$ = -1.5V, T_C = 100° C)		I_{CEV}	— —	0.1 1.0	mA
Emitter Cutoff Current (V_{EB} = 7V)		I_{EBO}	—	1.0	mA

second breakdown

Second Breakdown with Base Forward Biased	FBSOA	SEE FIGURE 13	
Clamped Inductive SOA with Base Reversed Bias	RBSOA	SEE FIGURE 14	

on characteristics

DC Current Gain (I_C = 10A, V_{CE} = 2V) (I_C = 15A, V_{CE} = 2V)	h_{FE}	10 8	— —	—
Collector-Emitter Saturation Voltage (I_C = 10A, I_B = 1.67A) (I_C = 15A, I_B = 2.5A) (I_C = 15A, I_B = 2.5A, T_C = 100° C)	$V_{CE(SAT)}$	— — —	0.7 1.0 1.5	Volts
Base-Emitter Saturation Voltage (I_C = 15A, I_B = 2.5A) (I_C = 15A, I_B = 2.5A, T_C = 100° C)	$V_{BE(SAT)}$	— —	1.5 1.5	Volts

dynamic characteristics

Current Gain — Bandwidth Product (I_C = 1.0A, V_{CE} = 10V, f_{test} = 1.0 MHz)	f_T	15	50	MHz
Output Capacitance (V_{CB} = 10V, I_E = 0, f = 0.1 MHz)	C_{OB}	150	360	pF

switching characteristics

			MAXIMUM		
Resistive Load (See Figure 17 for Test Circuit)		T_C	25° C	100° C	
Delay Time	V_{CC} = 250V, I_C = 15A I_{B1} = 2.5, I_{B2} = 3.0A, t_p = 50 μsec	t_d	0.1	0.2	μs
Rise Time		t_r	0.5	0.7	μsec
Storage Time		t_s	2.5	3.0	μsec
Fall Time		t_f	0.4	0.7	μsec
Inductive Load, Clamped (See Figure 17 for Test Circuit)					
Storage Time	I_C = 15A, V_{CLAMP} = 250V I_{B1} = 2.5A, I_{B2} = 3.0A, $V_{BE(OFF)}$ = -6V L = 200 μh, t_p = 25μsec	t_s	3.0	3.5	μs
Fall Time		t_f	0.3	0.6	μsec
			TYPICAL		
Storage Time		t_s	1.8	2.5	μsec
Fall Time		t_f	.085	.13	μsec

(1) Pulse Duration = 300μs, Duty Factor ≤ 2%. Do not measure on a curve tracer.