

RADIATION HARDENED P-CHANNEL MOSFET

Qualified per MIL-PRF-19500/615

DEVICES

2N7382

LEVELS

JANSM (3K RAD(Si))
JANS D (10K RAD(Si))
JANSR (100K RAD(Si))
JANSF (300K RAD(Si))

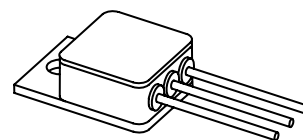
ABSOLUTE MAXIMUM RATINGS ($T_C = +25^\circ\text{C}$ unless otherwise noted)

Parameters / Test Conditions	Symbol	Value	Unit
Drain – Source Voltage	V_{DS}	-100	Vdc
Gate – Source Voltage	V_{GS}	± 20	Vdc
Continuous Drain Current $T_C = +25^\circ\text{C}$	I_{D1}	-11.0	Adc
Continuous Drain Current $T_C = +100^\circ\text{C}$	I_{D2}	-7.0	Adc
Max. Power Dissipation	P_{tl}	75 ⁽¹⁾	W
Drain to Source On State Resistance	$R_{ds(on)}$	0.3 ⁽²⁾	Ω
Operating & Storage Temperature	T_{op}, T_{stg}	-55 to +150	$^\circ\text{C}$

Note: (1) Derated Linearly by 0.6 W/ $^\circ\text{C}$ for $T_C > +25^\circ\text{C}$
(2) $V_{GS} = -12\text{Vdc}$, $I_D = -7.0\text{A}$

PRE-IRRADIATION ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, unless otherwise noted)

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Drain-Source Breakdown Voltage $V_{GS} = 0\text{V}$, $I_D = -1\text{mA}$	$V_{(BR)DSS}$	-100		Vdc
Gate-Source Voltage (Threshold) $V_{DS} \geq V_{GS}$, $I_D = -1.0\text{mA}$ $V_{DS} \geq V_{GS}$, $I_D = -1.0\text{mA}$, $T_j = +125^\circ\text{C}$ $V_{DS} \geq V_{GS}$, $I_D = -1.0\text{mA}$, $T_j = -55^\circ\text{C}$	$V_{GS(th)1}$ $V_{GS(th)2}$ $V_{GS(th)3}$	-2.0 -1.0	-4.0 -5.0	Vdc
Gate Current $V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$ $V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$, $T_j = +125^\circ\text{C}$	I_{GSS1} I_{GSS2}		± 100 ± 200	nAdc
Drain Current $V_{GS} = 0\text{V}$, $V_{DS} = -80\text{V}$ $V_{GS} = 0\text{V}$, $V_{DS} = -80\text{V}$, $T_j = +125^\circ\text{C}$	I_{DSS1} I_{DSS2}		-25 -0.25	μAdc mAdc
Static Drain-Source On-State Resistance $V_{GS} = -12\text{V}$, $I_D = -7.0\text{A}$ pulsed $V_{GS} = -12\text{V}$, $I_D = -11.0\text{A}$ pulsed $T_j = -125^\circ\text{C}$ $V_{GS} = -12\text{V}$, $I_D = -7.0\text{A}$ pulsed	$r_{DS(on)1}$ $r_{DS(on)2}$ $r_{DS(on)3}$		0.3 0.35 0.54	Ω Ω Ω
Diode Forward Voltage $V_{GS} = 0\text{V}$, $I_D = -11.0\text{A}$ pulsed	V_{SD}		-3.0	Vdc



TO-257AA
JANSM2N7382, JANS D2N7382,
JANSR2N7382, JANSF2N7382
See Figure 1

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DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Gate Charge:				
On-State Gate Charge	$Q_{g(on)}$		45	nC
Gate to Source Charge	Q_{gs}		10	
Gate to Drain Charge	Q_{gd}		25	

$V_{GS} = -12V$, $I_D = -11.0A$
 $V_{DS} = -50V$

SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Switching time tests:				
Turn-on delay time	$t_{d(on)}$		30	ns
Rinse time	t_r		50	
Turn-off delay time	$t_{d(off)}$		70	
Fall time	t_f		70	
Diode Reverse Recovery Time	t_{rr}		250	ns

$I_D = -11.0A$, $V_{GS} = -12Vdc$,
Gate drive impedance = 7.5Ω ,
 $V_{DD} = -50Vdc$
 $di/dt \leq -100A/\mu s$, $V_{DD} \leq -50V$,
 $I_F = -11.0A$

POST-IRRADIATION ELECTRICAL CHARACTERISTICS (3) ($T_A = +25^\circ C$, unless otherwise noted)

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Drain-Source Breakdown Voltage $V_{GS} = 0V$, $I_D = -1mA$	$V_{(BR)DSS}$	-100		Vdc
Gate-Source Voltage (Threshold) $V_{DS} \geq V_{GS}$, $I_D = -1.0mA$ JANSR $V_{DS} \geq V_{GS}$, $I_D = -1.0mA$ JANSF	$V_{GS(th)1}$ $V_{GS(th)1}$	-2.0 -2.0	-4.0 -5.0	Vdc
Gate Current $V_{GS} = \pm 20V$, $V_{DS} = 0V$	I_{GSS1}		± 100	nAdc
Drain Current $V_{GS} = 0V$, $V_{DS} = -80V$	I_{DSS1}		-25	μA dc
Static Drain-Source On-State Resistance $V_{GS} = -12V$, $I_D = -7.0A$ pulsed	$r_{DS(on)}$		0.30	Ω
Diode Forward Voltage $V_{GS} = 0V$, $I_D = -11.0A$ pulsed	V_{SD}		-3.0	Vdc

Note:

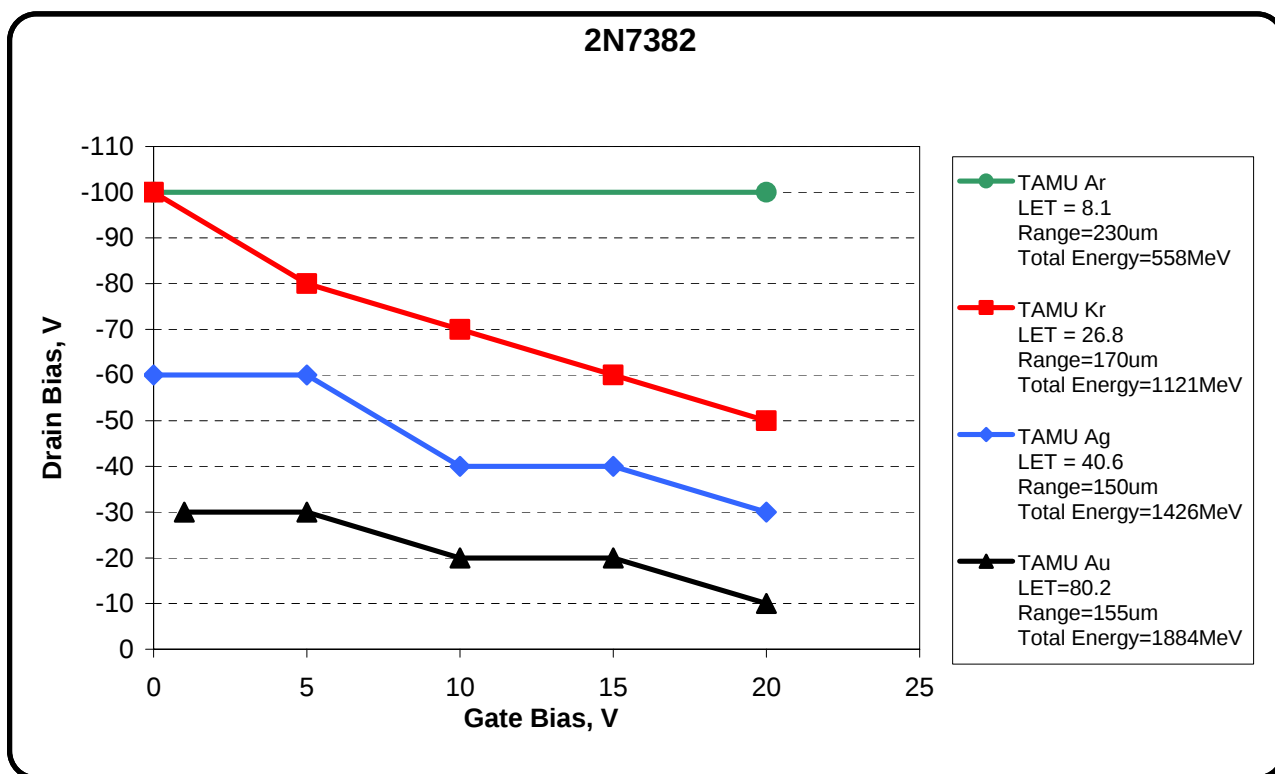
- (3) Post-Irradiation Electrical Characteristics apply to devices subjected to Steady State Total Dose Irradiation testing in accordance with MIL-STD-750 Method 1019. Separate samples are tested for VGS bias (12V), and VDS bias (80V) conditions.

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Single Event Effect (SEE) Characteristics:

Heavy Ion testing of the 2N7382 device was completed by similarity of die structure to the 2N7389. The 2N7389 has been characterized at the Texas A&M cyclotron. The following SOA curve has been established using the elements, LET, range, and Total Energy conditions as shown:

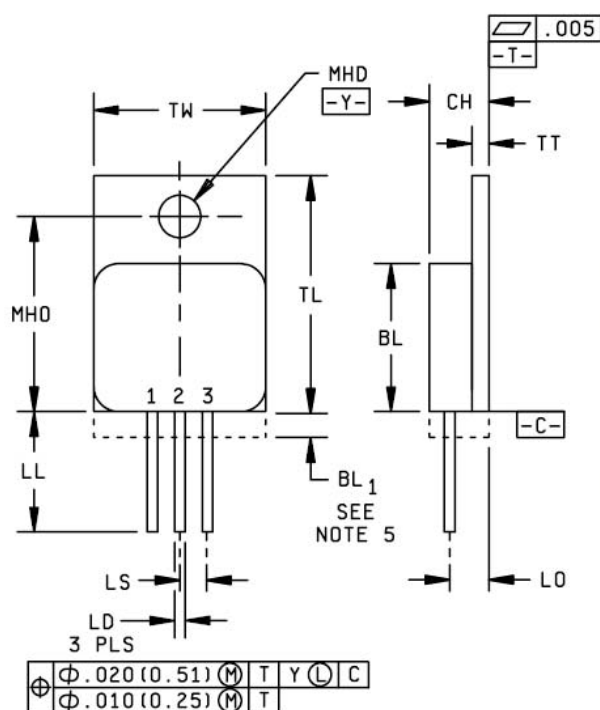


It should be noted that total energy levels are considered to be a factor in SEE characterization. Comparisons to other datasets should not be based on LET alone. Please consult factory for more information.

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Figure 1: Case Outline and Pin Configuration for JANSM2N7382, JANSD2N7382, JANSR2N7382 & JANSF2N7382



Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BL	.410	.430	10.41	10.92
BL1		.028		0.71
CH	.190	.200	4.83	5.08
LD	.025	.035	0.64	0.89
LL	.500	.625	12.70	15.88
LO	.120 BSC		3.05 BSC	
LS	.100 BSC		2.54 BSC	
MHD	.140	.150	3.56	3.81
MHO	.527	.537	13.39	13.64
TL	.645	.665	16.38	16.89
TT	.035	.045	0.89	1.14
TW	.410	.420	10.41	10.67
Term 1	Drain			
Term 2	Source			
Term 3	Gate			

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. All terminals are isolated from case.
4. This area is for the lead feed-thru eyelets (configuration is optional, but will not extend beyond this zone).
5. In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.