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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# 2N5638, 2N5639

2N5638 is a Preferred Device

## JFET Chopper Transistors N-Channel – Depletion

N-Channel Junction Field Effect Transistors, depletion mode (Type A) designed for chopper and high-speed switching applications.

### Features

- Low Drain-Source “ON” Resistance:  $R_{DS(on)} = 30\Omega$  for 2N5638  
 $R_{DS(on)} = 60\Omega$  for 2N5639
- Low Reverse Transfer Capacitance –  
 $C_{RSS} = 4.0$  pF (Max) @  $f = 1.0$  MHz
- Fast Switching Characteristics –  $t_r = 5.0$  ns (Max) (2N5638)
- Pb-Free Packages are Available\*

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	30	Vdc
Drain-Gate Voltage	$V_{DG}$	30	Vdc
Reverse Gate-Source Voltage	$V_{GSR}$	30	Vdc
Forward Gate Current	$I_{GF}$	10	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	310 2.82	mW mW/ $^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +150	$^\circ\text{C}$
Operating Junction Temp Range	$T_J$	-65 to +135	$^\circ\text{C}$

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.

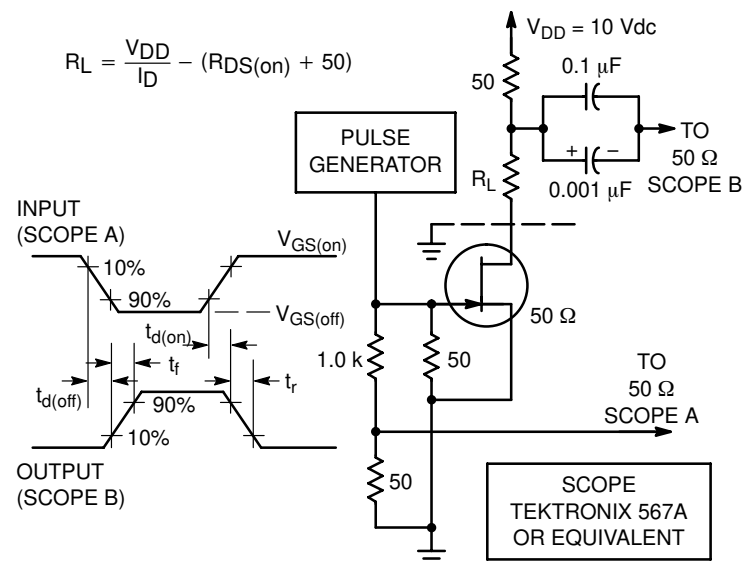


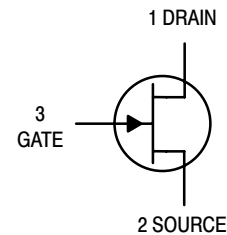
Figure 1. Switching Times Test Circuit

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

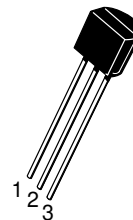


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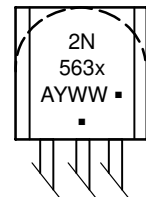
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### MARKING DIAGRAM



TO-92  
CASE 29  
STYLE 5



x = 8 or 9

A = Assembly Location

Y = Year

WW = Work Week

▪ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

Device	Package	Shipping†
2N5638RLRA	TO-92	2000/Tape & Reel
2N5638RLRAG	TO-92 (Pb-Free)	2000/Tape & Reel
2N5639	TO-92	1000 Units/Box
2N5639G	TO-92 (Pb-Free)	1000 Units/Box
2N5369RLRA	TO-92	2000/Tape & Reel
2N5369RLRAG	TO-92 (Pb-Free)	2000/Tape & Reel

†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.

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

## 2N5638, 2N5639

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

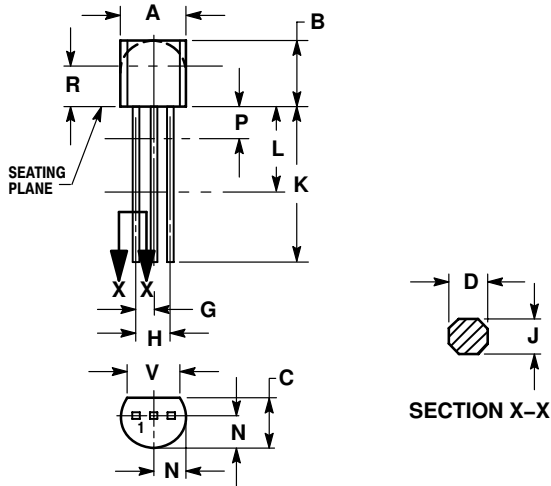
Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Gate–Source Breakdown Voltage (I <sub>G</sub> = -1.0 μAdc, V <sub>DS</sub> = 0)	V <sub>(BR)GSS</sub>	35	–	Vdc
Gate Reverse Current (V <sub>GS</sub> = -15 Vdc, V <sub>DS</sub> = 0) (V <sub>GS</sub> = -15 Vdc, V <sub>DS</sub> = 0, T <sub>A</sub> = 100°C)	I <sub>GSS</sub>	–	1.0 1.0	nAdc μAdc
Drain–Cutoff Current (V <sub>DS</sub> = 15 Vdc, V <sub>GS</sub> = -12 Vdc) (V <sub>DS</sub> = 15 Vdc, V <sub>GS</sub> = -12 Vdc, T <sub>A</sub> = 100°C) (V <sub>DS</sub> = 15 Vdc, V <sub>GS</sub> = -8.0 Vdc) (V <sub>DS</sub> = 15 Vdc, V <sub>GS</sub> = -8.0 Vdc, T <sub>A</sub> = 100°C)	I <sub>D(off)</sub>	–	1.0 1.0 1.0 1.0	μAdc
<b>ON CHARACTERISTICS</b>				
Zero–Gate–Voltage Drain Current (Note 1) (V <sub>DS</sub> = 20 Vdc, V <sub>GS</sub> = 0)	I <sub>DSS</sub>	50 25	– –	mAdc
Drain–Source “ON” Voltage (I <sub>D</sub> = 12 mAdc, V <sub>GS</sub> = 0) (I <sub>D</sub> = 6.0 mAdc, V <sub>GS</sub> = 0)	V <sub>DS(on)</sub>	– –	0.5 0.5	Vdc
Static Drain–Source “ON” Resistance (I <sub>D</sub> = 1.0 mAdc, V <sub>GS</sub> = 0)	R <sub>DS(on)</sub>	– –	30 60	Ω
<b>SMALL–SIGNAL CHARACTERISTICS</b>				
Static Drain–Source “ON” Resistance (V <sub>GS</sub> = 0, I <sub>D</sub> = 0, f = 1.0 kHz)	R <sub>DS(on)</sub>	– –	30 60	Ω
Input Capacitance (V <sub>DS</sub> = 0, V <sub>GS</sub> = -12 Vdc, f = 1.0 MHz)	C <sub>iss</sub>	–	10	pF
Reverse Transfer Capacitance (V <sub>DS</sub> = 0, V <sub>GS</sub> = -12 Vdc, f = 1.0 MHz)	C <sub>rss</sub>	–	4.0	pF
<b>SWITCHING CHARACTERISTICS</b> (V <sub>DD</sub> = 10 Vdc, V <sub>GS(on)</sub> = 0, V <sub>GS(off)</sub> = -10 Vdc, R <sub>G</sub> ' = 50 Ω. See Figure 1 on page 1)				
Turn–On Delay Time I <sub>D(on)</sub> = 12 mAdc, 2N5638 I <sub>D(on)</sub> = 6.0 mAdc, 2N5639	t <sub>d(on)</sub>	– –	4.0 6.0	ns
Rise Time I <sub>D(on)</sub> = 12 mAdc, 2N5638 I <sub>D(on)</sub> = 6.0 mAdc, 2N5639	t <sub>r</sub>	– –	5.0 8.0	ns
Turn–Off Delay Time I <sub>D(on)</sub> = 12 mAdc, 2N5638 I <sub>D(on)</sub> = 6.0 mAdc, 2N5639	t <sub>d(off)</sub>	– –	5.0 10	ns
Fall Time I <sub>D(on)</sub> = 12 mAdc, 2N5638 I <sub>D(on)</sub> = 6.0 mAdc, 2N5639	t <sub>f</sub>	– –	10 20	ns

1. Pulse Width ≤ 300 μs, Duty Cycle ≤ 3.0%.

# 2N5638, 2N5639

## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 29-11  
ISSUE AL



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
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	0.115	---	2.93	---
V	0.135	---	3.43	---

### STYLE 5:

1. DRAIN
2. SOURCE
3. GATE

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