

2N7224, JANTX2N7224, JANTXV2N7224
2N7225, JANTX2N7225, JANTXV2N7225

2N7227, JANTX2N7227, JANTXV2N7227
2N7228, JANTX2N7228, JANTXV2N7228

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

Parameter	JANTXV, JANTX, 2N7224	Units
I_D @ $V_{GS} = 10\text{V}$, $T_C = 25^\circ\text{C}$ Continuous Drain Current	34	A
I_D @ $V_{GS} = 10\text{V}$, $T_C = 100^\circ\text{C}$ Continuous Drain Current	21	A
I_{DM} Pulsed Drain Current ¹	136	A
P_D @ $T_C = 25^\circ\text{C}$ Maximum Power Dissipation	150	W
Linear Derating Factor	1.2	W/ $^\circ\text{C}$
V_{GS} Gate-Source Voltage	± 20	V
E_{AS} Single Pulse Avalanche Energy ²	150 ⁴	mJ
I_{AR} Avalanche Current ¹	34 ⁴	A
E_{ARR} Repetitive Avalanche Energy ¹	15 ⁴	mJ
T_J Operating Junction	-55 to 150	$^\circ\text{C}$
T_{STG} Storage Temperature Range		
Lead Temperature	300(.06 from case for 10 sec)	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS @ $T_J = 25^\circ\text{C}$ (Unless Otherwise Specified)

Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS} Drain-Source Breakdown Voltage	100			V	$V_{GS} = 0\text{V}$, $I_D \approx 1.0\text{ mA}$
$R_{DS(on)}$ Static Drain-to-Source On-State Resistance	—	—	0.07		$V_{GS} = 10\text{V}$, $I_D = 21\text{ A}$ ³
	—	—	0.081		$V_{GS} = 10\text{V}$, $I_D = 34\text{ A}$ ³
$V_{GS(th)}$ Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$
I_{DSS} Zero Gate Voltage Drain Current	—	—	25	μA	$V_{DS} = 80\text{ V}$, $V_{GS} = 0\text{V}$
	—	—	250		$V_{DS} = 80\text{ V}$, $V_{GS} = 0\text{V}$, $T_J = 125^\circ\text{C}$
I_{SSS} Gate -to-Source Leakage Forward	—	—	100	nA	$V_{GS} = 20\text{ V}$
I_{SSS} Gate -to-Source Leakage Reverse	—	—	-100	nA	$V_{GS} = -20\text{ V}$
$Q_{G(on)}$ On-state Gate Charge	—	—	125	nC	$V_{GS} = 10\text{V}$, $I_D = 34\text{A}$
Q_{GS} Gate-to-Source Charge	—	—	22	nC	$V_{DS} = 50\text{ V}$
Q_{GD} Gate-to-Drain ("Miller") Charge	—	—	65	nC	See note 4
$t_{B(on)}$ Turn-On Delay Time	—	—	35	ns	$V_{DD} = 50\text{ V}$, $I_D = 21\text{A}$, $R_G = 2.35$ See note 4
t_r Rise Time	—	—	190	ns	
$t_{(off)}$ Turn-Off Delay Time	—	—	170	ns	
t_f Fall Time	—	—	130	ns	

Source-Drain Diode Ratings and Characteristics

Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_{SD} Diode Forward Voltage	—	—	1.8	V	$T_J = 25^\circ\text{C}$, $I_S = 34\text{ A}$ ³ , $V_{GS} = 0\text{ V}$
t_r Reverse Recovery Time	—	—	500	ns	$T_J = 25^\circ\text{C}$, $I_F = 34\text{A}$, $di/dt \leq 100\text{A}/\mu\text{s}$

Thermal Resistance

Parameter	Min.	Typ.	Max.	Units	Test Conditions
R_{thJC} Junction-to-Case	—	—	0.83	$^\circ\text{C}/\text{W}$	Mounting surface flat, smooth, and greased
R_{thCS} Case-to-sink	—	0.21	—		
R_{thJA} Junction-to-Ambient	—	—	48		Typical socket mount

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. @ $V_{DD} = 25\text{V}$, Starting $T_J = 25^\circ\text{C}$; $L \geq 200\text{ }\mu\text{H}$, $R_G = 25$, Peak $I_L = 34\text{A}$
3. Pulse width $\leq 300\text{ }\mu\text{s}$; Duty Cycle $\leq 2\%$
4. See MIL-S-19500/592

2N7224, JANTX2N7224, JANTXV2N7224
2N7225, JANTX2N7225, JANTXV2N7225

2N7227, JANTX2N7227, JANTXV2N7227
2N7228, JANTX2N7228, JANTXV2N7228

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

Parameter	JANTXV, JANTX, 2N7225	Units
I_D @ $V_{GS} = 10\text{V}$, $T_C = 25^\circ\text{C}$ Continuous Drain Current	27.4	A
I_D @ $V_{GS} = 10\text{V}$, $T_C = 100^\circ\text{C}$ Continuous Drain Current	17	A
I_{DM} Pulsed Drain Current ¹	110	A
P_D @ $T_C = 25^\circ\text{C}$ Maximum Power Dissipation	150	W
Linear Derating Factor	1.2	W/ $^\circ\text{C}$
V_{GS} Gate-Source Voltage	± 20	V
E_{AS} Single Pulse Avalanche Energy ²	500 ⁴	mJ
I_{AR} Avalanche Current ¹	27.4 ⁴	A
E_{AR} Repetitive Avalanche Energy ¹	15 ⁴	mJ
T_J Operating Junction	-55 to 150	$^\circ\text{C}$
T_{STG} Storage Temperature Range		
Lead Temperature	300(.06 from case for 10 sec)	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS @ $T_J = 25^\circ\text{C}$ (Unless Otherwise Specified)

Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS} Drain-Source Breakdown Voltage	200			V	$V_{GS} = 0\text{V}$, $I_D = 1.0\text{ mA}$
$R_{DS(on)}$ Static Drain-to-Source On-State Resistance	—	—	0.100		$V_{GS} = 10\text{ V}$, $I_D = 17\text{ A}$ ³
	—	—	0.105		$V_{GS} = 10\text{ V}$, $I_D = 27.4\text{ A}$ ³
$V_{GS(th)}$ Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$
I_{SS} Zero Gate Voltage Drain Current	—	—	25	μA	$V_{DS} = 100\text{ V}$, $V_{GS} = 0\text{V}$
	—	—	250		$V_{DS} = 100\text{ V}$, $V_{GS} = 0\text{V}$, $T_J = 125^\circ\text{C}$
I_{SSS} Gate -to-Source Leakage Forward	—	—	100	nA	$V_{GS} = 20\text{ V}$
I_{SSS} Gate -to-Source Leakage Reverse	—	—	-100	nA	$V_{GS} = -20\text{ V}$
$Q_{G(on)}$ On-state Gate Charge	—	—	115	nC	$V_{GS} = 10\text{ V}$, $I_D = 27.4\text{ A}$
Q_{GS} Gate-to-Source Charge	—	—	22	nC	$V_{DS} = 100\text{ V}$
Q_{Gd} Gate-to-Drain ("Miller") Charge	—	—	60	nC	See note 4
$t_{b(on)}$ Turn-On Delay Time	—	—	35	ns	$V_{DD} = 100\text{ V}$, $I_D = 17\text{ A}$, $R_G = 2.35$
t_r Rise Time	—	—	190	ns	See note 4
$t_{b(off)}$ Turn-Off Delay Time	—	—	170	ns	
t_f Fall Time	—	—	130	ns	

Source-Drain Diode Ratings and Characteristics

Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_{SD} Diode Forward Voltage	—	—	1.9	V	$T_J = 25^\circ\text{C}$, $I_S = 27.4\text{ A}$ ³ , $V_{GS} = 0\text{ V}$
t_r Reverse Recovery Time	—	—	950	ns	$T_J = 25^\circ\text{C}$, $I_F = 27.4\text{ A}$, $dI/dt \leq 100\text{ A}/\mu\text{s}$

Thermal Resistance

Parameter	Min.	Typ.	Max.	Units	Test Conditions
R_{thJC} Junction-to-Case	—	—	0.83	$^\circ\text{C}/\text{W}$	Mounting surface flat, smooth, and greased
R_{thCS} Case-to-sink	—	0.21	—		
R_{thJA} Junction-to-Ambient	—	—	48		Typical socket mount

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. @ $V_{DD} = 50\text{V}$, Starting $T_J = 25^\circ\text{C}$, $L \geq 1\text{ mH}$, $R_G = 25$, Peak $I_L = 27.4\text{ A}$
3. Pulse width $\leq 300\text{ }\mu\text{s}$; Duty Cycle $\leq 2\%$
4. See MIL-S-19500/592

2N7224, JANTX2N7224, JANTXV2N7224
2N7225, JANTX2N7225, JANTXV2N7225

2N7227, JANTX2N7227, JANTXV2N7227
2N7228, JANTX2N7228, JANTXV2N7228

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

Parameter	JANTXV, JANTX, 2N7227	Units
I_D @ $V_{GS} = 10\text{V}$, $T_C = 25^\circ\text{C}$ Continuous Drain Current	14	A
I_D @ $V_{GS} = 10\text{V}$, $T_C = 100^\circ\text{C}$ Continuous Drain Current	9.0	A
I_{DM} Pulsed Drain Current ¹	56	A
P_D @ $T_C = 25^\circ\text{C}$ Maximum Power Dissipation	150	W
Linear Derating Factor	1.2	W/°C
V_{GS} Gate-Source Voltage	± 20	V
E_{AS} Single Pulse Avalanche Energy ²	700 ⁴	mJ
I_{AR} Avalanche Current ¹	14 ⁴	A
E_{ARR} Repetitive Avalanche Energy ¹	15 ⁴	mJ
T_J Operating Junction	-55 to 150	°C
T_{STG} Storage Temperature Range		
Lead Temperature	300(.06 from case for 10 sec)	°C

ELECTRICAL CHARACTERISTICS @ $T_J = 25^\circ\text{C}$ (Unless Otherwise Specified)

Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS} Drain-Source Breakdown Voltage	400			V	$V_{GS} = 0\text{V}$, $I_D \approx 1.0\text{ mA}$
$R_{DS(on)}$ Static Drain-to-Source On-State Resistance	—	—	0.315		$V_{GS} = 10\text{V}$, $I_D = 9.0\text{ A}$ ³
	—	—	0.415		$V_{GS} = 10\text{V}$, $I_D = 14\text{ A}$ ³
$V_{GS(th)}$ Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$
I_{DSS} Zero Gate Voltage Drain Current	—	—	25	μA	$V_{DS} = 300\text{ V}$, $V_{GS} = 0\text{V}$
	—	—	250		$V_{DS} = 300\text{ V}$, $V_{GS} = 0\text{V}$, $T_J = 125^\circ\text{C}$
I_{SS} Gate -to-Source Leakage Forward	—	—	100	nA	$V_{GS} = 20\text{ V}$
I_{SS} Gate -to-Source Leakage Reverse	—	—	-100	nA	$V_{GS} = -20\text{ V}$
$Q_{G(on)}$ On-state Gate Charge	—	—	110	nC	$V_{GS} = 10\text{V}$, $I_D = 14\text{A}$
Q_{GS} Gate-to-Source Charge	—	—	18	nC	$V_{DS} = 200\text{ V}$
Q_{GD} Gate-to-Drain ("Miller") Charge	—	—	65	nC	See note 4
$t_{B(on)}$ Turn-On Delay Time	—	—	35	ns	$V_{DD} = 200\text{ V}$, $I_D = 9\text{ A}$, $R_G = 2.35$ See note 4
t_r Rise Time	—	—	190	ns	
t_{off} Turn-Off Delay Time	—	—	170	ns	
t_f Fall Time	—	—	130	ns	

Source-Drain Diode Ratings and Characteristics

Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_{SD} Diode Forward Voltage	—	—	1.7	V	$T_J = 25^\circ\text{C}$, $I_S = 14\text{ A}$ ³ , $V_{GS} = 0\text{ V}$
t_r Reverse Recovery Time	—	—	1200	ns	$T_J = 25^\circ\text{C}$, $I_F = 14\text{A}$, $di/dt \leq 100\text{A}/\mu\text{s}$

Thermal Resistance

Parameter	Min.	Typ.	Max.	Units	Test Conditions
R_{thJC} Junction-to-Case	—	—	0.83	°C/W	Mounting surface flat, smooth, and greased Typical socket mount
R_{thCS} Case-to-sink	—	0.21	—		
R_{thJA} Junction-to-Ambient	—	—	48		

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. @ $V_{DD} = 50\text{V}$, Starting $T_J = 25^\circ\text{C}$, $L \geq 6.25\text{ mH}$, $R_G = 25$, Peak $I_L = 14\text{A}$
3. Pulse width $\leq 300\text{ }\mu\text{s}$; Duty Cycle $\leq 2\%$
4. See MIL-S-19500/592

2N7224, JANTX2N7224, JANTXV2N7224
2N7225, JANTX2N7225, JANTXV2N7225

2N7227, JANTX2N7227, JANTXV2N7227
2N7228, JANTX2N7228, JANTXV2N7228

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

Parameter	JANTXV, JANTX, 2N7228	Units
I_D @ $V_{GS} = 10\text{V}$, $T_C = 25^\circ\text{C}$ Continuous Drain Current	12	A
I_D @ $V_{GS} = 10\text{V}$, $T_C = 100^\circ\text{C}$ Continuous Drain Current	8.0	A
I_{DM} Pulsed Drain Current ¹	48	A
P_D @ $T_C = 25^\circ\text{C}$ Maximum Power Dissipation	150	W
Linear Derating Factor	1.2	W/ $^\circ\text{C}$
V_{GS} Gate-Source Voltage	± 20	V
E_{AS} Single Pulse Avalanche Energy ²	750 ⁴	mJ
I_{AR} Avalanche Current ¹	12 ⁴	A
E_{ARR} Repetitive Avalanche Energy ¹	15 ⁴	mJ
T_J Operating Junction	-55 to 150	$^\circ\text{C}$
T_{STG} Storage Temperature Range		
Lead Temperature	300(.06 from case for 10 sec)	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS @ $T_J = 25^\circ\text{C}$ (Unless Otherwise Specified)

Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS} Drain-Source Breakdown Voltage	500			V	$V_{GS} = 0\text{V}$, $I_D \approx 1.0\text{ mA}$
$R_{DS(on)}$ Static Drain-to-Source On-State Resistance	—	—	0.415		$V_{GS} = 10\text{V}$, $I_D = 8.0\text{ A}$ ³
	—	—	0.515		$V_{GS} = 10\text{V}$, $I_D = 12\text{ A}$ ³
$V_{GS(th)}$ Gate Threshold Voltage	2.0	—	4.0	V	$V_{GS} = V_{GS}I_D = 250\text{ }\mu\text{A}$
I_{DSS} Zero Gate Voltage Drain Current	—	—	25	μA	$V_{DS} = 400\text{ V}$, $V_{GS} = 0\text{V}$
	—	—	250	μA	$V_{DS} = 400\text{ V}$, $V_{GS} = 0\text{V}$, $T_J = 125^\circ\text{C}$
I_{SS} Gate -to-Source Leakage Forward	—	—	100	nA	$V_{GS} = 20\text{ V}$
I_{SSS} Gate -to-Source Leakage Reverse	—	—	-100	nA	$V_{GS} = -20\text{ V}$
$Q_{G(on)}$ On-state Gate Charge	—	—	120	nC	$V_{GS} = 10\text{V}$, $I_D = 12\text{A}$
Q_{GS} Gate-to-Source Charge	—	—	19	nC	$V_{DS} = 250\text{ V}$
Q_{GD} Gate-to-Drain ("Miller") Charge	—	—	70	nC	See note 4
$t_{b(on)}$ Turn-On Delay Time	—	—	35	ns	$V_{DD} = 250\text{ V}$, $I_D = 8\text{A}$, $R_G = 2.35$ See note 4
t_r Rise Time	—	—	190	ns	
$t_{f(off)}$ Turn-Off Delay Time	—	—	170	ns	
t_f Fall Time	—	—	130	ns	

Source-Drain Diode Ratings and Characteristics

Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_{SD} Diode Forward Voltage	—	—	1.7	V	$T_J = 25^\circ\text{C}$, $I_S = 12\text{ A}$ ³ , $V_{GS} = 0\text{ V}$
t_r Reverse Recovery Time	—	—	1600	ns	$T_J = 25^\circ\text{C}$, $I_F = 12\text{A}$, $di/dt \leq 100\text{A}/\mu\text{s}$

Thermal Resistance

Parameter	Min.	Typ.	Max.	Units	Test Conditions
R_{thJC} Junction-to-Case	—	—	0.83		Mounting surface flat, smooth, and greased Typical socket mount
R_{thCS} Case-to-sink	—	0.21	—	$^\circ\text{C}/\text{W}$	
R_{thJA} Junction-to-Ambient	—	—	48		

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. @ $V_{DD} = 50\text{V}$, Starting $T_J = 25^\circ\text{C}$; $L \geq 9.4\text{ mH}$, $R_G = 25$, Peak $I_L = 12\text{A}$
3. Pulse width $\leq 300\text{ }\mu\text{s}$; Duty Cycle $\leq 2\%$
4. See MIL-S-19500/592