

# 2N4856, 2N4857, 2N4858, 2N4859, 2N4860, 2N4861

## N-Channel Silicon Junction Field-Effect Transistor

- Choppers
- Commutators
- Analog Switches

### Absolute maximum ratings at $T_A = 25^\circ\text{C}$

	2N4856, 2N4857, 2N4858	2N4859, 2N4860, 2N4861
Reverse Gate Source Voltage	– 40 V	– 30 V
Reverse Gate Drain Voltage	– 40 V	– 30 V
Continuous Device Dissipation	1.8 W	1.8 W
Power Derating	10 mW/°C	10 mW/°C
Continuous Forward Gate Current	50 mA	50 mA

### At $25^\circ\text{C}$ free air temperature:

#### Static Electrical Characteristics

		2N4856 2N4859		2N4857 2N4860		2N4858 2N4861		Process NJ132	
		Min	Max	Min	Max	Min	Max	Unit	Test Conditions
Gate Source Breakdown Voltage 2N4856, 2N4857, 2N4858 2N4859, 2N4860, 2N4861	$V_{(BR)GSS}$		– 40		– 40		– 40	V	$I_G = -1\mu\text{A}$ , $V_{DS} = 0\text{V}$
			– 30		– 30		– 30	V	$I_G = -1\mu\text{A}$ , $V_{DS} = 0\text{V}$
Gate Reverse Current 2N4856, 2N4857, 2N4858	$I_{GSS}$		– 250		– 250		– 250	pA	$V_{GS} = -20\text{V}$ , $V_{DS} = 0\text{V}$
			– 500		– 500		– 500	nA	$V_{GS} = -20\text{V}$ , $V_{DS} = 0\text{V}$ , $T_A = 150^\circ\text{C}$
Gate Reverse Current 2N4859, 2N4860, 2N4861	$I_{GSS}$		– 250		– 250		– 250	pA	$V_{GS} = -15\text{V}$ , $V_{DS} = 0\text{V}$
			– 500		– 500		– 500	nA	$V_{GS} = -15\text{V}$ , $V_{DS} = 0\text{V}$ , $T_A = 150^\circ\text{C}$
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	– 4	– 10	– 2	– 6	– 0.8	– 4	V	$V_{DS} = 15\text{V}$ , $I_D = 0.5\text{ nA}$
Drain Saturation Current (Pulsed)	$I_{DSS}$	50		20	100	8	80	mA	$V_{DS} = 15\text{V}$ , $V_{GS} = 0\text{V}$
Drain Cutoff Current	$I_{D(OFF)}$		250		250		250	pA	$V_{DS} = 15\text{V}$ , $V_{GS} = -10\text{V}$
			500		500		500	nA	$V_{DS} = 15\text{V}$ , $V_{GS} = -10\text{V}$ , $T_A = 150^\circ\text{C}$
Drain Source ON Voltage	$V_{DS(ON)}$		0.75 (20)		0.5 (10)		0.5 (5)	V (mA)	$V_{GS} = 0\text{V}$ , $I_D = ( )$

#### Dynamic Electrical Characteristics

Common Source ON Resistance	$r_{ds(on)}$		25		40		60	$\Omega$	$V_{GS} = 0\text{V}$ , $I_D = 0\text{A}$	$f = 1\text{ kHz}$
Common Source Input Capacitance	$C_{iss}$		18		18		18	pF	$V_{DS} = 0\text{V}$ , $V_{GS} = -10\text{V}$	$f = 1\text{ MHz}$
Common Source Reverse Transfer Capacitance	$C_{rss}$		8		8		8	pF	$V_{DS} = 0\text{V}$ , $V_{GS} = -10\text{V}$	$f = 1\text{ MHz}$

#### Switching Characteristics

Turn ON Delay Time	$t_{d(on)}$		6 (20) [–10]		6 (10) [– 6]		10 (5) [– 4]	ns (mA) [V]	$V_{DD} = 10\text{V}$ , $V_{GS} = 0\text{V}$ $I_{D(ON)} = ( )$ $V_{GS(OFF)} = [ ]$ <b>(2N4856, 2N4859)</b> $R_L = 465\Omega$ <b>(2N4857, 2N4860)</b> $R_L = 953\Omega$ <b>(2N4858, 2N4861)</b> $R_L = 1910\Omega$
Rise Time	$t_r$		3 (20) [–10]		4 (10) [– 6]		10 (5) [– 4]	ns (mA) [V]	
Turn OFF Delay Time	$t_{d(off)}$		25 (20) [–10]		50 (10) [– 6]		100 (5) [– 4]	ns (mA) [V]	

#### TO-18 Package

See Section G for Outline Dimensions

#### Pin Configuration

1 Source, 2 Drain, 3 Gate & Case

#### Surface Mount

SMP4856, SMP4857, SMP4858,  
SMP4859, SMP4860, SMP4861

