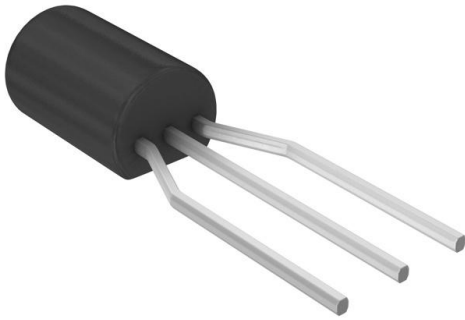


# MPSW51ARLRA Datasheet

[www.digi-electronics.com](http://www.digi-electronics.com)



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	MPSW51ARLRA-DG
Manufacturer	<a href="#">onsemi</a>
Manufacturer Product Number	MPSW51ARLRA
Description	TRANS PNP 40V 1A TO92
Detailed Description	Bipolar (BJT) Transistor PNP 40 V 1 A 50MHz 1 W Th rough Hole TO-92 (TO-226)



Tel: +00 852-30501935

RFQ Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)

DiGi is a global authorized distributor of electronic components.

## Purchase and inquiry

Manufacturer Product Number:

MPSW51ARLRA

Series:

-

Transistor Type:

PNP

Voltage - Collector Emitter Breakdown (Max):

40 V

Current - Collector Cutoff (Max):

100nA (ICBO)

Power - Max:

1 W

Operating Temperature:

-55°C ~ 150°C (TJ)

Package / Case:

TO-226-3, TO-92-3 Long Body (Formed Leads)

Base Product Number:

MPSW51

Manufacturer:

onsemi

Product Status:

Obsolete

Current - Collector (Ic) (Max):

1 A

Vce Saturation (Max) @ Ib, Ic:

700mV @ 100mA, 1A

DC Current Gain (hFE) (Min) @ Ic, Vce:

60 @ 100mA, 1V

Frequency - Transition:

50MHz

Mounting Type:

Through Hole

Supplier Device Package:

TO-92 (TO-226)

## Environmental & Export classification

RoHS Status:

RoHS non-compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0075

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

# MPSW51, MPSW51A

## One Watt High Current Transistors

### PNP Silicon

#### Features

- These Devices are Pb-Free and are RoHS Compliant\*

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector - Emitter Voltage MPSW51 MPSW51A	$V_{CEO}$	-30 -40	Vdc
Collector - Base Voltage MPSW51 MPSW51A	$V_{CBO}$	-40 -50	Vdc
Emitter - Base Voltage	$V_{EBO}$	-5.0	Vdc
Collector Current - Continuous	$I_C$	-1000	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.0 8.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	2.5 20	W mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

#### THERMAL CHARACTERISTICS

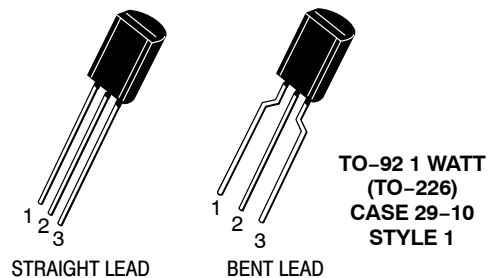
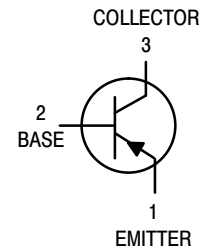
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	50	$^\circ\text{C}/\text{W}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

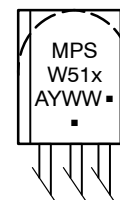


ON Semiconductor®

<http://onsemi.com>



#### MARKING DIAGRAM



- x = 51A Devices
- A = Assembly Location
- Y = Year
- WW = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

**MPSW51, MPSW51A****ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector – Emitter Breakdown Voltage (Note 1) ( $I_C = -1.0\text{ mAdc}$ , $I_B = 0$ )	MPSW51 MPSW51A	$V_{(BR)CEO}$	-30 -40	- -	Vdc
Collector – Base Breakdown Voltage ( $I_C = -100\ \mu\text{Adc}$ , $I_E = 0$ )	MPSW51 MPSW51A	$V_{(BR)CBO}$	-40 -50	- -	Vdc
Emitter – Base Breakdown Voltage ( $I_E = -100\ \mu\text{Adc}$ , $I_C = 0$ )		$V_{(BR)EBO}$	-5.0	-	Vdc
Collector Cutoff Current ( $V_{CB} = -30\text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = -40\text{ Vdc}$ , $I_E = 0$ )	MPSW51 MPSW51A	$I_{CBO}$	- -	-0.1 -0.1	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{EB} = -3.0\text{ Vdc}$ , $I_C = 0$ )		$I_{EBO}$	-	-0.1	$\mu\text{Adc}$

**ON CHARACTERISTICS**

DC Current Gain ( $I_C = -10\text{ mAdc}$ , $V_{CE} = -1.0\text{ Vdc}$ ) ( $I_C = -100\text{ mAdc}$ , $V_{CE} = -1.0\text{ Vdc}$ ) ( $I_C = -1000\text{ mAdc}$ , $V_{CE} = -1.0\text{ Vdc}$ )		$h_{FE}$	55 60 50	- - -	-
Collector – Emitter Saturation Voltage ( $I_C = -1000\text{ mAdc}$ , $I_B = -100\text{ mAdc}$ )		$V_{CE(sat)}$	-	-0.7	Vdc
Base – Emitter On Voltage ( $I_C = -1000\text{ mAdc}$ , $V_{CE} = -1.0\text{ Vdc}$ )		$V_{BE(on)}$	-	-1.2	Vdc

**SMALL-SIGNAL CHARACTERISTICS**

Current-Gain – Bandwidth Product ( $I_C = -50\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ , $f = 20\text{ MHz}$ )		$f_T$	50	-	MHz
Output Capacitance ( $V_{CB} = -10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )		$C_{obo}$	-	30	pF

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

**ORDERING INFORMATION**

Device	Package	Shipping <sup>†</sup>
MPSW51G	TO-92 (Pb-Free)	5000 Units / Bulk
MPSW51AG	TO-92 (Pb-Free)	5000 Units / Bulk
MPSW51RLRAG	TO-92 (Pb-Free)	2000 / Tape & Reel
MPSW51ARLRAG	TO-92 (Pb-Free)	2000 / Tape & Reel
MPSW51ARLRPG	TO-92 (Pb-Free)	2000 / Ammo Pack

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# MPSW51, MPSW51A

## TYPICAL CHARACTERISTICS

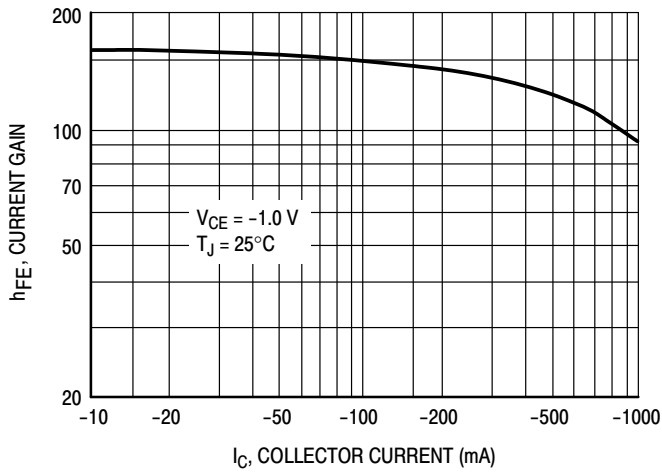


Figure 1. DC Current Gain

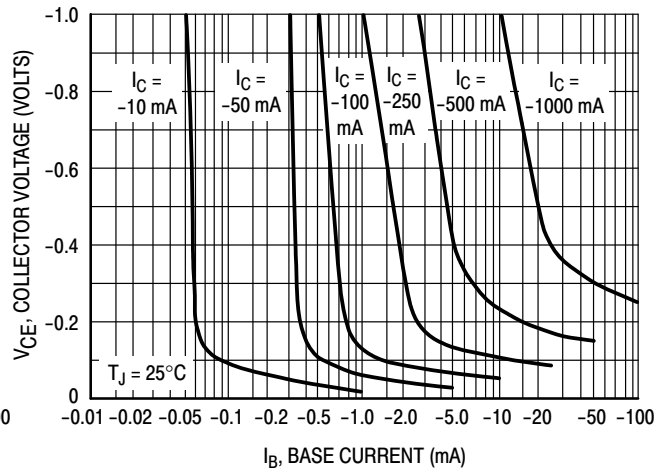


Figure 2. Collector Saturation Region

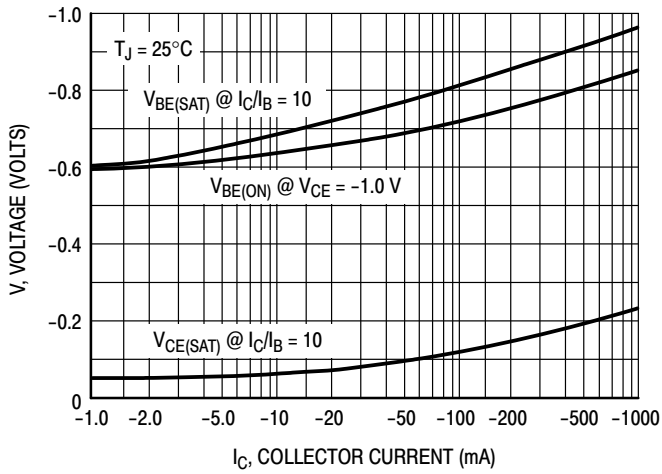


Figure 3. "ON" Voltages

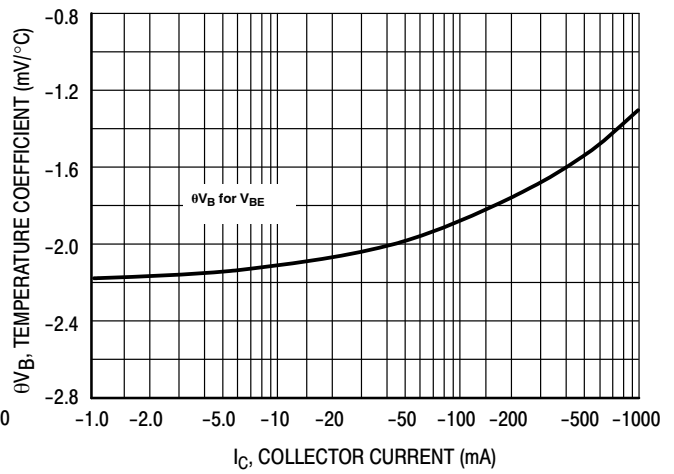


Figure 4. Temperature Coefficient

# MPSW51, MPSW51A

## TYPICAL CHARACTERISTICS

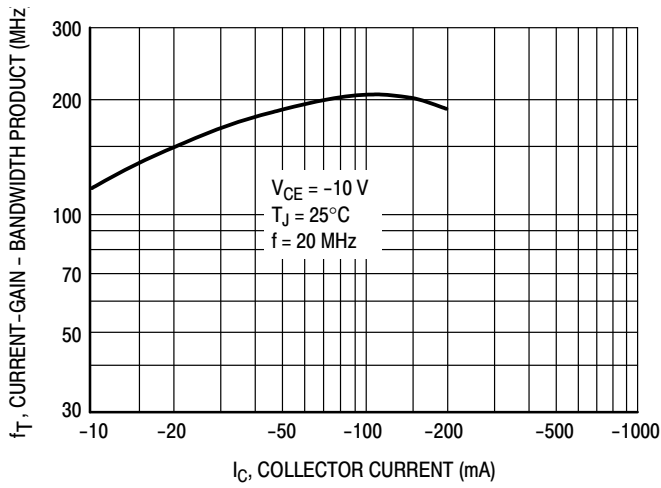


Figure 5. Current Gain — Bandwidth Product

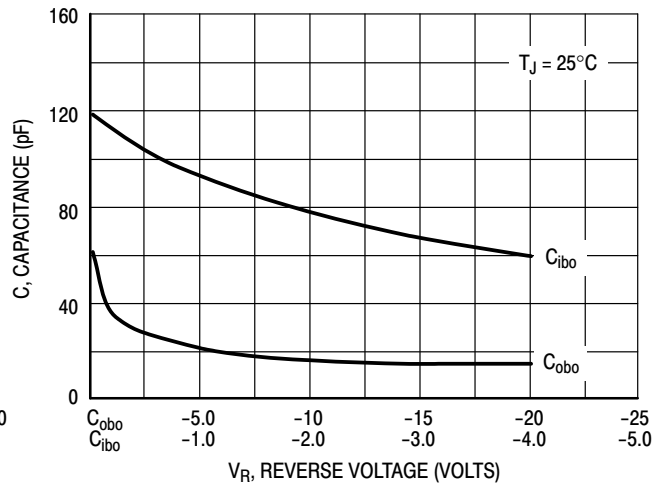


Figure 6. Capacitance

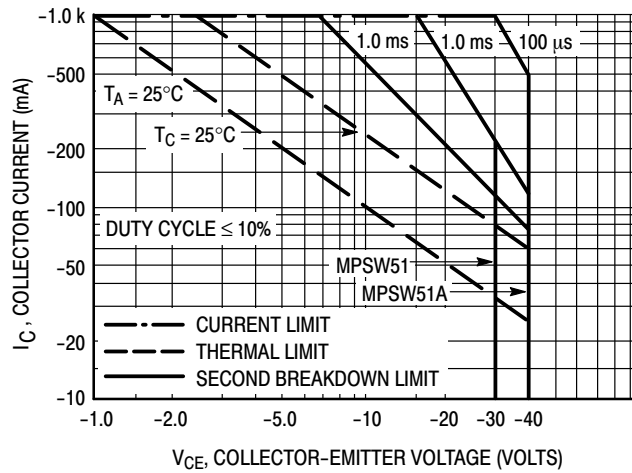
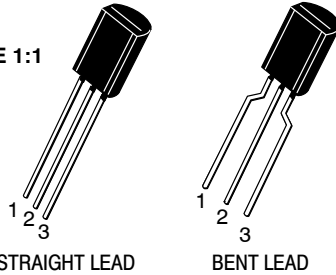


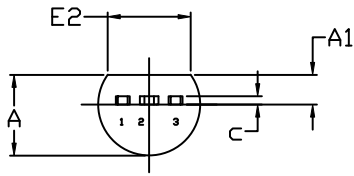
Figure 7. Active Region — Safe Operating Area

SCALE 1:1

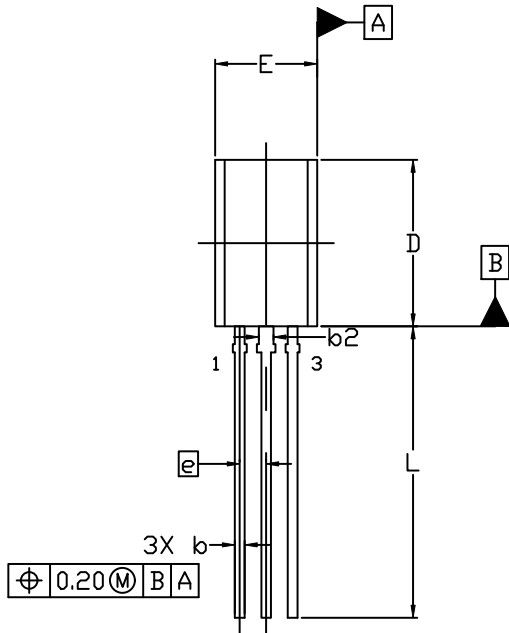

**TO-92 (TO-226) 1 WATT**  
**CASE 29-10**  
**ISSUE D**

DATE 05 MAR 2021

## STRAIGHT LEAD



END VIEW



TOP VIEW

## NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR GATE PROTRUSIONS.
4. DIMENSION b AND b2 DOES NOT INCLUDE DAMBAR PROTRUSION. LEAD WIDTH INCLUDING PROTRUSION SHALL NOT EXCEED 0.20. DIMENSION b2 LOCATED ABOVE THE DAMBAR PORTION OF MIDDLE LEAD.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	3.75	3.90	4.05
A1	1.28	1.43	1.58
b	0.38	0.465	0.55
b2	0.62	0.70	0.78
c	0.35	0.40	0.45
D	7.85	8.00	8.15
E	4.75	4.90	5.05
E2	3.90	---	---
e	1.27 BSC		
L	13.80	14.00	14.20

## STYLES AND MARKING ON PAGE 3

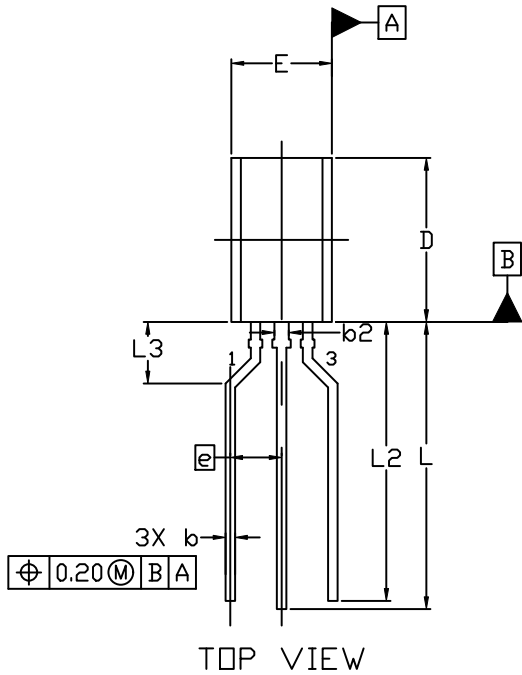
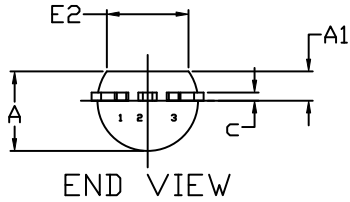
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<b>DESCRIPTION:</b>	<b>TO-92 (TO-226) 1 WATT</b>	<b>PAGE 1 OF 3</b>

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**TO-92 (TO-226) 1 WATT**  
CASE 29-10  
ISSUE D

DATE 05 MAR 2021

FORMED LEAD



NOTES:

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D	7.85	8.00	8.15
E	4.75	4.90	5.05
E2	3.90	---	---
e	2.50 BSC		
L	13.80	14.00	14.20
L2	13.20	13.60	14.00
L3	3.00 REF		

**STYLES AND MARKING ON PAGE 3**

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<b>DESCRIPTION:</b>	<b>TO-92 (TO-226) 1 WATT</b>	<b>PAGE 2 OF 3</b>

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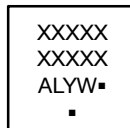


**TO-92 (TO-226) 1 WATT  
CASE 29-10  
ISSUE D**

DATE 05 MAR 2021

- STYLE 1:  
PIN 1. EMITTER  
2. BASE  
3. COLLECTOR
- STYLE 2:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR
- STYLE 3:  
PIN 1. ANODE  
2. ANODE  
3. CATHODE
- STYLE 4:  
PIN 1. CATHODE  
2. CATHODE  
3. ANODE
- STYLE 5:  
PIN 1. DRAIN  
2. SOURCE  
3. GATE
- STYLE 6:  
PIN 1. GATE  
2. SOURCE & SUBSTRATE  
3. DRAIN
- STYLE 7:  
PIN 1. SOURCE  
2. DRAIN  
3. GATE
- STYLE 8:  
PIN 1. DRAIN  
2. GATE  
3. SOURCE & SUBSTRATE
- STYLE 9:  
PIN 1. BASE 1  
2. EMITTER  
3. BASE 2
- STYLE 10:  
PIN 1. CATHODE  
2. GATE  
3. ANODE
- STYLE 11:  
PIN 1. ANODE  
2. CATHODE & ANODE  
3. CATHODE
- STYLE 12:  
PIN 1. MAIN TERMINAL 1  
2. GATE  
3. MAIN TERMINAL 2
- STYLE 13:  
PIN 1. ANODE 1  
2. GATE  
3. CATHODE 2
- STYLE 14:  
PIN 1. EMITTER  
2. COLLECTOR  
3. BASE
- STYLE 15:  
PIN 1. ANODE 1  
2. CATHODE  
3. ANODE 2
- STYLE 16:  
PIN 1. ANODE  
2. GATE  
3. CATHODE
- STYLE 17:  
PIN 1. COLLECTOR  
2. BASE  
3. EMITTER
- STYLE 18:  
PIN 1. ANODE  
2. CATHODE  
3. NOT CONNECTED
- STYLE 19:  
PIN 1. GATE  
2. ANODE  
3. CATHODE
- STYLE 20:  
PIN 1. NOT CONNECTED  
2. CATHODE  
3. ANODE
- STYLE 21:  
PIN 1. COLLECTOR  
2. EMITTER  
3. BASE
- STYLE 22:  
PIN 1. SOURCE  
2. GATE  
3. DRAIN
- STYLE 23:  
PIN 1. GATE  
2. SOURCE  
3. DRAIN
- STYLE 24:  
PIN 1. EMITTER  
2. COLLECTOR/ANODE  
3. CATHODE
- STYLE 25:  
PIN 1. MT 1  
2. GATE  
3. MT 2
- STYLE 26:  
PIN 1. V<sub>CC</sub>  
2. GROUND 2  
3. OUTPUT
- STYLE 27:  
PIN 1. MT  
2. SUBSTRATE  
3. MT
- STYLE 28:  
PIN 1. CATHODE  
2. ANODE  
3. GATE
- STYLE 29:  
PIN 1. NOT CONNECTED  
2. ANODE  
3. CATHODE
- STYLE 30:  
PIN 1. DRAIN  
2. GATE  
3. SOURCE
- STYLE 31:  
PIN 1. GATE  
2. DRAIN  
3. SOURCE
- STYLE 32:  
PIN 1. BASE  
2. COLLECTOR  
3. EMITTER
- STYLE 33:  
PIN 1. RETURN  
2. INPUT  
3. OUTPUT
- STYLE 34:  
PIN 1. INPUT  
2. GROUND  
3. LOGIC
- STYLE 35:  
PIN 1. GATE  
2. COLLECTOR  
3. EMITTER

**GENERIC  
MARKING DIAGRAM\***



- XXXX = Specific Device Code
- A = Assembly Location
- L = Wafer Lot
- Y = Year
- W = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

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<b>DESCRIPTION:</b>	TO-92 (TO-226) 1 WATT	<b>PAGE 3 OF 3</b>

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