2N5638
2N5639
2N5640

CASE 29-02, STYLE 5
TO-92 (TO-226AA)

JFET
SWITCHING

N-CHANNEL — DEPLETION

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
Junction Temperature Range	T_J	−65 to +150	°C
Storage Temperature Range	T_{stg}	−65 to +150	°C

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Gate-Source Breakdown Voltage (I_G = 10 μAdc, V_{DS} = 0)		$V_{(BR)GSS}$	30	—	Vdc
Gate Reverse Current		I_{GSS}			
(V_{GS} = −15 Vdc, V_{DS} = 0)			—	1.0	nAdc
(V_{GS} = −15 Vdc, V_{DS} = 0, T_A = 100°C)			—	1.0	μAdc
Drain Cutoff Current		$I_{D(off)}$			
(V_{DS} = 15 Vdc, V_{GS} = −12 Vdc)	2N5638		—	1.0	nAdc
(V_{DS} = 15 Vdc, V_{GS} = −8.0 Vdc)	2N5639		—	1.0	
(V_{DS} = 15 Vdc, V_{GS} = −6.0 Vdc)	2N5640		—	1.0	
(V_{DS} = 15 Vdc, V_{GS} = −12 Vdc, T_A = 100°C)	2N5638		—	1.0	μAdc
(V_{DS} = 15 Vdc, V_{GS} = −8.0 Vdc, T_A = 100°C)	2N5639		—	1.0	
(V_{DS} = 15 Vdc, V_{GS} = −6.0 Vdc, T_A = 100°C)	2N5640		—	1.0	
ON CHARACTERISTICS					
Zero-Gate-Voltage Drain Current(1)		I_{DSS}			mAdc
(V_{DS} = 20 Vdc, V_{GS} = 0)	2N5638		50	—	
	2N5639		25	—	
	2N5640		5.0	—	
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	
(I_D = 3.0 mAdc, V_{GS} = 0)	2N5640		—	0.5	
Static Drain-Source On Resistance		$r_{DS(on)}$			Ohms
(I_D = 1.0 mAdc, V_{GS} = 0)	2N5638		—	30	
	2N5639		—	60	
	2N5640		—	100	
SMALL-SIGNAL CHARACTERISTICS					
Static Drain-Source "ON" Resistance		$r_{ds(on)}$			Ohms
(V_{GS} = 0, I_D = 0, f = 1.0 kHz)	2N5638		—	30	
	2N5639		—	60	
	2N5640		—	100	
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

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

Characteristic				Symbol	Min	Max	Unit
SWITCHING CHARACTERISTICS							
Turn-On Delay Time	V_{DD} = 10 Vdc, $V_{GS(on)}$ = 0, $V_{GS(off)}$ = −10 Vdc, R_G' = 50 ohms	$I_{D(on)}$ = 12 mAdc	2N5638	$t_{d(on)}$	—	4.0	ns
		6.0 mAdc	2N5639		—	6.0	
		3.0 mAdc	2N5640		—	8.0	
Rise Time		$I_{D(on)}$ = 12 mAdc	2N5638	t_r	—	5.0	ns
		6.0 mAdc	2N5639		—	8.0	
		3.0 mAdc	2N5640		—	10	
Turn-Off Delay Time		$I_{D(on)}$ = 12 mAdc	2N5638	$t_{d(off)}$	—	5.0	ns
		6.0 mAdc	2N5639		—	10	
		3.0 mAdc	2N5640		—	15	
Fall Time		$I_{D(on)}$ = 12 mAdc	2N5638	t_f	—	10	ns
		6.0 mAdc	2N5639		—	20	
		3.0 mAdc	2N5640		—	30	

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 3.0%.