



N-CHANNEL MOSFET

Qualified per MIL-PRF-19500/555

Qualified Levels:
JAN, JANTX, and
JANTXV

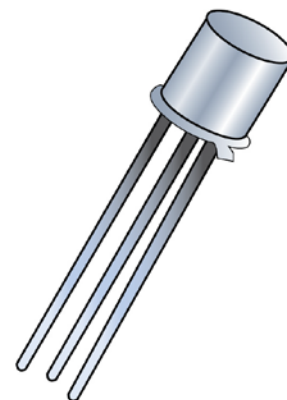
DESCRIPTION

This 2N6790 device is military qualified up to a JANTXV level for high-reliability applications. Microsemi also offers numerous other products to meet higher and lower power voltage regulation applications.

Important: For the latest information, visit our website <http://www.microsemi.com>.

FEATURES

- JEDEC registered 2N6790.
- JAN, JANTX, and JANTXV qualifications are available per MIL-PRF-19500/555.
- RoHS compliant versions available (commercial grade only).



TO-205AF
(formerly TO-39)
Package

APPLICATIONS / BENEFITS

- High frequency operation.
- Lightweight package.
- ESD to class 1A.

Also available in:

U-18 LCC Package
(surface mount)
 [2N6790U](#)

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

Parameters / Test Conditions	Symbol	Value	Unit
Junction & Storage Temperature	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	6.25	$^\circ\text{C/W}$
Drain to Gate Voltage	V_{DG}	200	V
Drain – Source Voltage	V_{DS}	200	V
Gate – Source Voltage	V_{GS}	± 20	V
Continuous Drain Current @ $T_C = +25^\circ\text{C}$	I_{D1}	3.5	A
Continuous Drain Current @ $T_C = +100^\circ\text{C}$	I_{D2}	2.25	A
Off-State Power Dissipation ⁽¹⁾	P_{D1}	20	W
Source Current – Drain Diode (Forward Biased V_{SD})	I_S	3.5	A
Off-State Current	I_{DM}	14	A (pk)
Drain to Source On State Resistance ⁽²⁾	$r_{DS(on)}$	0.80	Ω

Notes: 1. Derated linearly by 0.16 W/ $^\circ\text{C}$ for $T_C > +25^\circ\text{C}$.
2. $V_{GS} = 10\text{ V}$, $I_D = 2.25\text{ A}$.

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MECHANICAL and PACKAGING

- CASE: Hermetically sealed, kovar base, nickel cap.
- TERMINALS: Tin/lead solder dip nickel plate or RoHS compliant pure tin (commercial grade only) plate.
- MARKING: Part number, date code, manufacturer's ID.
- POLARITY: NPN (see package outline).
- WEIGHT: Approximately 1.064 grams.
- See [Package Dimensions](#) on last page.

PART NOMENCLATURE

JAN 2N6790 (e3)

Reliability Level

JAN=JAN level
JANTX=JANTX level
JANTXV=JANTXV level
Blank = Commercial

JEDEC type number

RoHS Compliance

e3 = RoHS compliant ([available on commercial grade only](#))
Blank = non-RoHS compliant

SYMBOLS & DEFINITIONS

Symbol	Definition
I_D	Drain current.
I_F	Forward current.
T_C	Case temperature.
V_{DD}	Drain supply voltage.
V_{DS}	Drain to source voltage.
V_{GS}	Gate to source voltage.

ELECTRICAL CHARACTERISTICS @ $T_A = +25\text{ }^{\circ}\text{C}$, unless otherwise noted

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Drain-Source Breakdown Voltage $V_{GS} = 0\text{ V}, I_D = 1\text{ mA}$	$V_{(BR)DSS}$	200		V
Gate-Source Voltage (Threshold) $V_{DS} \geq V_{GS}, I_D = 0.25\text{ mA}$ $V_{DS} \geq V_{GS}, I_D = 0.25\text{ mA}, T_j = +125\text{ }^{\circ}\text{C}$ $V_{DS} \geq V_{GS}, I_D = 0.25\text{ mA}, T_j = -55\text{ }^{\circ}\text{C}$	$V_{GS(th)1}$ $V_{GS(th)2}$ $V_{GS(th)3}$	2.0 1.0	4.0 5.0	V
Gate Current $V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$ $V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}, T_j = +125\text{ }^{\circ}\text{C}$	I_{GSS1} I_{GSS2}		± 100 ± 200	nA

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
ON CHARACTERISTICS				
Drain Current $V_{GS} = 0\text{ V}, V_{DS} = 160\text{ V}$ $V_{GS} = 0\text{ V}, V_{DS} = 160\text{ V}, T_j = +125\text{ }^{\circ}\text{C}$	I_{DSS1} I_{DSS2}		25 0.25	μA mA
Static Drain-Source On-State Resistance $V_{GS} = 10\text{ V}, I_D = 2.25\text{ A}$ pulsed $V_{GS} = 10\text{ V}, I_D = 3.5\text{ A}$ pulsed $T_j = +125\text{ }^{\circ}\text{C}$: $V_{GS} = 10\text{ V}, I_D = 2.25\text{ A}$ pulsed	$r_{DS(on)1}$ $r_{DS(on)2}$ $r_{DS(on)3}$		0.80 0.85 1.50	Ω Ω Ω
Diode Forward Voltage $V_{GS} = 0\text{ V}, I_D = 3.5\text{ A}$ pulsed $V_{GS} = 0\text{ V}, I_D = 2.8\text{ A}$ pulsed	V_{SD}		1.5	V

DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Gate Charge: On-State Gate Charge Gate to Source Charge Gate to Drain Charge	$Q_{g(on)}$ Q_{gs} Q_{gd}		14.3 3.0 9.0	nC

SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Switching time tests: Turn-on delay time $I_D = 3.5\text{ A}, V_{GS} = 10\text{ V}$ Rinse time Gate drive impedance = $7.5\text{ }\Omega$, Turn-off delay time $V_{DD} = 74\text{ V}$ Fall time	$t_{d(on)}$ t_r $t_{d(off)}$ t_f		40 50 50 50	ns
Reverse Recovery Time: $di/dt = 100\text{ A}/\mu\text{s}, V_{DD} \leq 50\text{ V},$ $I_F = 3.5\text{ A}$	t_{rr}		400	ns

GRAPHS

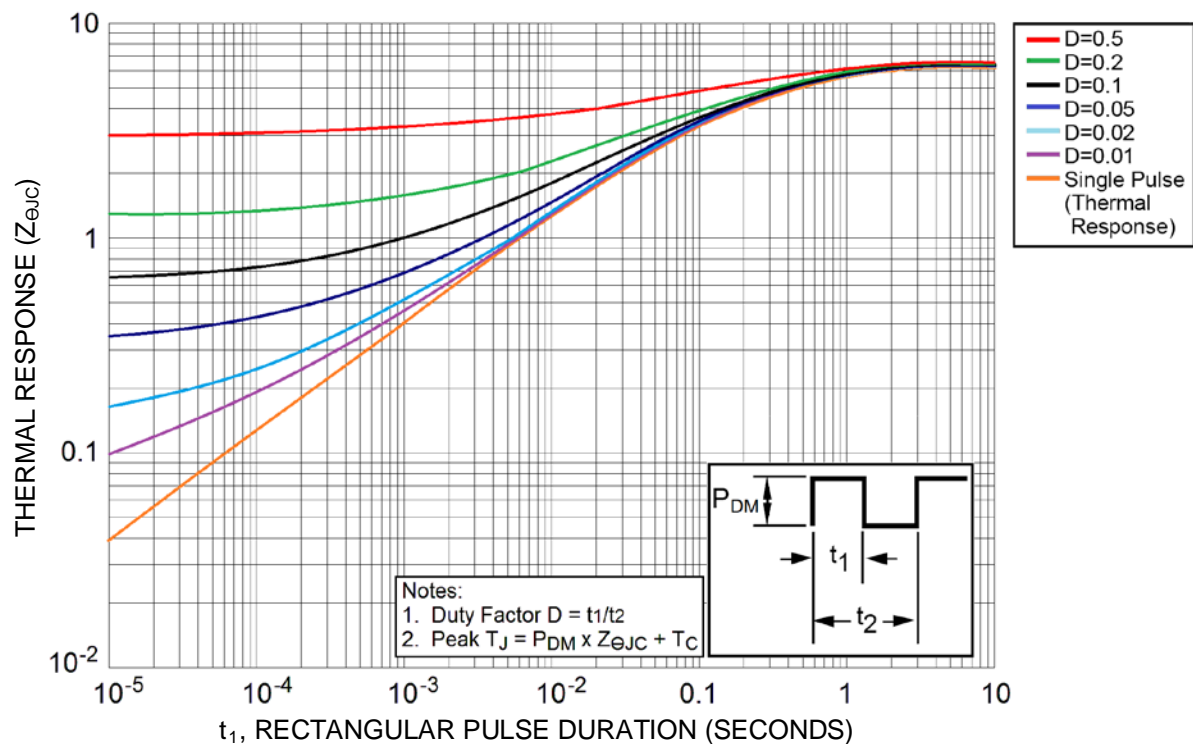


Figure 1
Thermal Impedance Curves

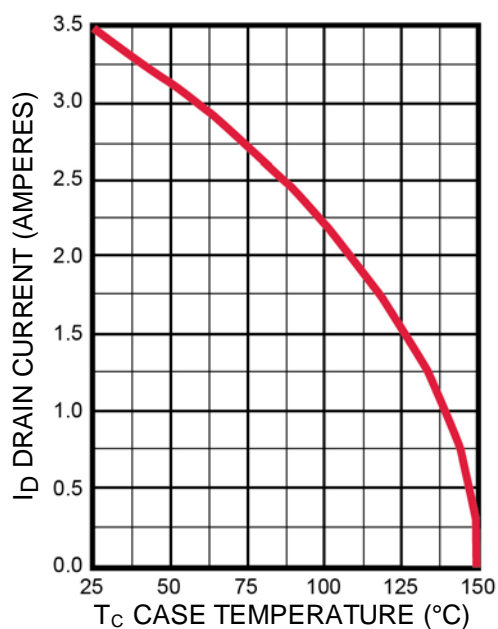


Figure 2
Maximum Drain Current vs. Case Temperature Graph

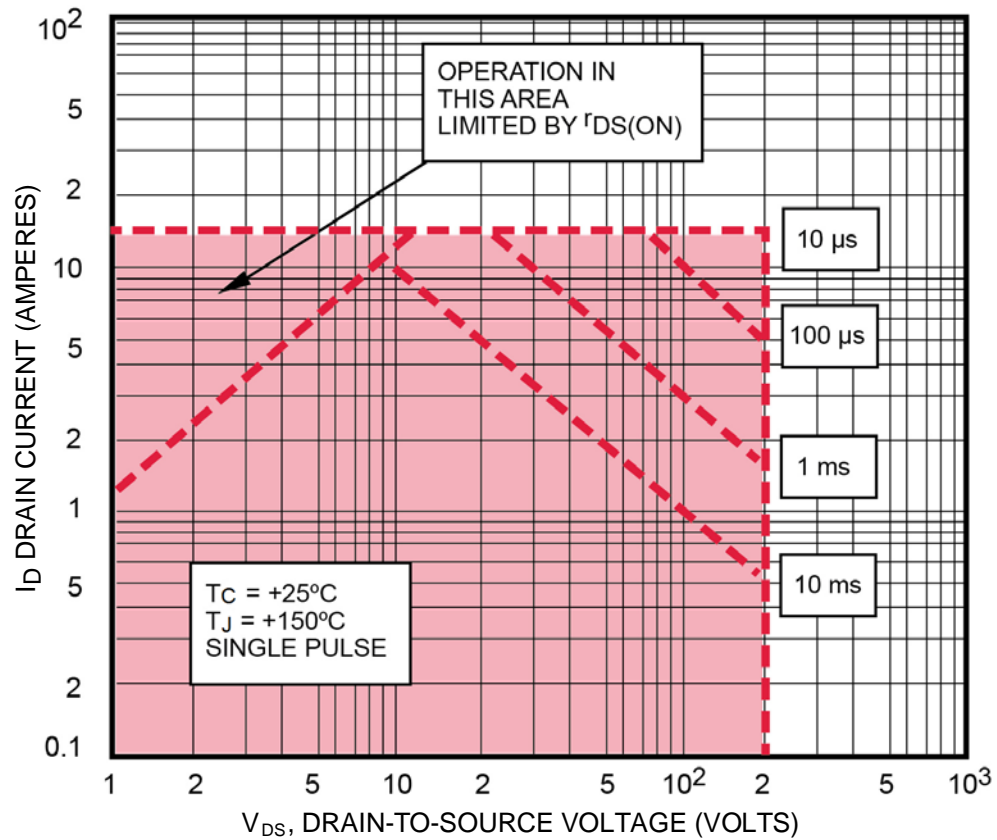
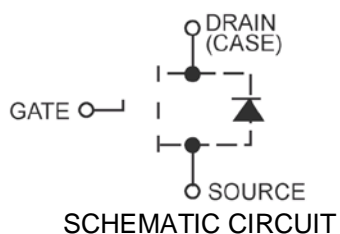
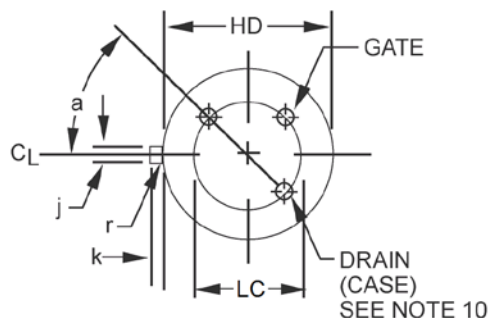
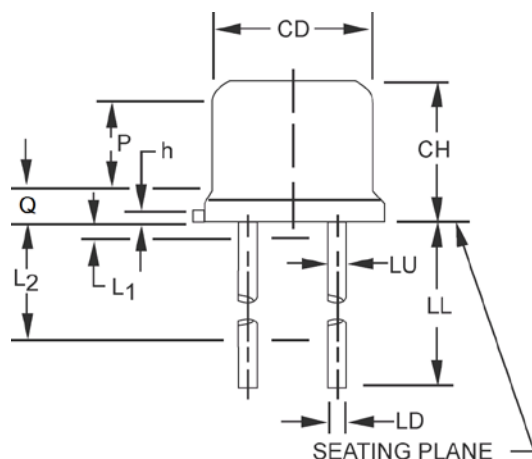
GRAPHS (continued)


Figure 3
Maximum Safe Operating Area

PACKAGE DIMENSIONS


Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.335	7.75	8.51	
CH	.160	.180	4.07	4.57	
HD	.335	.370	8.51	9.40	
h	.009	.041	0.23	1.04	
J	.028	.034	0.71	0.86	3
k	.029	.045	0.74	1.14	3, 4
LD	.016	.021	0.41	0.53	7, 8
LL	.500	.750	12.7	19.05	7, 8, 12
LS	.200 TP		5.08 TP		6
LU	.016	.019	0.41	0.48	7, 8
L1		.050		1.27	7, 8
L2	.250		6.35		7, 8
P	.100		2.54		
Q		.050		1.27	5
r		.010		0.25	10
α	45° TP		45° TP		6

NOTES:

- Dimensions are in inches.
- Millimeters are given for general information only.
- Beyond r (radius) maximum, TL shall be held for a minimum length of .011 inch (0.28 mm).
- Dimension TL measured from maximum HD.
- Body contour optional within zone defined by HD, CD, and Q.
- Leads at gauge plane .054 +.001 -.000 inch (1.37 +0.03 -0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC.
- Dimension LU applies between L1 and L2. Dimension LD applies between L2 and LL minimum. Diameter is uncontrolled in L1 and beyond LL minimum.
- All three leads.
- The collector shall be internally connected to the case.
- Dimension r (radius) applies to both inside corners of tab.
- In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.
- Lead 1 = source, lead 2 = gate, lead 3 = drain.