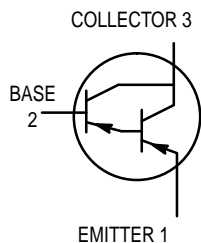


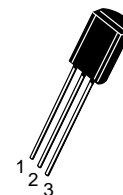
# One Watt Darlington Transistors

## PNP Silicon



**MPSW63**  
**MPSW64\***

\*Motorola Preferred Device



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

### MAXIMUM RATINGS

Rating	Symbol	MPSW63 MPSW64	Unit
Collector–Emitter Voltage	$V_{CES}$	-30	Vdc
Collector–Base Voltage	$V_{CBO}$	-30	Vdc
Emitter–Base Voltage	$V_{EBO}$	-10	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
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### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ( $I_C = -100 \mu\text{Adc}$ , $V_{BE} = 0$ )	$V_{(BR)CES}$	-30	—	Vdc
Collector Cutoff Current ( $V_{CB} = -30 \text{Vdc}$ , $I_E = 0$ )	$I_{CBO}$	—	-100	nAdc
Emitter Cutoff Current ( $V_{EB} = -10 \text{Vdc}$ , $I_C = 0$ )	$I_{EBO}$	—	-100	nAdc

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

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

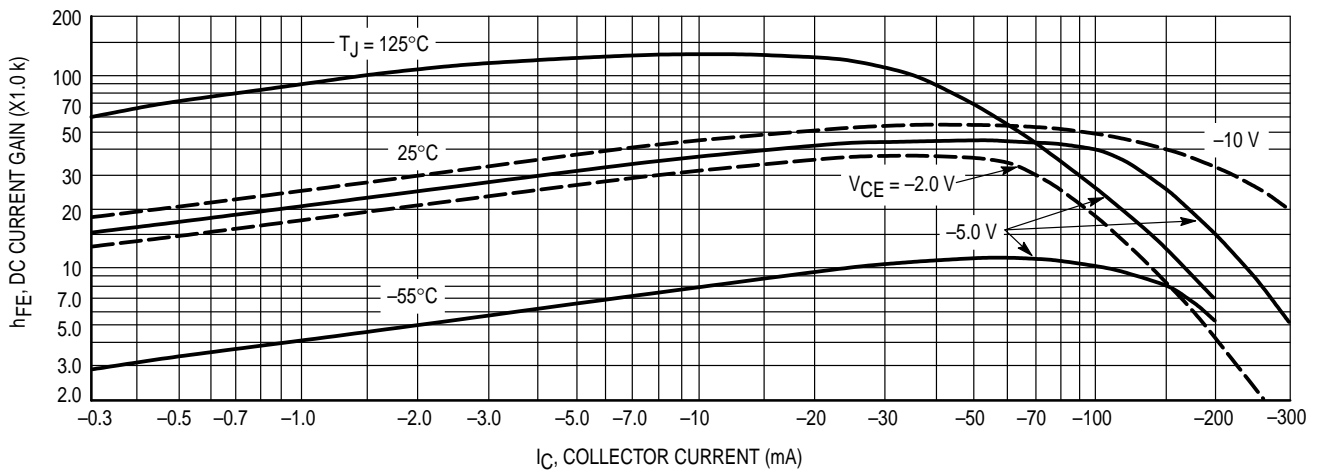
Characteristic	Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS(1)</b>				
DC Current Gain ( $I_C = -10\text{ mAdc}$ , $V_{CE} = -5.0\text{ Vdc}$ )	MPSW63	5,000	—	—
	MPSW64	10,000	—	—
( $I_C = -100\text{ mAdc}$ , $V_{CE} = -5.0\text{ Vdc}$ )	MPSW63	10,000	—	—
	MPSW64	20,000	—	—
Collector–Emitter Saturation Voltage ( $I_C = -100\text{ mAdc}$ , $I_B = -0.1\text{ mAdc}$ )	$V_{CE(sat)}$	—	-1.5	Vdc
Base–Emitter On Voltage ( $I_C = -100\text{ mAdc}$ , $V_{CE} = -5.0\text{ Vdc}$ )	$V_{BE(on)}$	—	-2.0	Vdc

**SMALL-SIGNAL CHARACTERISTICS**

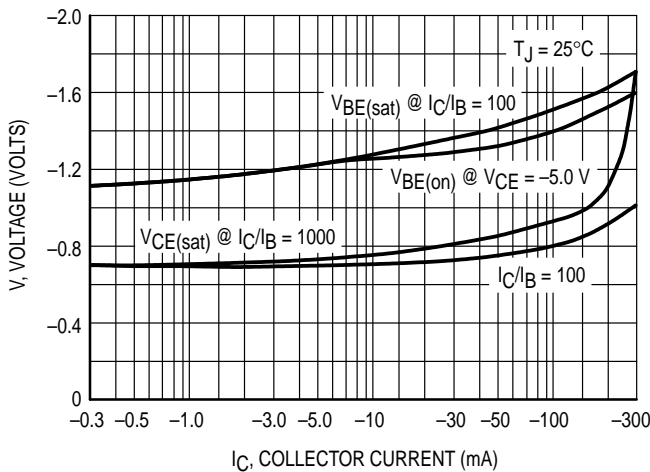
Current–Gain — Bandwidth Product(2) ( $I_C = -10\text{ mAdc}$ , $V_{CE} = -5.0\text{ Vdc}$ , $f = 100\text{ MHz}$ )	$f_T$	125	—	MHz
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1. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .
2.  $f_T = |h_{fe}| \cdot f_{test}$ .

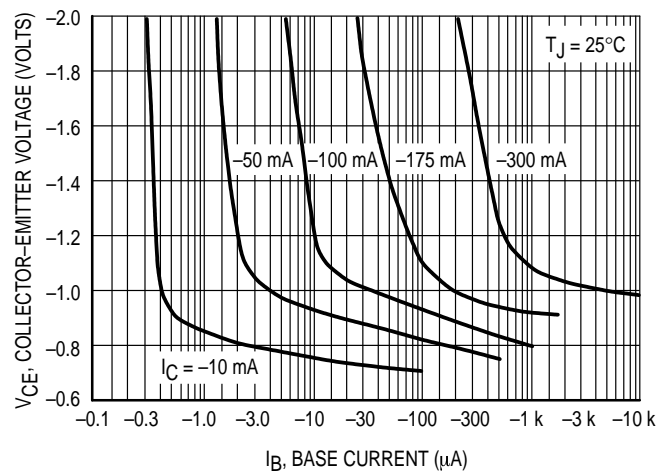
**TYPICAL ELECTRICAL CHARACTERISTICS**



**Figure 1. DC Current Gain**



**Figure 2. "ON" Voltage**



**Figure 3. Collector Saturation Region**

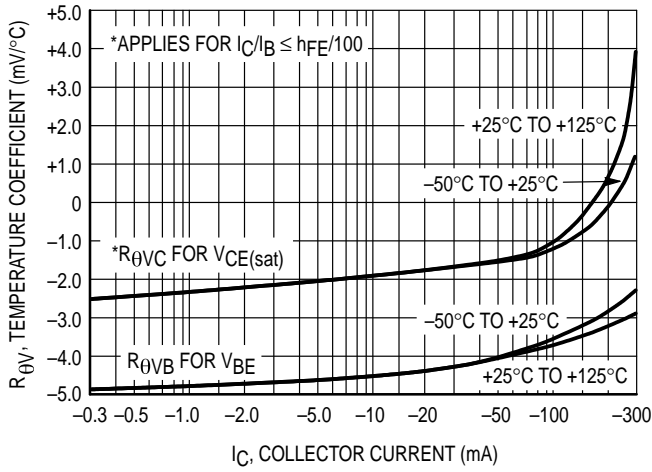


Figure 4. Temperature Coefficients

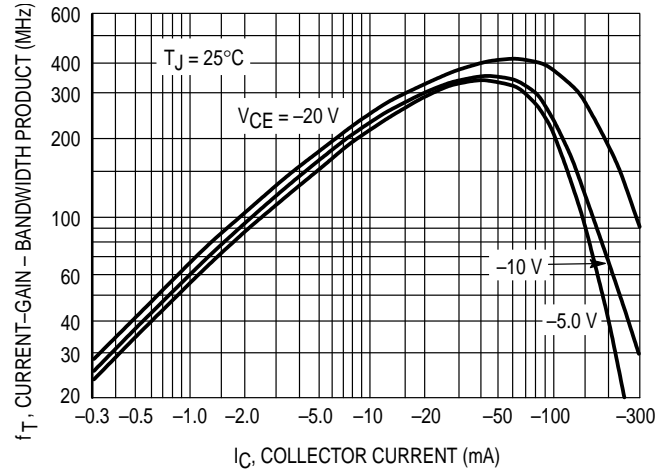


Figure 5. Current-Gain — Bandwidth Product

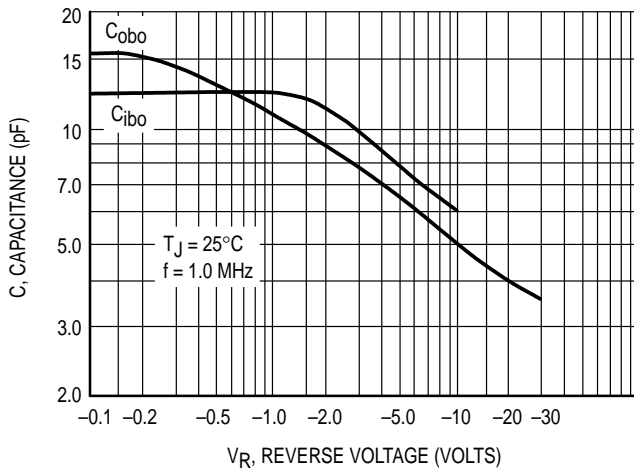


Figure 6. Capacitance

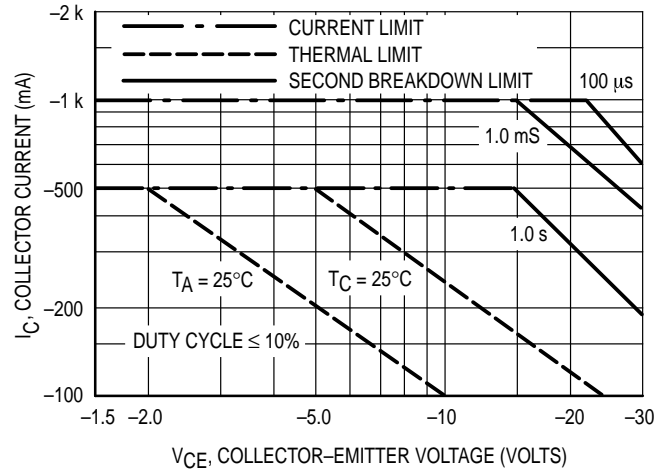
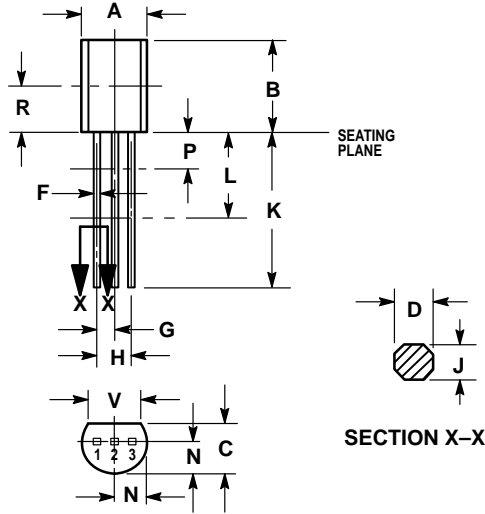


Figure 7. Active Region, Safe Operating Area

PACKAGE DIMENSIONS



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
  4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSIONS D AND J APPLY BETWEEN L AND K MINIMUM. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.44	5.21
B	0.290	0.310	7.37	7.87
C	0.125	0.165	3.18	4.19
D	0.018	0.022	0.46	0.56
F	0.016	0.019	0.41	0.48
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.018	0.024	0.46	0.61
K	0.500	—	12.70	—
L	0.250	—	6.35	—
N	0.080	0.105	2.04	2.66
P	—	0.100	—	2.54
R	0.135	—	3.43	—
V	0.135	—	3.43	—

CASE 029-05  
(TO-226AE)  
ISSUE AD

- STYLE 1:  
PIN 1. EMITTER  
2. BASE  
3. COLLECTOR

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