FAIRCHILD
SEMICONDUCTOR ™

MPSW3725

NPN Transistor

This device is designed for high current, low impedance line driver applications. Sourced from Process 26.

Absolute Maximum Ratings

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	40	V
V_{CBO}	Collector-Base Voltage	60	V
V_{EBO}	Emitter-Base Voltage	6.0	V
I_C	Collector Current - Continuous	1.2	A
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		MPSW3725	
P_D	Total Device Dissipation Derate above 25°C	1.0 8.0	W mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	125	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	50	°C/W

NPN Transistor
(continued)

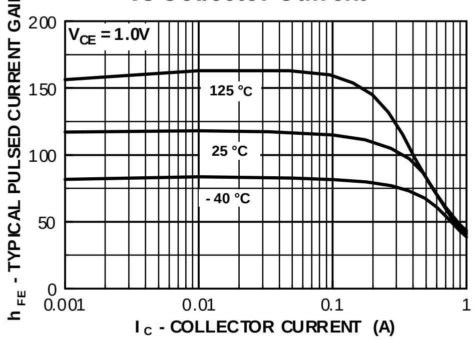
Electrical Characteristics
TA= 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage*	I_C = 10 mA, I_B = 0	40			V
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	I_C = 10 μA, V_{BE} = 0	60			V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 100 μA, I_{CE} = 0	60			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10 μA, I_C = 0	6.0			V
I_{CBO}	Collector Cutoff Current	V_{CB} = 50 V, I_E = 0 V_{CB} = 50 V, I_E = 0, T_A = 100°C			100 10	nA μA
ON CHARACTERISTICS*						
h_{FE}	DC Current Gain	I_C = 10 mA, V_{CE} = 1.0 V I_C = 100 mA, V_{CE} = 1.0 V I_C=100mA,V_{CE}=1.0V,T_A=-55°C I_C = 300 mA, V_{CE} = 1.0 V I_C = 500 mA, V_{CE} = 1.0 V I_C=500mA,V_{CE}=1.0V,T_A=-55°C I_C = 800 mA, V_{CE} = 2.0 V I_C = 1.0 A, V_{CE} = 5.0 V	30 60 30 40 35 20 20 25		 180	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 10 mA, I_B = 1.0 mA I_C = 100 mA, I_B = 10 mA I_C = 300 mA, I_B = 30 mA I_C = 500 mA, I_B = 50 mA I_C = 800 mA, I_B = 80 mA I_C = 1.0 A, I_B = 100 mA			0.25 0.26 0.4 0.52 0.8 0.95	V V V V V V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	I_C = 10 mA, I_B = 1.0 mA I_C = 100 mA, I_B = 10 mA I_C = 300 mA, I_B = 30 mA I_C = 500 mA, I_B = 50 mA I_C = 800 mA, I_B = 80 mA I_C = 1.0 A, I_B = 100 mA			0.76 0.86 1.1 1.2 1.5 1.7	V V V V V V
SMALL SIGNAL CHARACTERISTICS						
f_T	Current Gain - Bandwidth Product	I_C = 50 mA, V_{CE} = 10 V, f = 100 MHz	250			MHz
C_{obo}	Output Capacitance	V_{CB} = 10 V, I_E = 0, f = 1.0 MHz			25	pF
C_{ibo}	Input Capacitance	V_{EB} = 0.5 V, I_C = 0, f = 1.0 MHz			100	pF
SWITCHING CHARACTERISTICS						
t_{on}	Turn-on Time	V_{CC} = 30 V, V_{BE} = 3.8 V, I_C = 500 mA, I_{B1} = 50 mA		22		ns
t_d	Delay Time			10		ns
t_r	Rise Time			12		ns
t_{off}	Turn-off Time	V_{CC} = 30 V, I_C = 500mA I_{B1} = I_{B2} = 50 mA		250		ns
t_s	Storage Time			235		ns
t_f	Fall Time			15		ns

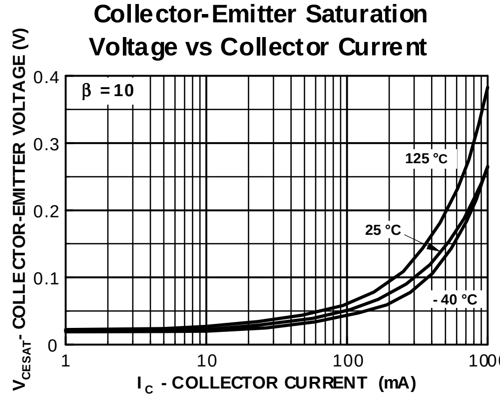
*Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 1.0%

Typical Characteristics

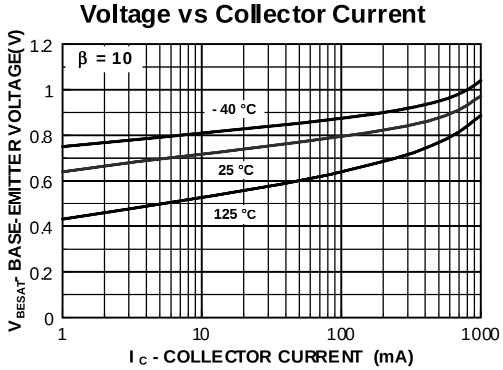
Typical Pulsed Current Gain vs Collector Current



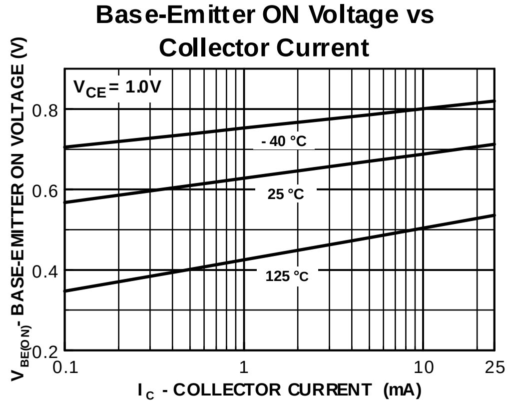
Collector-Emitter Saturation Voltage vs Collector Current



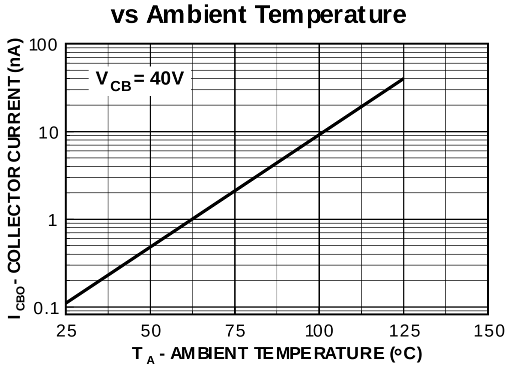
Base-Emitter Saturation Voltage vs Collector Current



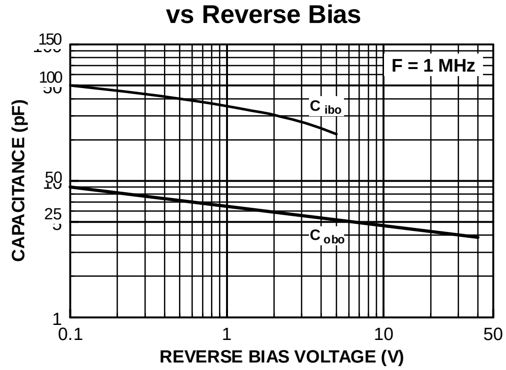
Base-Emitter ON Voltage vs Collector Current



Collector-Cutoff Current vs Ambient Temperature

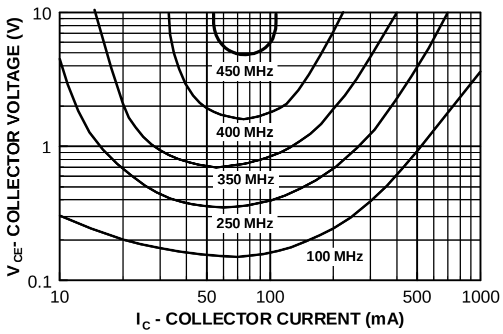


Input / Output Capacitance vs Reverse Bias

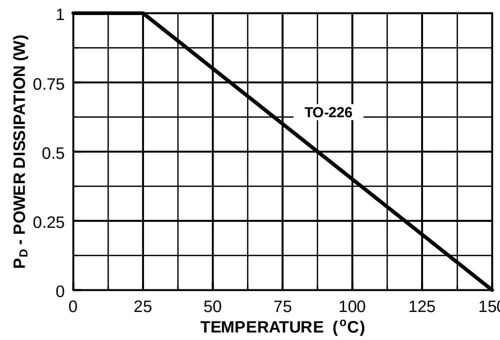


Typical Characteristics (continued)

Contours of Constant Bandwidth Product (f_T)

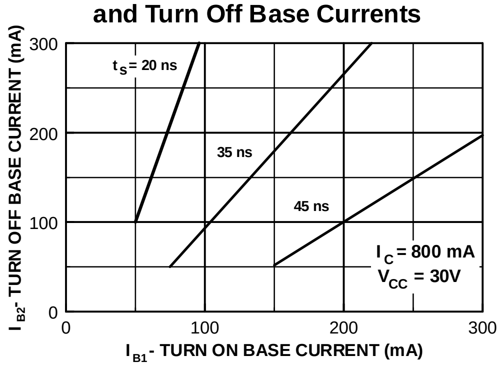


Power Dissipation vs Ambient Temperature

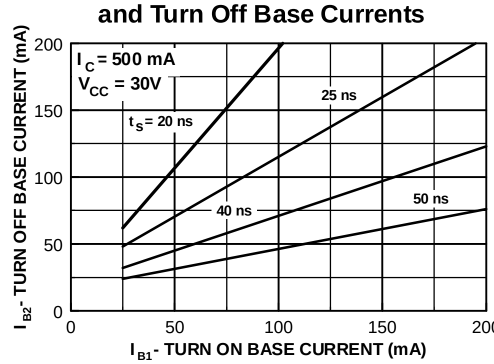


Typical Characteristics (continued)

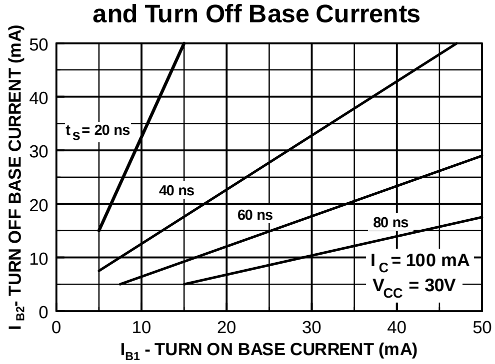
Storage Time vs. Turn On and Turn Off Base Currents



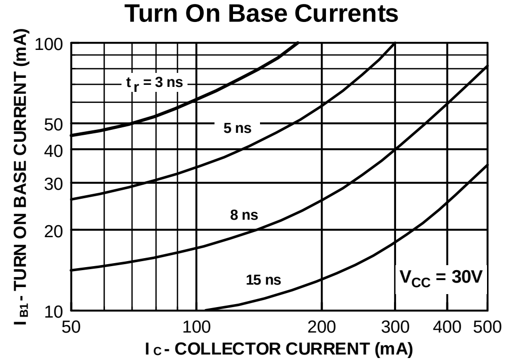
Storage Time vs. Turn On and Turn Off Base Currents



Storage Time vs. Turn On and Turn Off Base Currents

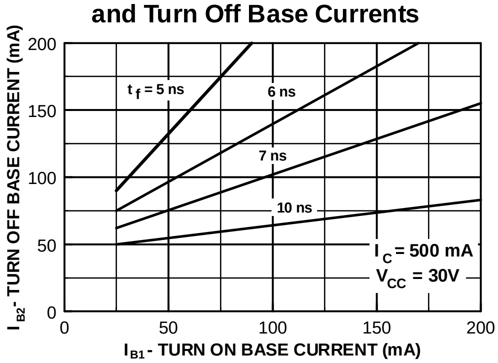


Rise Time vs. Collector and Turn On Base Currents

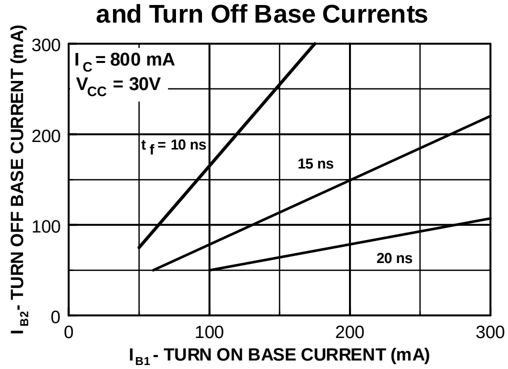


Typical Characteristics (continued)

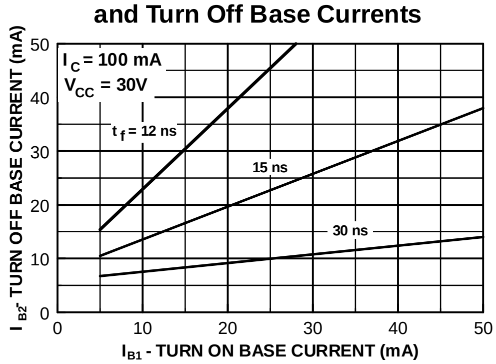
Fall Time vs. Turn On and Turn Off Base Currents



Fall Time vs. Turn On and Turn Off Base Currents



Fall Time vs. Turn On and Turn Off Base Currents



Test Circuit

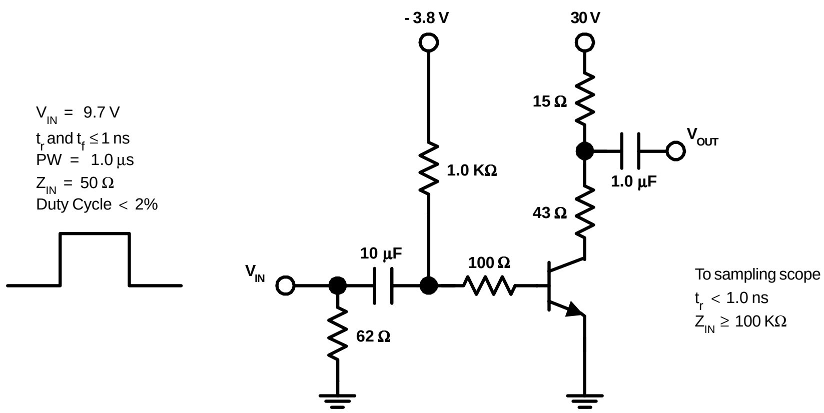


FIGURE 1: Switching Time Test Circuit
(I_C = 500 mA, I_{B1} = 50 mA, I_{B2} = 50 mA)

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