

2N6796, JANTX2N6796 JANTXV2N6796
 2N6798, JANTX2N6798 JANTXV2N6798

2N6800, JANTX2N6800, JANTXV2N6800
 2N6802, JANTX2N6802, JANTXV2N6802

JANTX, JANTXV POWER MOSFET IN TO-205 AF PACKAGE, QUALIFIED TO MIL-PRF-19500/557

100 V, 200 V, 400 V & 500 V, N-Channel,
 Enhancement Mode MOSFET Power Transistor

FEATURES

- Low $R_{DS(on)}$
- Ease of Paralleling
- Qualified to MIL-PRF-19500/557

DESCRIPTION

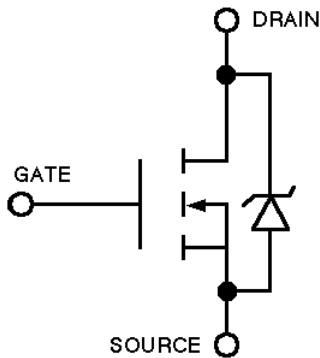
This hermetically packaged QPL product features the latest advanced MOSFET technology. It is ideally suited for Military requirements where small size, high performance and high reliability are required, and in applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers and high energy pulse circuits.



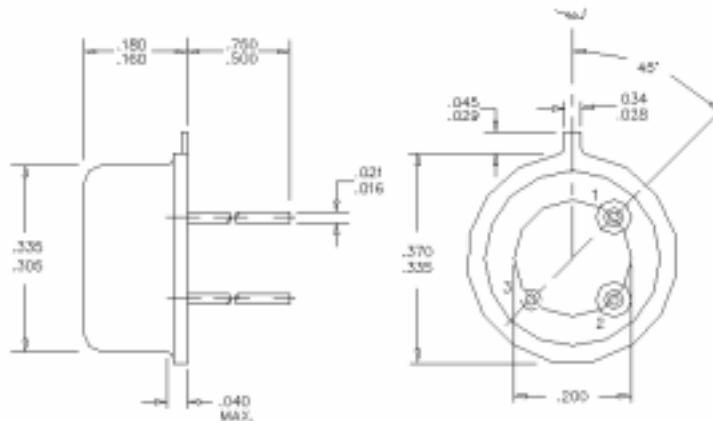
PRIMARY ELECTRICAL CHARACTERISTICS @ $T_c = 25\text{ C}$

PART NUMBER	V_{DS} , Volts	$R_{DS(on)}$	I_D , Amps
2N6796	100	.18	8.0
2N6798	200	.40	5.5
2N6800	400	1.00	3.0
2N6802	500	1.50	2.5

SCHEMATIC



MECHANICAL OUTLINE



Pin Connection
 Pin 1: Source
 Pin 2: Gate
 Pin 3: Drain
 (Case)

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2N6800, JANTX2N6800, JANTXV2N6800
2N6802, JANTX2N6802, JANTXV2N6802

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

Parameter	JANTXV, JANTX, 2N6796	Units
I_D @ $V_{GS} = 10\text{V}$, $T_C = 25^\circ\text{C}$ Continuous Drain Current	8.0	A
I_D @ $V_{GS} = 10\text{V}$, $T_C = 100^\circ\text{C}$ Continuous Drain Current	5.0	A
I_{DM} Pulsed Drain Current ¹	32	A
P_D @ $T_C = 25^\circ\text{C}$ Maximum Power Dissipation	25	W
Linear Derating Factor	0.2	W/ $^\circ\text{C}$
V_{GS} Gate-Source Voltage	± 20	V
E_{AS} Single Pulse Avalanche Energy ²	4.3 ⁴	mJ
T_J Operating Junction	-55 to 150	$^\circ\text{C}$
T_{STG} Storage Temperature Range		$^\circ\text{C}$
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	$V_{GS} = 0\text{V}$, $I_D = 1.0\text{ mA}$,
$R_{DS(on)}$ Static Drain-to-Source On-State Resistance	—	—	.18		$V_{GS} = 10\text{V}$, $I_D = 5.0\text{ A}$ ³
	—	—	.195		$V_{GS} = 10\text{V}$, $I_D = 8.0\text{ A}$ 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_{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	—	—	28.5	nC	$V_{GS} = 10\text{ V}$, $I_D = 8\text{ A}$
Q_{GS} Gate-to-Source Charge	—	—	6.3	nC	$V_{DS} = 50\text{ V}$
Q_{Gd} Gate-to-Drain ("Miller") Charge	—	—	16.6	nC	See note 4
$t_{(on)}$ Turn-On Delay Time	—	—	30	ns	$V_{DD} = 30\text{ V}$, $I_D = 5.0\text{ A}$, $R_G = 7.5$
t_r Rise Time	—	—	75	ns	See note 4
$t_{(off)}$ Turn-Off Delay Time	—	—	40	ns	
t_f Fall Time	—	—	45	ns	

Source-Drain Diode Ratings and Characteristics

Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_{SD} Diode Forward Voltage	—	—	1.5	V	$T_J = 25^\circ\text{C}$, $I_S = 8.0\text{ A}$ ³ , $V_{GS} = 0\text{ V}$ ³
t_r Reverse Recovery Time	—	—	300	ns	$T_J = 25^\circ\text{C}$, $I_S = 8.0\text{ A}$, $di/dt \leq 100\text{ A}/\mu\text{s}$

Thermal Resistance

Parameter	Min.	Typ.	Max.	Units	Test Conditions
R_{thJC} Junction-to-Case	—	—	5.0	$^\circ\text{C}/\text{W}$	Mounting surface flat, smooth, and greased
R_{thCS} Case-to-sink	—	0.21	—		
R_{thJA} Junction-to-Ambient	—	—	175		

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. @ $V_{DD} = 25\text{ V}$, Starting $T_J = 25^\circ\text{C}$, $L = 100\text{ }\mu\text{H} \pm 10\%$, $R_G = 25$, Peak $I_L = 8.0\text{ A}$
3. Pulse width $\leq 300\text{ }\mu\text{s}$; Duty Cycle $\leq 2\%$
4. See MIL-S-19500/557



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2N6800, JANTX2N6800, JANTXV2N6800
2N6802, JANTX2N6802, JANTXV2N6802

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

Parameter		JANTXV, JANTX, 2N6798	Units
I_D @ $V_{GS} = 10\text{V}$, $T_C = 25^\circ\text{C}$	Continuous Drain Current	5.5	A
I_D @ $V_{GS} = 10\text{V}$, $T_C = 100^\circ\text{C}$	Continuous Drain Current	3.5	A
I_{DM}	Pulsed Drain Current ¹	22	A
P_D @ $T_C = 25^\circ\text{C}$	Maximum Power Dissipation	25	W
	Linear Derating Factor	0.2	W/ $^\circ\text{C}$
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy ²	2.0 ⁴	mJ
T_J	Operating Junction	-55 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range		$^\circ\text{C}$
	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	—	—	.40		$V_{GS} = 10\text{V}$, $I_D = 3.5\text{ A}$ ³
	—	—	.42		$V_{GS} = 10\text{V}$, $I_D = 5.5\text{ A}$ 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	$V_{DS} = 160\text{ V}$, $V_{GS} = 0\text{V}$
	—	—	250		$V_{DS} = 160\text{ V}$, $V_{GS} = 0\text{V}$, $T_J = 125^\circ\text{C}$
I_{DSS} Gate -to-Source Leakage Forward	—	—	100	nA	$V_{GS} = 20\text{ V}$
I_{DSS} Gate -to-Source Leakage Reverse	—	—	-100	nA	$V_{GS} = -20\text{ V}$
$Q_{G(on)}$ On-state Gate Charge	—	—	42.1	nC	$V_{GS} = 10\text{V}$, $I_D = 5.5\text{ A}$
Q_{GS} Gate-to-Source Charge	—	—	5.3	nC	$V_{DS} = 100\text{ V}$
Q_{Gd} Gate-to-Drain ("Miller") Charge	—	—	28.1	nC	See note 4
$t_{(on)}$ Turn-On Delay Time	—	—	30	ns	$V_{DD} = 77\text{ V}$, $I_D = 3.5\text{ A}$, $R_G = 7.5$
t_r Rise Time	—	—	50	ns	See note 4
$t_{(off)}$ Turn-Off Delay Time	—	—	50	ns	
t_f Fall Time	—	—	40	ns	

Source-Drain Diode Ratings and Characteristics

Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_{SD} Diode Forward Voltage	—	—	1.4	V	$T_J = 25^\circ\text{C}$, $I_S = 5.5\text{ A}$ ³ , $V_{GS} = 0\text{ V}$ ³
t_r Reverse Recovery Time	—	—	500	ns	$T_J = 25^\circ\text{C}$, $I_F = 5.5\text{ A}$, $dI/dt < 100\text{ A}/\mu\text{s}$

Thermal Resistance

Parameter	Min.	Typ.	Max.	Units	Test Conditions
R_{thJC} Junction-to-Case	—	—	5.0	$^\circ\text{C}/\text{W}$	Mounting surface flat, smooth, and greased
R_{thCS} Case-to-sink	—	0.21	—		
R_{thJA} Junction-to-Ambient	—	—	175		

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. @ $V_{DD} = 50\text{ V}$, Starting $T_J = 25^\circ\text{C}$, $L = 100\text{ }\mu\text{H} \pm 10\%$, $R_G = 25$, Peak $I_D = 5.5\text{ A}$
3. Pulse width $\leq 300\text{ }\mu\text{s}$; Duty Cycle $\leq 2\%$
4. See MIL-S-19500/557



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2N6800, JANTX2N6800, JANTXV2N6800
2N6802, JANTX2N6802, JANTXV2N6802

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

Parameter	JANTXV, JANTX, 2N6800	Units
I_D @ $V_{GS} = 10\text{V}$, $T_C = 25^\circ\text{C}$ Continuous Drain Current	3.0	A
I_D @ $V_{GS} = 10\text{V}$, $T_C = 100^\circ\text{C}$ Continuous Drain Current	2.0	A
I_{DM} Pulsed Drain Current ¹	14	A
P_D @ $T_C = 25^\circ\text{C}$ Maximum Power Dissipation	25	W
Linear Derating Factor	0.2	W/ $^\circ\text{C}$
V_{GS} Gate-Source Voltage	± 20	V
E_{AS} Single Pulse Avalanche Energy ²	0.51 ⁴	mJ
T_J Operating Junction	-55 to 150	$^\circ\text{C}$
T_{STG} Storage Temperature Range		$^\circ\text{C}$
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	400			V	$V_{GS} = 0\text{V}$, $I_D = 1.0\text{ mA}$,
$R_{DS(on)}$ Static Drain-to-Source On-State Resistance	—	—	1.0		$V_{GS} = 10\text{V}$, $I_D = 2.0\text{ A}$ ³
	—	—	1.10		$V_{GS} = 10\text{V}$, $I_D = 3.0\text{ A}$ 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	$V_{DS} = 320\text{ V}$, $V_{GS} = 0\text{V}$
	—	—	250		$V_{DS} = 320\text{ V}$, $V_{GS} = 0\text{V}$, $T_J = 125^\circ\text{C}$
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	—	—	33	nC	$V_{GS} = 10\text{ V}$, $I_D = 3.0\text{ A}$
Q_{GS} Gate-to-Source Charge	—	—	5.8	nC	$V_{DS} = 200\text{ V}$
Q_{GD} Gate-to-Drain ("Miller") Charge	—	—	16.6	nC	See note 4
$t_{(on)}$ Turn-On Delay Time	—	—	30	ns	$V_{DD} = 176\text{ V}$, $I_D = 2\text{ A}$, $R_G = 7.5$ See note 4
t_r Rise Time	—	—	35	ns	
$t_{(off)}$ Turn-Off Delay Time	—	—	55	ns	
t_f Fall Time	—	—	35	ns	

Source-Drain Diode Ratings and Characteristics

Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_{SD} Diode Forward Voltage	—	—	1.4	V	$T_J = 25^\circ\text{C}$, $I_F = 3\text{ A}$ ³ , $V_{GS} = 0\text{ V}$
t_r Reverse Recovery Time	—	—	700	ns	$T_J = 25^\circ\text{C}$, $I_F = 3.0\text{ A}$, $di/dt < 100\text{ A}/\mu\text{s}$ ³

Thermal Resistance

Parameter	Min.	Typ.	Max.	Units	Test Conditions
R_{thjc} Junction-to-Case	—	—	5.0	$^\circ\text{C}/\text{W}$	Mounting surface flat, smooth, and greased
R_{thcs} Case-to-sink	—	0.21	—		
R_{thja} Junction-to-Ambient	—	—	175		

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. @ $V_{DD} = 50\text{ V}$, Starting $T_J = 25^\circ\text{C}$, $L = 100\text{ }\mu\text{H} \pm 10\%$, $R_G = 25$, Peak $I_L = 3.0\text{ A}$
3. Pulse width $\leq 300\text{ }\mu\text{s}$; Duty Cycle $\leq 2\%$
4. See MIL-S-19500/557



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

Parameter	JANTXV, JANTX, 2N6802	Units
I_D @ $V_{GS} = 10\text{V}$, $T_C = 25^\circ\text{C}$ Continuous Drain Current	2.5	A
I_D @ $V_{GS} = 10\text{V}$, $T_C = 100^\circ\text{C}$ Continuous Drain Current	1.5	A
I_{DM} Pulsed Drain Current ¹	11	A
P_D @ $T_C = 25^\circ\text{C}$ Maximum Power Dissipation	25	W
Linear Derating Factor	0.20	W/ $^\circ\text{C}$
V_{GS} Gate-Source Voltage	± 20	V
E_{AS} Single Pulse Avalanche Energy ²	.35 ⁴	mJ
T_J Operating Junction	-55 to 150	$^\circ\text{C}$
T_{STG} Storage Temperature Range		$^\circ\text{C}$
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	$V_{GS} = 0\text{V}$, $I_D = 1.0\text{ mA}$,
$R_{DS(on)}$ Static Drain-to-Source On-State Resistance	—	—	1.5		$V_{GS} = 10\text{ V}$, $I_D = 1.5\text{ A}$ ³
	—	—	1.6		$V_{GS} = 10\text{ V}$, $I_D = 2.5\text{ A}$ 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		$V_{DS} = 400\text{ V}$, $V_{GS} = 0\text{V}$, $T_J = 125^\circ\text{C}$
I_{SS} Gate -to-Source Leakage Forward	—	—	100	nA	$V_{GS} = 20\text{ V}$
I_{SS} Gate -to-Source Leakage Reverse	—	—	-100	nA	$V_{GS} = -20\text{ V}$
$Q_{G(on)}$ On-state Gate Charge	—	—	29.5	nC	$V_{GS} = 10\text{ V}$, $I_D = 2.5\text{ A}$
Q_{GS} Gate-to-Source Charge	—	—	4.5	nC	$V_{DS} = 250\text{ V}$
Q_{GD} Gate-to-Drain ("Miller") Charge	—	—	28.1	nC	See note 4
t_{ON} Turn-On Delay Time	—	—	30	ns	$V_{DD} = 225\text{ V}$, $I_D = 1.5\text{ A}$, $R_G = 7.5$ See note 4
t_r Rise Time	—	—	30	ns	
t_{OFF} Turn-Off Delay Time	—	—	55	ns	
t_f Fall Time	—	—	30	ns	

Source-Drain Diode Ratings and Characteristics

Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_{SD} Diode Forward Voltage	—	—	1.4	V	$T_J = 25^\circ\text{C}$, $I_S = 2.5\text{ A}$ ³ , $V_{GS} = 0\text{ V}$
t_r Reverse Recovery Time	—	—	900	ns	$T_J = 25^\circ\text{C}$, $I_F = 2.5\text{ A}$, $di/dt \leq 100\text{A}/\mu\text{s}$ ³

Thermal Resistance

Parameter	Min.	Typ.	Max.	Units	Test Conditions
R_{thJC} Junction-to-Case	—	—	5.0	$^\circ\text{C}/\text{W}$	Mounting surface flat, smooth, and greased
R_{thCS} Case-to-sink	—	0.21	—		
R_{thJA} Junction-to-Ambient	—	—	175		

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. @ $V_{DD} = 50\text{ V}$, Starting $T_J = 25^\circ\text{C}$, $L = 100\text{ }\mu\text{H} \pm 10\%$, $R_G = 25$, Peak $I_D = 2.5\text{ A}$
3. Pulse width $\leq 300\text{ }\mu\text{s}$; Duty Cycle $\leq 2\%$
4. See MIL-S-19500/557



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