MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

NPN D44E Series PNP D45E Series

COMPLEMENTARY SILICON POWER DARLINGTON TRANSISTORS

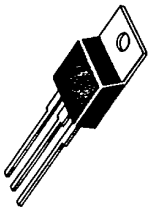
. . . for general purpose power amplification and switching such as output or driver stages in applications such as switching regulators, converters and power amplifiers.

- Low Collector-Emitter Saturation Voltage — $V_{CE(sat)}$ = 2.0 V (Max) @ 10 A
- High DC Current Gain — 1000 (Min) @ 5.0 Adc
- Complementary Pairs Simplifies Designs

DARLINGTON
10 AMPERE

COMPLEMENTARY SILICON POWER TRANSISTORS

40-80 VOLTS
50 WATTS



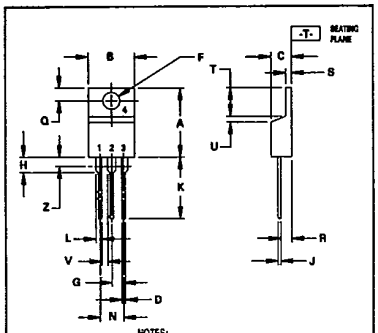
MAXIMUM RATINGS

Rating	Symbol	D44E or D45E 1	2	3	Unit
Collector-Emitter Voltage	V_{CEO}	40	60	80	Vdc
Emitter Base Voltage	V_{EB}		7.0		Vdc
Collector Current — Continuous Peak (1)	I_C		10 20		Adc
Total Power Dissipation @ T_C = 25°C @ T_A = 25°C	P_D		50 1.67		Watts
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	$R_{\theta JC}$	2.5	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	75	°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 ≤ 50%.



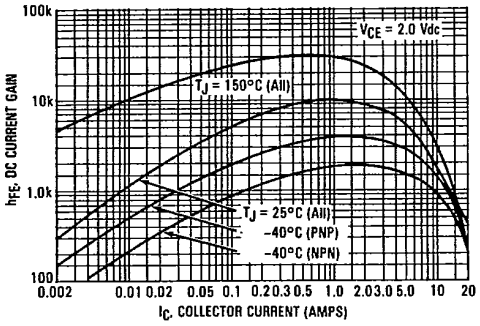
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIM Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED

DIM	MILLIMETERS MIN	MAX	INCHES 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	0.88	0.025	0.035
F	3.61	3.73	0.142	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	1.39	0.045	0.055
N	4.83	5.33	0.190	0.210
Q	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	5.97	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.
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

CASE 221A-04
TO-220AB

FIGURE 1 — TYPICAL DC CURRENT GAIN



3

T-33-33

D44E Series NPN, D45 Series PNP

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector Cutoff Current (V_{CE} = Rated V_{CEO}, V_{BE} = 0)	I_{CES}	—	—	10	μA
Emitter Cutoff Current (V_{EB} = 7.0 Vdc)	I_{EBO}	—	—	1.0	μA
ON CHARACTERISTICS (1)					
DC Current Gain (I_C = 5.0 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	1000	—	—	—
Collector-Emitter Saturation Voltage (I_C = 5.0 Adc, I_B = 10 mAdc) (I_C = 10 Adc, I_B = 20 mAdc)	$V_{CE(sat)}$	— —	— —	1.5 2.0	Vdc
Base-Emitter Saturation Voltage (I_C = 5.0 Adc, I_B = 10 mAdc)	$V_{BE(sat)}$	—	—	2.5	Vdc
DYNAMIC CHARACTERISTICS					
Collector Capacitance (V_{CB} = 10 Vdc, f_{test} = 1.0 MHz) D44E Series D45E Series	C_{CBO}	— —	— —	130 220	pF
SWITCHING CHARACTERISTICS					
Delay and Rise Times (I_C = 10 Adc, I_{B1} = 20 mAdc)	$t_d + t_r$	—	0.6	—	μs
Storage Time (I_C = 10 Adc, I_{B1} = I_{B2} = 20 mAdc)	t_s	—	2.0	—	μs
Fall Time (I_C = 10 Adc, I_{B1} = I_{B2} = 20 mAdc)	t_f	—	0.5	—	μs

SAFE OPERATING AREA INFORMATION

FIGURE 2 — MAXIMUM RATED FORWARD BIAS SAFE OPERATING AREA (NPN)

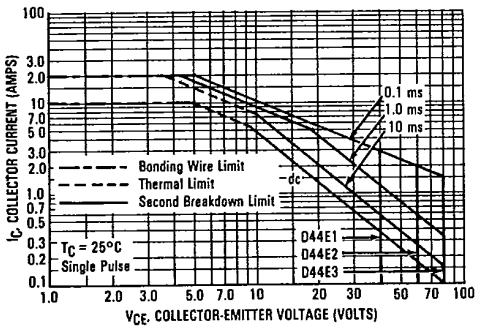


FIGURE 3 — MAXIMUM RATED FORWARD BIAS SAFE OPERATING AREA (PNP)

