

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.

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

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°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	$^\circ\text{C}$

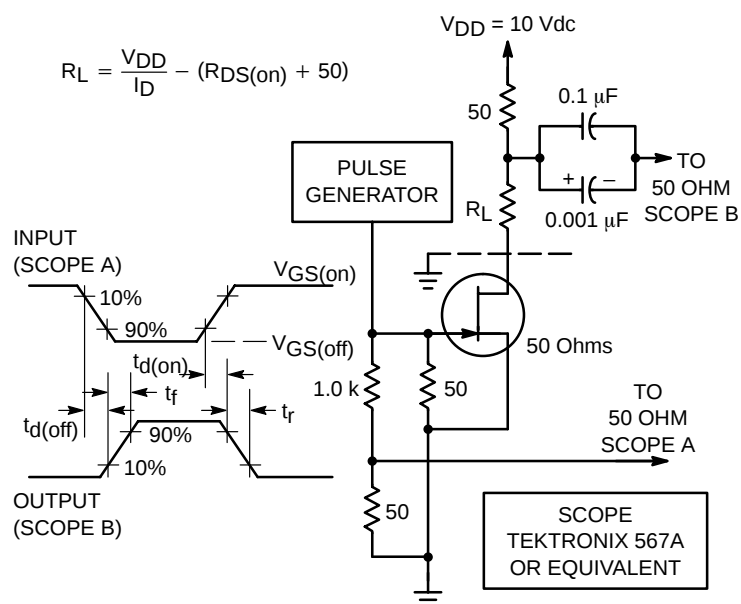
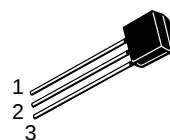
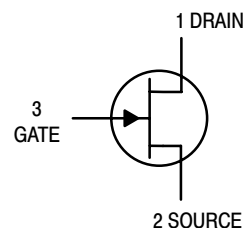


Figure 1. Switching Times Test Circuit



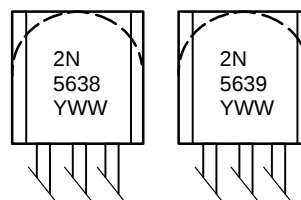
ON Semiconductor™

<http://onsemi.com>



TO-92
CASE 29
STYLE 5

MARKING DIAGRAMS



Y = Year
WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping
2N5638RLRA	TO-92	2000/Tape & Reel
2N5639	TO-92	5000/Box
2N5639RLRA	TO-92	2000/Tape & Reel

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

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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Gate–Source Breakdown Voltage ($I_G = -1.0\ \mu\text{Adc}$, $V_{DS} = 0$)	$V_{(BR)GSS}$	35	–	Vdc
Gate Reverse Current ($V_{GS} = -15\ \text{Vdc}$, $V_{DS} = 0$) ($V_{GS} = -15\ \text{Vdc}$, $V_{DS} = 0$, $T_A = 100^\circ\text{C}$)	I_{GSS}	–	1.0 1.0	nAdc μAdc
Drain–Cutoff Current ($V_{DS} = 15\ \text{Vdc}$, $V_{GS} = -12\ \text{Vdc}$) ($V_{DS} = 15\ \text{Vdc}$, $V_{GS} = -12\ \text{Vdc}$, $T_A = 100^\circ\text{C}$) ($V_{DS} = 15\ \text{Vdc}$, $V_{GS} = -8.0\ \text{Vdc}$) ($V_{DS} = 15\ \text{Vdc}$, $V_{GS} = -8.0\ \text{Vdc}$, $T_A = 100^\circ\text{C}$)	$I_{D(off)}$	–	1.0 1.0 1.0 1.0	μAdc

ON CHARACTERISTICS

Zero–Gate–Voltage Drain Current (Note 1.) ($V_{DS} = 20\ \text{Vdc}$, $V_{GS} = 0$)	2N5638 2N5639	I_{DSS}	50 25	– –	mAdc
Drain–Source “ON” Voltage ($I_D = 12\ \text{mAdc}$, $V_{GS} = 0$) ($I_D = 6.0\ \text{mAdc}$, $V_{GS} = 0$)	2N5638 2N5639	$V_{DS(on)}$	– –	0.5 0.5	Vdc
Static Drain–Source “ON” Resistance ($I_D = 1.0\ \text{mAdc}$, $V_{GS} = 0$)	2N5638 2N5639	$R_{DS(on)}$	– –	30 60	Ω

SMALL–SIGNAL CHARACTERISTICS

Static Drain–Source “ON” Resistance ($V_{GS} = 0$, $I_D = 0$, $f = 1.0\ \text{kHz}$)	2N5638 2N5639	$R_{DS(on)}$	– –	30 60	Ω
Input Capacitance ($V_{DS} = 0$, $V_{GS} = -12\ \text{Vdc}$, $f = 1.0\ \text{MHz}$)		C_{iss}	–	10	pF
Reverse Transfer Capacitance ($V_{DS} = 0$, $V_{GS} = -12\ \text{Vdc}$, $f = 1.0\ \text{MHz}$)		C_{rss}	–	4.0	pF

SWITCHING CHARACTERISTICS ($V_{DD} = 10\ \text{Vdc}$, $V_{GS(on)} = 0$, $V_{GS(off)} = -10\ \text{Vdc}$, $R_G = 50\ \Omega$. See Figure 1 on page 1)

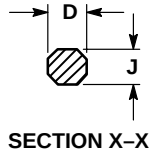
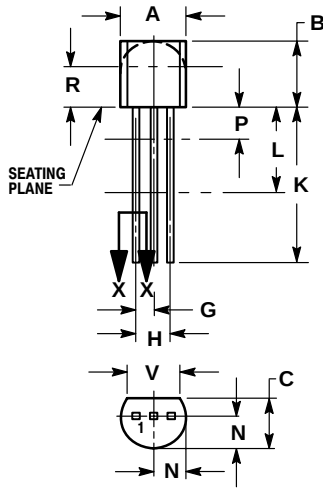
Turn–On Delay Time $I_{D(on)} = 12\ \text{mAdc}$, 2N5638 $I_{D(on)} = 6.0\ \text{mAdc}$, 2N5639	$t_{d(on)}$	– –	4.0 6.0	ns
Rise Time $I_{D(on)} = 12\ \text{mAdc}$, 2N5638 $I_{D(on)} = 6.0\ \text{mAdc}$, 2N5639	t_r	– –	5.0 8.0	ns
Turn–Off Delay Time $I_{D(on)} = 12\ \text{mAdc}$, 2N5638 $I_{D(on)} = 6.0\ \text{mAdc}$, 2N5639	$t_{d(off)}$	– –	5.0 10	ns
Fall Time $I_{D(on)} = 12\ \text{mAdc}$, 2N5638 $I_{D(on)} = 6.0\ \text{mAdc}$, 2N5639	t_f	– –	10 20	ns

1. Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 3.0\%$.

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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	---

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