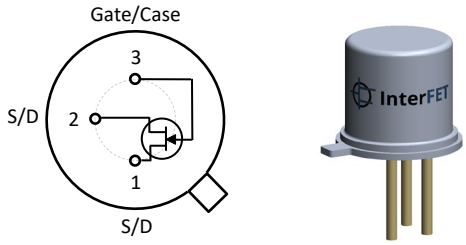
2N4856/A, 2N4857/A, 2N4858/A N-Channel JFET JAN Equivalent Parts

Features

- InterFET N0132S Geometry
- Low noise: 1.0 nV/√Hz typical
- High gain: 22mS typical
- Low gate leakage: 750fA typical @20
- High radiation tolerance
- RoHS, REACH, CMR compliant
- Custom test and binning options available
- Edge case SPICE modeling: InterFET SPICE

TO-18 Bottom View



Built to MIL-PRF-19500

(Source and Drain pins are interchangeable)

InterFET Similar Parts

- 2N3970, 2N4391
- IFN113

Applications

- General: Amplifiers; Switches; Voltage regulators; Oscillators; Signal mixers; Noise generators
- Military/Aero: Radar; Communications; Satellites; Missiles guidance; Hydrophone Pre-Amps
- Medical: Medical imaging systems; Medical monitors and recorders; Ultrasound equipment
- Audio: Tone control circuits; Headphone amplifiers; Audio filters; Electret Microphone

Description

The -40V InterFET 2N4856/A, 2N4857/A, and 2N4858/A JFET's are targeted for very low noise switching applications for mid to high frequency designs. Gate leakages are typically 50pA at room temperatures. The TO-18 package is hermetically sealed and suitable for military applications.

Ordering Information Custom Part and Binning Options Available

Part Number	Description	Case	Packaging
2N4856JANequiv; 2N4857JANequiv 2N4858JANequiv;	JAN equivalent	TO-18	Bulk
2N4856AJANequiv; 2N4857AJANequiv 2N4858AJANequiv;	JAN equivalent	TO-18	Bulk
2N4856JANTXequiv; 2N4857JANTXequiv 2N4858JANTXequiv;	JANTX equivalent	TO-18	Bulk
2N4856AJANTXequiv; 2N4857AJANTXequiv 2N4858AJANTXequiv;	JANTX equivalent	TO-18	Bulk
2N4856JANTXVequiv; 2N4857JANTXVequiv 2N4858JANTXVequiv;	JANTXV equivalent	TO-18	Bulk
2N4856AJANTXVequiv; 2N4857AJANTXVequiv 2N4858AJANTXVequiv;	JANTXV equivalent	TO-18	Bulk
2N4856JANSequiv; 2N4857JANSequiv 2N4858JANSequiv;	JANS equivalent	TO-18	Bulk
2N4856AJANSequiv; 2N4857AJANSequiv 2N4858AJANSequiv;	JANS equivalent	TO-18	Bulk

Electrical Characteristics

Maximum Ratings (@ T_A = 25°C, Unless otherwise specified)

Parameters		TO-72	SOT-23	TO-92	Unit
V_{RGS}	Reverse Gate Source and Gate Drain Voltage	-20	-20	-20	V
I_{FG}	Continuous Forward Gate Current	50	50	50	mA
P_D	Continuous Device Power Dissipation[1]	500	350	500	mW
P	Power Derating[1]	3.3	2.8	4	mW/°C
T_J	Operating Junction Temperature	-65 to 175	-55 to 150	-55 to 150	°C
T_{STG}	Storage Temperature	-65 to 175	-55 to 150	-55 to 150	°C

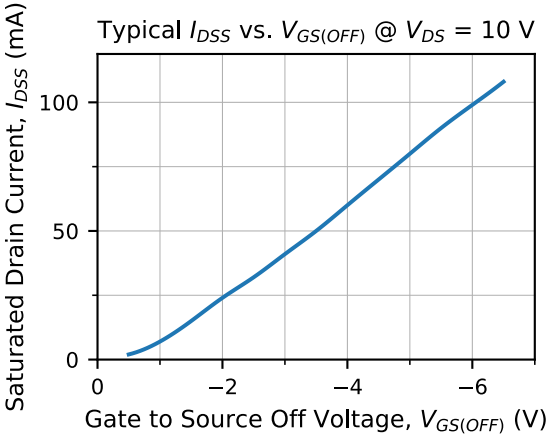
[1] Thermal power dissipation and derating values obtained with gate pin (substrate) thermally connected to pad and/or internal layer.

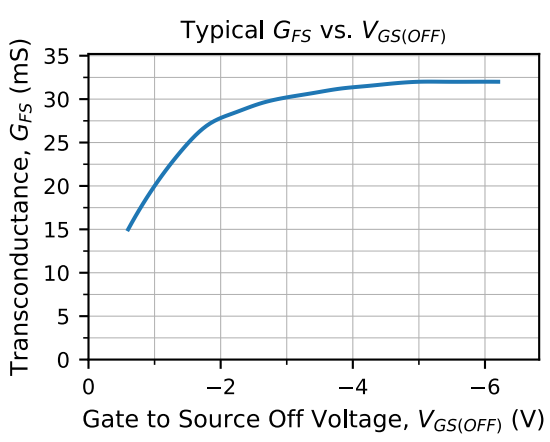
Static Characteristics (@ TA = 25°C, Unless otherwise specified, Highlighted values = A variant)

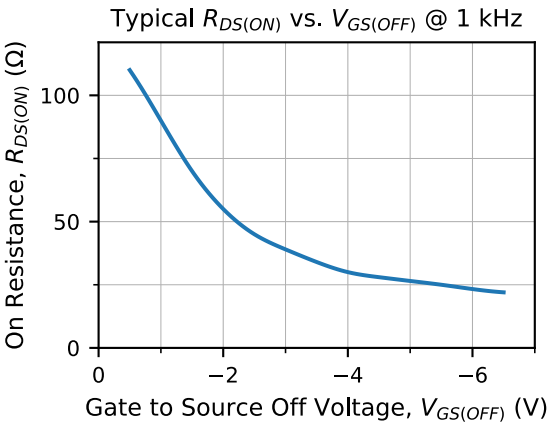
Parameters		Conditions	2N4856/A		2N4857/A		2N4858/A		Unit
			Min	Max	Min	Max	Min	Max	
$V_{(BR)GSS}$	Gate to Source Breakdown Voltage	I_G = -1µA, V_{DS} = 0V	-40		-40		-40		V
I_{GSS}	Gate to Source Reverse Current	V_{GS} = -20V, V_{DS} = 0V, T_A = 25°C V_{GS} = -20V, V_{DS} = 0V, T_A = 150°C		-250 -500		-200 -500		-200 -500	pA nA
$V_{GS(OFF)}$	Gate to Source Cutoff Voltage	V_{DS} = 15V, I_D = 0.5nA	-4	-10	-2	-6	-0.8	-4	V
I_{DSS}	Drain to Source Saturation Current	V_{DS} = 15V, V_{GS} = 0V (Pulsed)	50		20	100	8	80	mA
$I_{D(OFF)}$	Drain Cutoff Current	V_{DS} = 15V, V_{GS} = -10V, T_A = 25°C V_{DS} = 15V, V_{GS} = -10V, T_A = 150°C		250 500		250 500		250 500	pA nA
$V_{DS(ON)}$	Drain to Source ON Voltage	V_{GS} = 0V, I_D = ( )		0.75 (20)		0.5 (10)		0.5 (5)	V mA

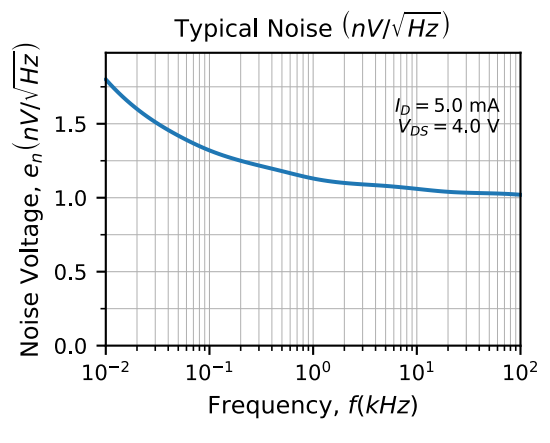
Dynamic Characteristics (@ TA = 25°C, Unless otherwise specified, Highlighted values = A variant)

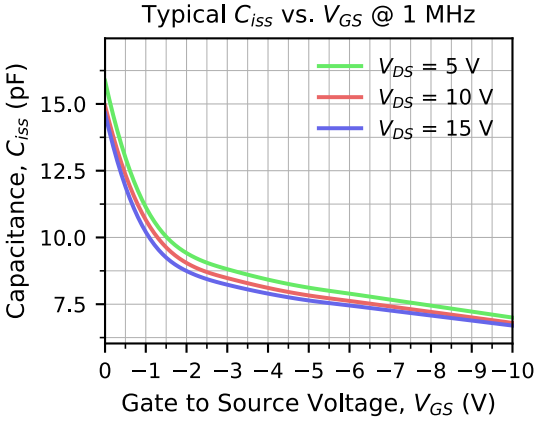
Parameters		Conditions	2N4856/A		2N4857/A		2N4858/A		Unit
			Min	Max	Min	Max	Min	Max	
$R_{DS(ON)}$	Drain to Source ON Resistance	V_{GS} = 0V, I_D = 0A, f = 1kHz		25		40		60	Ω
C_{iss}	Input Capacitance	V_{DS} = 0V, V_{GS} = -10V, f = 1MHz		18		18		18	pF
				10		10		10	
C_{rss}	Reverse Transfer Capacitance	V_{DS} = 0V, V_{GS} = -10V, f = 1MHz		8		8		8	pF
				4		3.5		3.5	
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 10V, $V_{GS(ON)}$ = 0V $I_{D(ON)}$ = ( ), $V_{GS(OFF)}$ = [ ]		6		6		10	ns
				5		6		8	
				(20) [-10]		(10) [-6]		(5) [-4]	(mA) [V]
t_r	Rise Time	V_{DD} = 10V, $V_{GS(ON)}$ = 0V $I_{D(ON)}$ = ( ), $V_{GS(OFF)}$ = [ ]		3		4		10	ns
				3		4		8	
				(20) [-10]		(10) [-6]		(5) [-4]	(mA) [V]
$t_{d(off)}$	Turn-Off Delay Time	V_{DD} = 10V, $V_{GS(ON)}$ = 0V $I_{D(ON)}$ = ( ), $V_{GS(OFF)}$ = [ ]		25		50		100	ns
				25		40		80	
				(20) [-10]		(10) [-6]		(5) [-4]	(mA) [V]

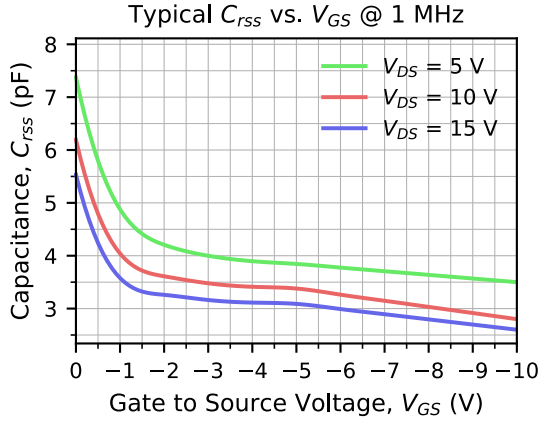

Typical I_{DSS} vs. $V_{GS(OFF)}$ @ V_{DS} = 10 V
Saturated Drain Current, I_{DSS} (mA)
100
50
0
0
−2
−4
−6
Gate to Source Off Voltage, $V_{GS(OFF)}$ (V)

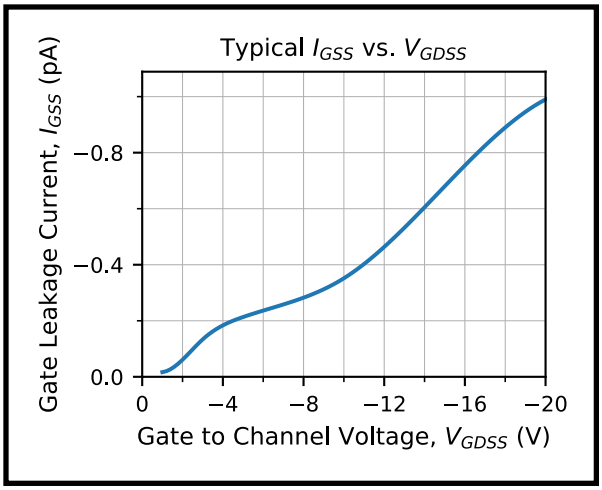

Typical G_{FS} vs. $V_{GS(OFF)}$
Transconductance, G_{FS} (mS)
35
30
25
20
15
10
5
0
0
−2
−4
−6
Gate to Source Off Voltage, $V_{GS(OFF)}$ (V)


Typical $R_{DS(ON)}$ vs. $V_{GS(OFF)}$ @ 1 kHz
On Resistance, $R_{DS(ON)}$ (Ω)
100
50
0
0
−2
−4
−6
Gate to Source Off Voltage, $V_{GS(OFF)}$ (V)


Typical Noise $(nV/\sqrt{Hz})$
I_D = 5.0 mA
V_{DS} = 4.0 V
Noise Voltage, $e_n(nV/\sqrt{Hz})$
1.5
1.0
0.5
0.0
10^{-2}
10^{-1}
10^{0}
10^{1}
10^{2}
Frequency, $f(kHz)$

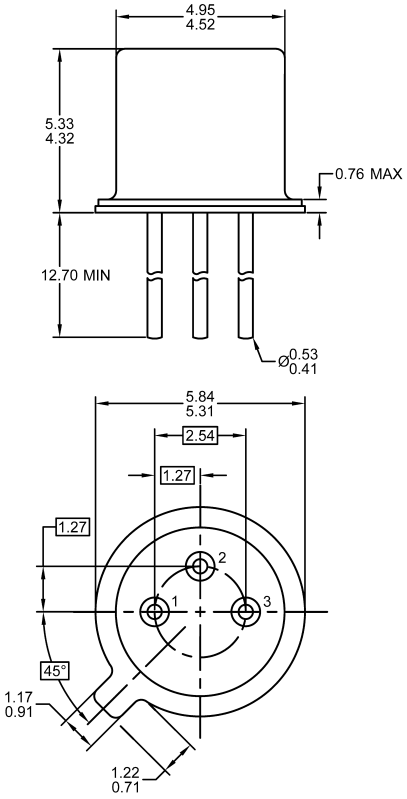

Typical C_{iss} vs. V_{GS} @ 1 MHz
V_{DS} = 5 V
V_{DS} = 10 V
V_{DS} = 15 V
Capacitance, C_{iss} (pF)
15.0
12.5
10.0
7.5
0 −1 −2 −3 −4 −5 −6 −7 −8 −9 −10
Gate to Source Voltage, V_{GS} (V)


Typical C_{rss} vs. V_{GS} @ 1 MHz
V_{DS} = 5 V
V_{DS} = 10 V
V_{DS} = 15 V
Capacitance, C_{rss} (pF)
8
7
6
5
4
3
0 −1 −2 −3 −4 −5 −6 −7 −8 −9 −10
Gate to Source Voltage, V_{GS} (V)


Typical I_{GSS} vs. V_{GDSS}
Gate Leakage Current, I_{GSS} (pA)
−0.8
−0.4
0.0
0
−4
−8
−12
−16
−20
Gate to Channel Voltage, V_{GDSS} (V)

TO-18 Mechanical and Layout Data

Package Outline Data



1. All linear dimensions are in millimeters.
2. Package weight approximately 0.29 grams
3. Bulk product is shipped in standard ESD shipping material
4. Refer to JEDEC standards for additional information.

Compliance and Legal

Environment

InterFET parts follow the latest RoHS Compliance, REACH Compliance, Proposition 65 Statement, TSCA Statement, and Chemical Disposal and Waste Mitigation requirement and guidelines. For more on InterFET's Environmental Commitment please visit www.InterFET.com/environmental/.

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