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:
  RDS(on) = 30Ω for 2N5638
  RDS(on) = 60Ω 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)

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°C Derate above 25°C	P_D	 310 2.82	 mW mW/°C
Storage Temperature Range	T_{stg}	–65 to +150	°C
Operating Junction Temp Range	T_J	–65 to +135	°C

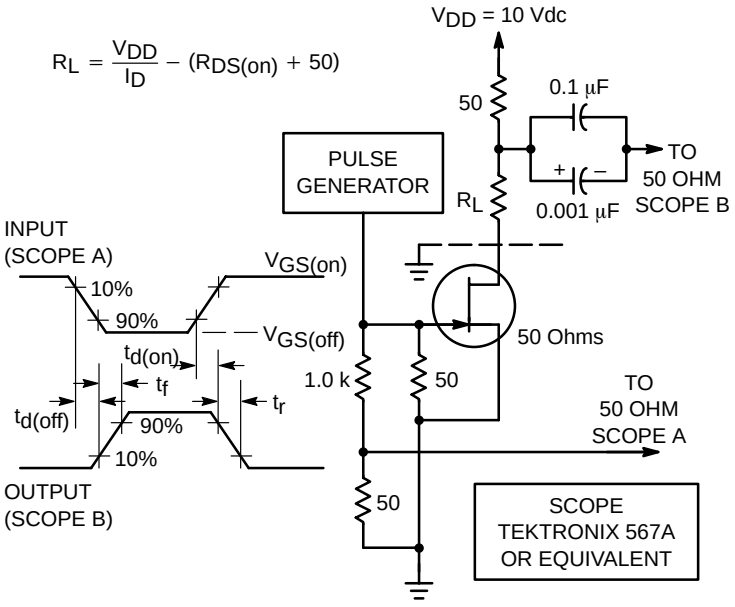
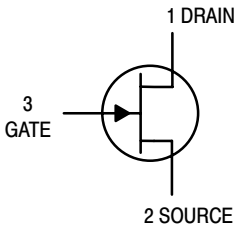
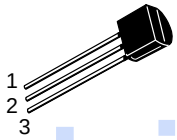


Figure 1. Switching Times Test Circuit

ON Semiconductor™

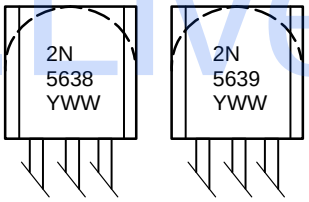
http://onsemi.com





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
2N5369RLRA	TO–92	2000/Tape & Reel

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

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Gate–Source Breakdown Voltage (I_G = –1.0 μAdc, V_{DS} = 0)		$V_{(BR)GSS}$	35	–	Vdc
Gate Reverse Current (V_{GS} = –15 Vdc, V_{DS} = 0)		I_{GSS}	–	1.0	nAdc
(V_{GS} = –15 Vdc, V_{DS} = 0, T_A = 100°C)				1.0	μAdc
Drain–Cutoff Current		$I_{D(off)}$	–		μAdc
(V_{DS} = 15 Vdc, V_{GS} = –12 Vdc)	2N5638			1.0	
(V_{DS} = 15 Vdc, V_{GS} = –12 Vdc, T_A = 100°C)	2N5638			1.0	
(V_{DS} = 15 Vdc, V_{GS} = –8.0 Vdc)	2N5639			1.0	
(V_{DS} = 15 Vdc, V_{GS} = –8.0 Vdc, T_A = 100°C)	2N5639			1.0	
ON CHARACTERISTICS					
Zero–Gate–Voltage Drain Current (Note 1.)	2N5638	I_{DSS}	50	–	mAdc
(V_{DS} = 20 Vdc, V_{GS} = 0)	2N5639		25	–	
Drain–Source “ON” Voltage		$V_{DS(on)}$			Vdc
(I_D = 12 mAdc, V_{GS} = 0)	2N5638		–	0.5	
(I_D = 6.0 mAdc, V_{GS} = 0)	2N5639		–	0.5	
Static Drain–Source “ON” Resistance		$R_{DS(on)}$			Ω
(I_D = 1.0 mAdc, V_{GS} = 0)	2N5638		–	30	
	2N5639		–	60	
SMALL–SIGNAL CHARACTERISTICS					
Static Drain–Source “ON” Resistance		$R_{DS(on)}$			Ω
(V_{GS} = 0, I_D = 0, f = 1.0 kHz)	2N5638		–	30	
	2N5639		–	60	
Input Capacitance (V_{DS} = 0, V_{GS} = –12 Vdc, f = 1.0 MHz)		C_{iss}	–	10	pF
Reverse Transfer Capacitance (V_{DS} = 0, V_{GS} = –12 Vdc, f = 1.0 MHz)		C_{rss}	–	4.0	pF

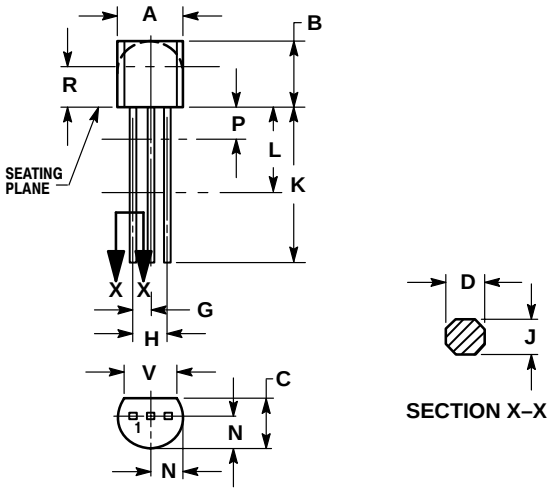
SWITCHING CHARACTERISTICS (V_{DD} = 10 Vdc, $V_{GS(on)}$ = 0, $V_{GS(off)}$ = –10 Vdc, $R_{G'}$ = 50 Ω. See Figure 1 on page 1)

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

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

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.

	INCHES		MILLIMETERS	
DIM	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	---

PUBLICATION ORDERING INFORMATION

Literature Fulfillment:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303–675–2175 or 800–344–3860 Toll Free USA/Canada
Fax: 303–675–2176 or 800–344–3867 Toll Free USA/Canada
Email: ONlit@hibbertco.com

N. American Technical Support: 800–282–9855 Toll Free USA/Canada

JAPAN: ON Semiconductor, Japan Customer Focus Center
4–32–1 Nishi–Gotanda, Shinagawa–ku, Tokyo, Japan 141–0031
Phone: 81–3–5740–2700
Email: r14525@onsemi.com

ON Semiconductor Website: http://onsemi.com

For additional information, please contact your local
Sales Representative.