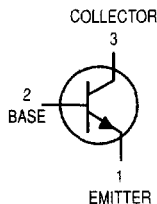


One Watt High Voltage Transistor

NPN Silicon

MPSW42

Motorola Preferred Device



CASE 29-05, STYLE 1
TO-92 (TO-226AE)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	300	Vdc
Collector–Base Voltage	V_{CBO}	300	Vdc
Emitter–Base Voltage	V_{EBO}	6.0	Vdc
Collector Current — Continuous	I_C	500	mA _{dc}
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	1.0 8.0	Watt mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	2.5 20	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	50	$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ⁽¹⁾ ($I_C = 1.0 \text{ mA}_{dc}, I_B = 0$)	$V_{(BR)CEO}$	300	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 100 \mu\text{A}_{dc}, I_E = 0$)	$V_{(BR)CBO}$	300	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 100 \mu\text{A}_{dc}, I_C = 0$)	$V_{(BR)EBO}$	6.0	—	Vdc
Collector Cutoff Current ($V_{CB} = 200 \text{ Vdc}, I_E = 0$)	I_{CBO}	—	0.1	μA_{dc}
Emitter Cutoff Current ($V_{EB} = 6.0 \text{ Vdc}, I_C = 0$)	I_{EBO}	—	0.1	μA_{dc}

1. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

Preferred devices are Motorola recommended choices for future use and best overall value.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS				
DC Current Gain (I _C = 1.0 mA, V _{CE} = 10 Vdc) (I _C = 10 mA, V _{CE} = 10 Vdc) (I _C = 30 mA, V _{CE} = 10 Vdc)	h _{FE}	25 40 40	— — —	—
Collector-Emitter Saturation Voltage (I _C = 20 mA, I _B = 2.0 mA)	V _{CE(sat)}	—	0.5	Vdc
Base-Emitter Saturation Voltage (I _C = 20 mA, I _B = 2.0 mA)	V _{BE(sat)}	—	0.9	Vdc
SMALL-SIGNAL CHARACTERISTICS				
Current-Gain — Bandwidth Product (I _C = 10 mA, V _{CE} = 20 Vdc, f = 20 MHz)	f _T	50	—	MHz
Collector Capacitance (V _{CB} = 20 Vdc, I _E = 0, f = 1.0 MHz)	C _{cb}	—	3.0	pF

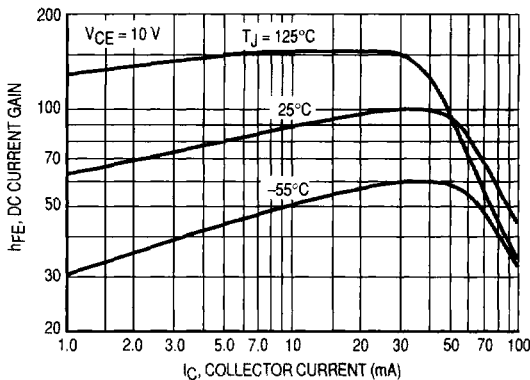


Figure 1. DC Current Gain

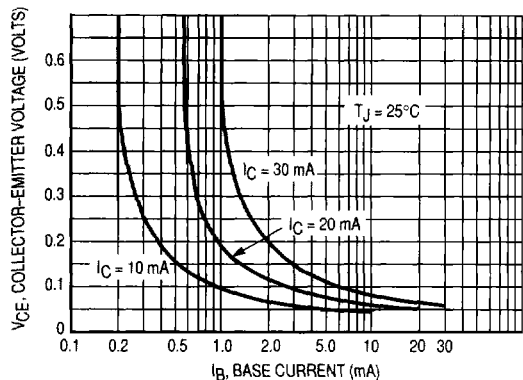


Figure 2. Collector Saturation Region

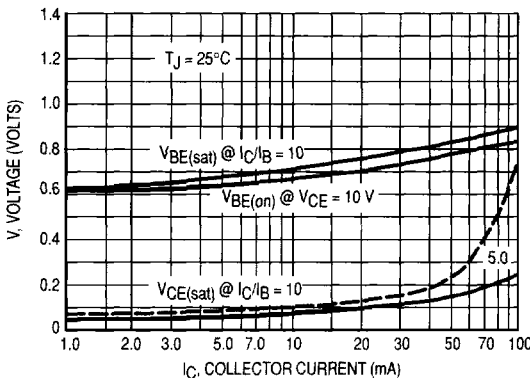


Figure 3. "On" Voltages

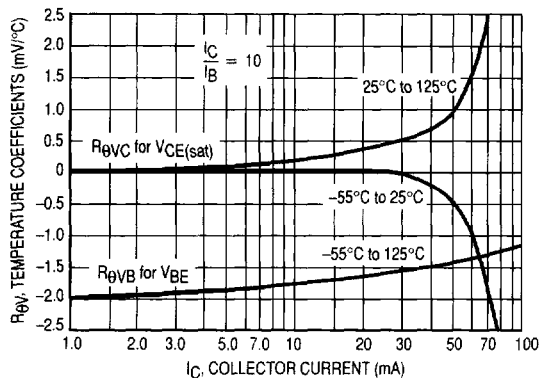


Figure 4. Temperature Coefficients

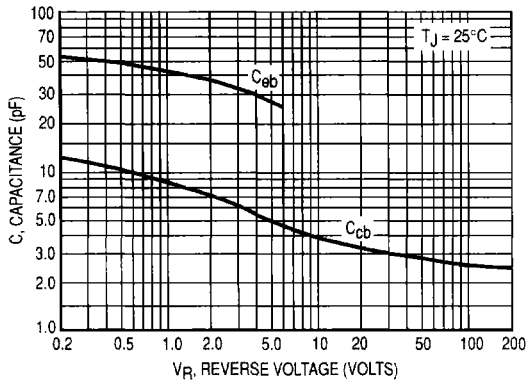


Figure 5. Capacitance

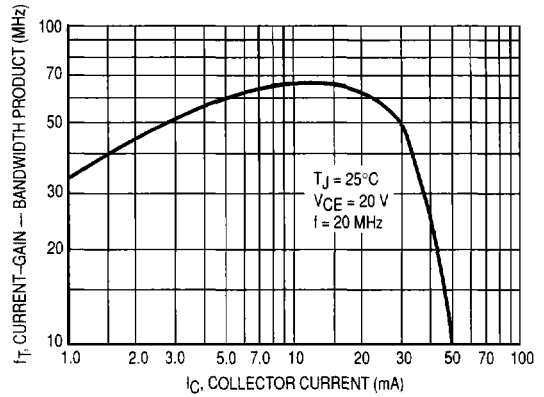


Figure 6. Current-Gain — Bandwidth Product

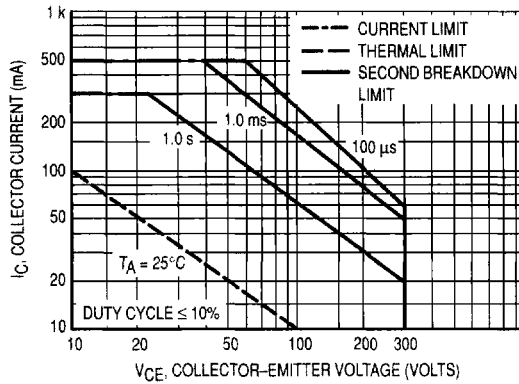


Figure 7. Active Region — Safe Operating Area