

## N-CHANNEL MOSFET

Qualified per MIL-PRF-19500/555

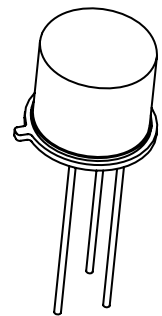
### DEVICES

**2N6788    2N6788U**

**LEVELS**  
**JAN**  
**JANTX**  
**JANTXV**

### 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	$V_{GS}$	$\pm 20$	Vdc
Continuous Drain Current $T_C = +25^\circ\text{C}$	$I_{D1}$	6.0 4.5	Adc
Continuous Drain Current $T_C = +100^\circ\text{C}$	$I_{D2}$	3.5 2.8	Adc
Max. Power Dissipation	$P_{tl}$	20 <sup>(1)</sup> 14	W
Drain to Source On State Resistance	$R_{ds(on)}$	0.30 <sup>(2)</sup>	$\Omega$
Operating & Storage Temperature	$T_{op}, T_{stg}$	-55 to +150	$^\circ\text{C}$

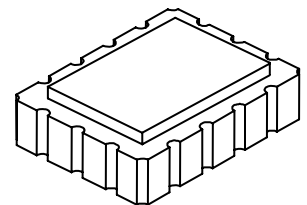


**TO-205AF**  
(formerly TO-39)

**Note:** (1) Derated Linearly by 0.16 W/ $^\circ\text{C}$  (2N6788); 0.11 W/ $^\circ\text{C}$  (2N6788U) for  $T_C > +25^\circ\text{C}$   
 (2)  $V_{GS} = 10\text{Vdc}$ ,  $I_D = 3.5\text{A}$  (2N6788), 2.8A (2N6788U)

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

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



**U – 18 LCC**

## ELECTRICAL CHARACTERISTICS ( $T_A = +25^\circ\text{C}$ , unless otherwise noted) (Cont.)

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>OFF CHARACTERISTICS</b>				
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	$\mu\text{A}_{dc}$ $\text{mA}_{dc}$
Static Drain-Source On-State Resistance $V_{GS} = 10\text{V}$ , $I_D = 3.5\text{A}$ pulsed $V_{GS} = 10\text{V}$ , $I_D = 2.8\text{A}$ pulsed $V_{GS} = 10\text{V}$ , $I_D = 6.0\text{A}$ pulsed $V_{GS} = 10\text{V}$ , $I_D = 4.5\text{A}$ pulsed $T_j = +125^\circ\text{C}$ $V_{GS} = 10\text{V}$ , $I_D = 3.5\text{A}$ pulsed $V_{GS} = 10\text{V}$ , $I_D = 2.8\text{A}$ pulsed	2N6788 2N3788U  2N6788 2N3788U  2N6788 2N3788U	$r_{DS(on)1}$  $r_{DS(on)2}$  $r_{DS(on)3}$	0.30  0.35  0.54	$\Omega$  $\Omega$  $\Omega$
Diode Forward Voltage $V_{GS} = 0\text{V}$ , $I_D = 6.0\text{A}$ pulsed $V_{GS} = 0\text{V}$ , $I_D = 4.5\text{A}$ pulsed	2N6788 2N3788U	$V_{SD}$	1.8	Vdc

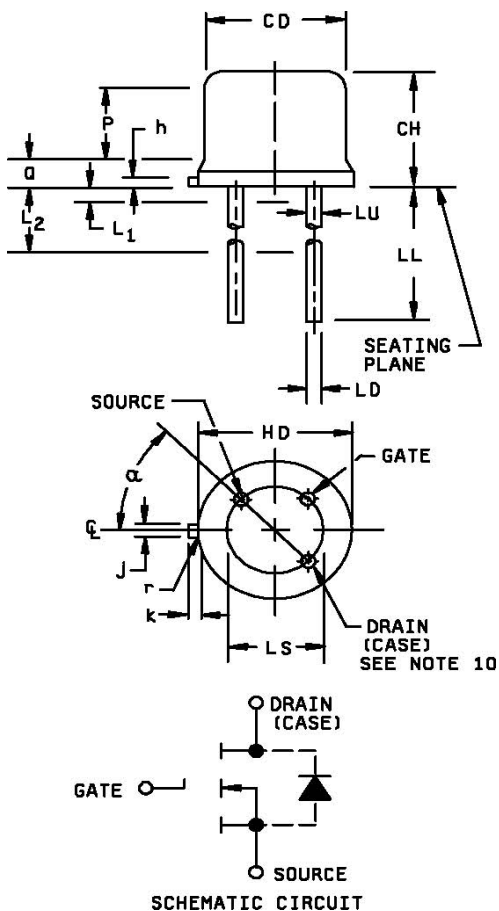
## DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit	
Gate Charge: On-State Gate Charge Gate to Source Charge Gate to Drain Charge	$V_{DS} = 50\text{V}$ $V_{GS} = 10\text{V}$ , $I_D = 6.0\text{A}$ $V_{GS} = 10\text{V}$ , $I_D = 4.5\text{A}$	2N6788 2N3788U	$Q_{g(on)}$ $Q_{gs}$ $Q_{gd}$	18.0 4.0 9.0	nC

## SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit	
Switching time tests: Turn-on delay time Rinse time Turn-off delay time Fall time	$I_D = 6.0\text{A}$ , $V_{GS} = 10\text{Vdc}$ $I_D = 4.5\text{A}$ , $V_{GS} = 10\text{Vdc}$ Gate drive impedance = $7.5\Omega$ , $V_{DD} = 35\text{Vdc}$	2N6788 2N3788U	$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$	40 70 40 70	ns
Diode Reverse Recovery Time	$di/dt \leq 100\text{A}/\mu\text{s}$ , $V_{DD} \leq 50\text{V}$ , $I_F = 6.0\text{A}$ $I_F = 4.5\text{A}$	2N6788 2N3788U	$t_{rr}$	240	ns

## PACKAGE DIMENSIONS



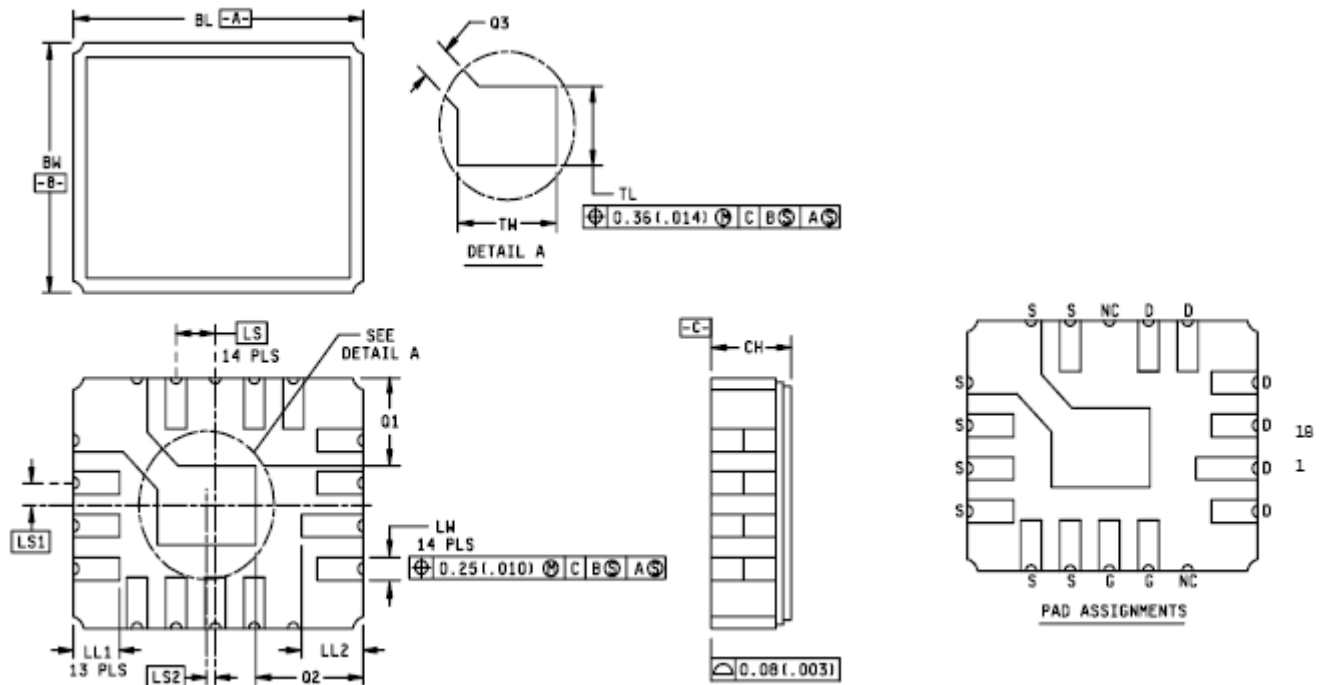
Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.355	7.75	9.02	
CH	.160	.180	4.07	4.57	
HD	.335	.370	8.51	9.39	
h	.009	.041	0.23	1.04	
J	.028	.034	0.72	0.86	2
k	.029	.045	0.74	1.14	3
LD	.016	.021	0.41	0.53	7, 8
LL	.500	.750	12.7	19.05	7, 8
LS	.200 TP		5.08 TP		6
LU	.016	.019	0.41	0.48	7, 8
L1		.050		1.27	7, 8
L2	.250		6.35		7, 8
P	.070		1.78		5
Q		.050		1.27	4
r		.010		0.25	9
α	45° TP		45° TP		6

### NOTES:

- 1 Dimensions are in inches. Millimeters are given for general information only.
- 2 Beyond radius (r) maximum, j shall be held for a minimum length of .011 (0.028 mm).
- 3 Dimension k measured from maximum HD.
- 4 Outline in this zone is not controlled.
- 5 Dimension CD shall not vary more than .010 (0.25 mm) in zone P. This zone is controlled for automatic handling.
- 6 Leads at gauge plane .054 +.001, -.000 (1.37 +0.03, -0.00 mm) below seating plane shall be within .007 (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC.
- 7 LU applies between L1 and L2. LD applies between L2 and L minimum. Diameter is uncontrolled in L1 and beyond LL minimum.
- 8 All three leads.
- 9 Radius (r) applies to both inside corners of tab.
- 10 Drain is electrically connected to the case.
- 11 In accordance with ASME Y14.5M, diameters are equivalent to  $\phi$ x symbology.

\* **FIGURE 1-** Physical dimensions for TO-205AF.

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**NOTES:**

- 1 Dimensions are in inches.
- 2 Millimeters are given for general information only.
- 3 In accordance with ASME Y14.5M, diameters are equivalent to  $\phi$ x symbology.
- 4 Ceramic package only.

Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BL	.345	.360	8.77	
BW	.280	.295	7.11	
CH	.095	.115	2.41	
LL1	.040	.055	1.02	
LL2	.055	.065	1.40	
LS	.050 BSC		1.27 BSC	
LS1	.025 BSC		0.635 BSC	
LS2	.008 BSC		0.203 BSC	
LW	.020	.030	0.51	0.76
Q1	.105 REF		2.67 REF	
Q2	.120 REF		3.05 REF	
Q3	.045	.055	1.14	1.40
TL	.070	.080	1.78	2.03
TW	.120	.130	3.05	3.30

\* **FIGURE 2** - Physical dimensions for LCC.