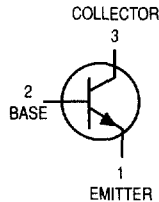


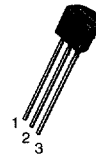
# One Watt Amplifier Transistors

## NPN Silicon



**MPSW05**  
**MPSW06\***

\*Motorola Preferred Device



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

### MAXIMUM RATINGS

Rating	Symbol	MPSW05	MPSW06	Unit
Collector-Emitter Voltage	$V_{CE0}$	60	80	Vdc
Collector-Base Voltage	$V_{CB0}$	60	80	Vdc
Emitter-Base Voltage	$V_{EB0}$	4.0		Vdc
Collector Current — Continuous	$I_C$	500		mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.0	8.0	Watt mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	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
----------------	--------	-----	-----	------

### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage <sup>(1)</sup> ( $I_C = 1.0$ mAdc, $I_B = 0$ )	MPSW05 MPSW06	$V_{(BR)CEO}$	60 80	— —	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 100$ $\mu$ Adc, $I_C = 0$ )		$V_{(BR)EBO}$	4.0	—	Vdc
Collector Cutoff Current ( $V_{CE} = 40$ Vdc, $I_B = 0$ ) ( $V_{CE} = 60$ Vdc, $I_B = 0$ )	MPSW05 MPSW06	$I_{CES}$	— —	0.5 0.5	$\mu$ Adc
Collector Cutoff Current ( $V_{CB} = 40$ Vdc, $I_E = 0$ ) ( $V_{CB} = 60$ Vdc, $I_E = 0$ )	MPSW05 MPSW06	$I_{CBO}$	— —	0.1 0.1	$\mu$ Adc
Emitter Cutoff Current ( $V_{EB} = 3.0$ Vdc, $I_C = 0$ )		$I_{EBO}$	—	0.1	$\mu$ Adc

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

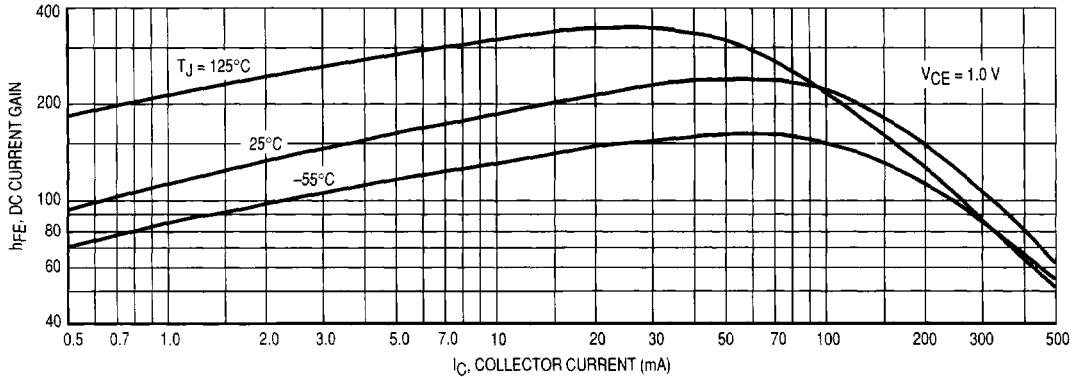
Preferred devices are Motorola recommended choices for future use and best overall value.

**MPSW05 MPSW06**

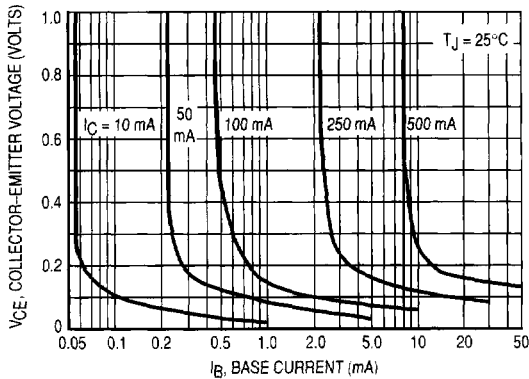
**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS(1)</b>				
DC Current Gain ( $I_C = 50\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ ) ( $I_C = 250\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ )	$h_{FE}$	80 60	— —	—
Collector–Emitter Saturation Voltage ( $I_C = 250\text{ mAdc}$ , $I_B = 10\text{ mAdc}$ )	$V_{CE(sat)}$	—	0.4	Vdc
Base–Emitter Saturation Voltage ( $I_C = 250\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$V_{BE(sat)}$	—	1.2	Vdc
<b>SMALL–SIGNAL CHARACTERISTICS</b>				
Current–Gain – Bandwidth Product ( $I_C = 200\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ , $f = 20\text{ MHz}$ )	$f_T$	50	—	MHz
Output Capacitance ( $V_{CB} = 10\text{ V}$ , $f = 1.0\text{ MHz}$ )	$C_{obo}$	—	12	pF

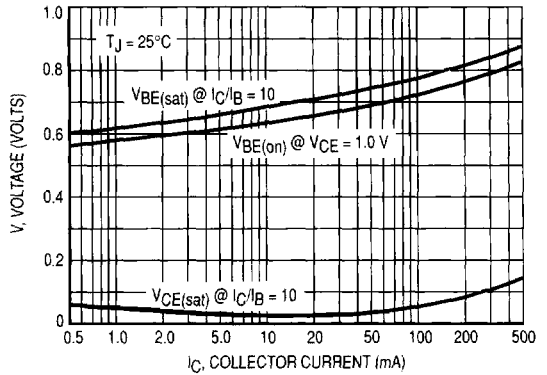
1. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .



**Figure 1. DC Current Gain**



**Figure 2. Collector Saturation Region**



**Figure 3. "On" Voltages**

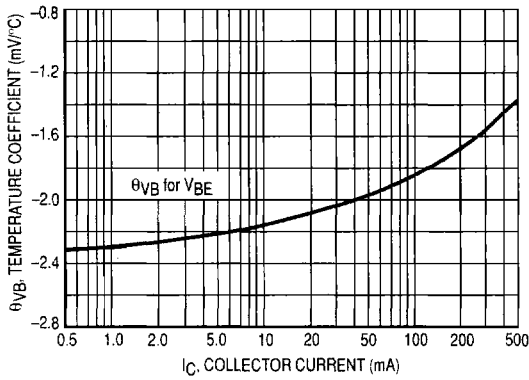


Figure 4. Base-Emitter Temperature Coefficient

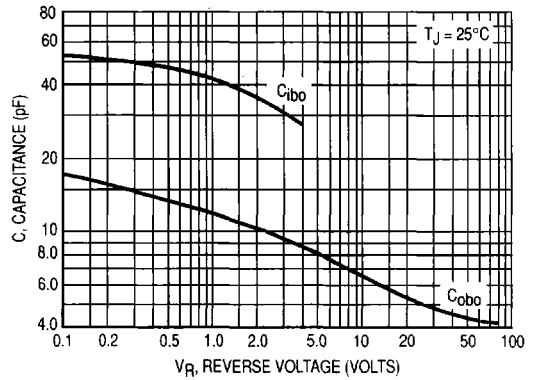


Figure 5. Capacitance

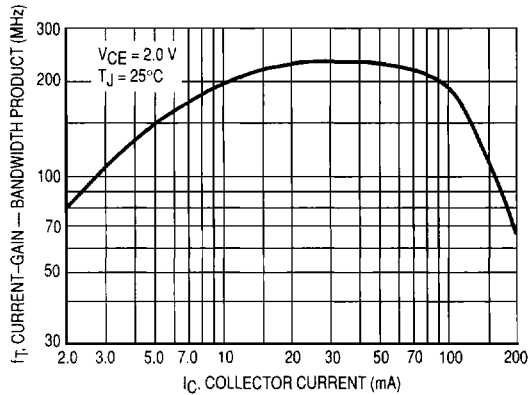


Figure 6. Current-Gain — Bandwidth Product

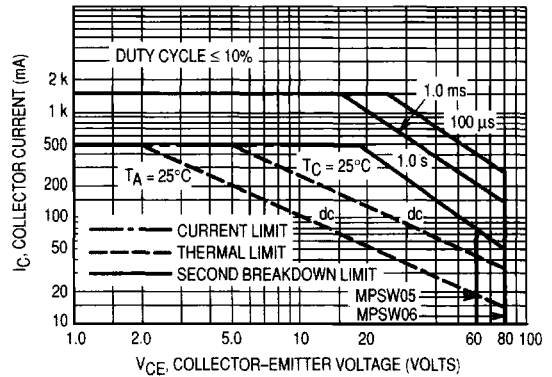


Figure 7. Active Region — Safe Operating Area