

## N-CHANNEL MOSFET

Qualified per MIL-PRF-19500/557

### DEVICES

**2N6800 2N6800U**

### LEVELS

**JAN  
JANTX  
JANTXV**

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

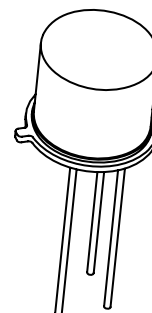
| Parameters / Test Conditions                           | Symbol            | Value              | Unit             |
|--------------------------------------------------------|-------------------|--------------------|------------------|
| Drain – Source Voltage                                 | $V_{DS}$          | 400                | Vdc              |
| Gate – Source Voltage                                  | $V_{GS}$          | $\pm 20$           | Vdc              |
| Continuous Drain Current<br>$T_C = +25^\circ\text{C}$  | $I_{D1}$          | 3.0                | Adc              |
| Continuous Drain Current<br>$T_C = +100^\circ\text{C}$ | $I_{D2}$          | 2.0                | Adc              |
| Max. Power Dissipation                                 | $P_{tl}$          | 25 <sup>(1)</sup>  | W                |
| Drain to Source On State Resistance                    | $R_{ds(on)}$      | 1.0 <sup>(2)</sup> | $\Omega$         |
| Operating & Storage Temperature                        | $T_{op}, T_{stg}$ | -55 to +150        | $^\circ\text{C}$ |

**Note:** (1) Derated Linearly by 0.2 W/ $^\circ\text{C}$  for  $T_C > +25^\circ\text{C}$

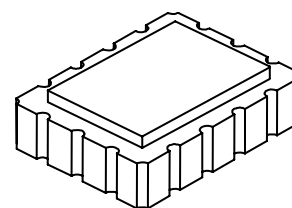
(2)  $V_{GS} = 10\text{Vdc}$ ,  $I_D = 2.0\text{A}$

### 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<br>$V_{GS} = 0\text{V}$ , $I_D = 1\text{mA}$                                                                                                                                                              | $V_{(BR)DSS}$                                   | 400        |                        | Vdc                              |
| Gate-Source Voltage (Threshold)<br>$V_{DS} \geq V_{GS}$ , $I_D = 0.25\text{mA}$<br>$V_{DS} \geq V_{GS}$ , $I_D = 0.25\text{mA}$ , $T_j = +125^\circ\text{C}$<br>$V_{DS} \geq V_{GS}$ , $I_D = 0.25\text{mA}$ , $T_j = -55^\circ\text{C}$ | $V_{GS(th)1}$<br>$V_{GS(th)2}$<br>$V_{GS(th)3}$ | 2.0<br>1.0 | 4.0<br>5.0             | Vdc                              |
| Gate Current<br>$V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$<br>$V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$ , $T_j = +125^\circ\text{C}$                                                                                        | $I_{GSS1}$<br>$I_{GSS2}$                        |            | $\pm 100$<br>$\pm 200$ | nAdc                             |
| Drain Current<br>$V_{GS} = 0\text{V}$ , $V_{DS} = 320\text{V}$<br>$V_{GS} = 0\text{V}$ , $V_{DS} = 320\text{V}$ , $T_j = +125^\circ\text{C}$                                                                                             | $I_{DSS1}$<br>$I_{DSS2}$                        |            | 25<br>0.25             | $\mu\text{Adc}$<br>mAdc          |
| Static Drain-Source On-State Resistance<br>$V_{GS} = 10\text{V}$ , $I_D = 2.0\text{A}$ pulsed<br>$V_{GS} = 10\text{V}$ , $I_D = 3.0\text{A}$ pulsed<br>$T_j = +125^\circ\text{C}$<br>$V_{GS} = 10\text{V}$ , $I_D = 2.0\text{A}$ pulsed  | $r_{DS(on)1}$<br>$r_{DS(on)2}$<br>$r_{DS(on)3}$ |            | 1.0<br>1.10<br>2.40    | $\Omega$<br>$\Omega$<br>$\Omega$ |
| Diode Forward Voltage<br>$V_{GS} = 0\text{V}$ , $I_D = 3.0\text{A}$ pulsed                                                                                                                                                               | $V_{SD}$                                        |            | 1.4                    | Vdc                              |



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



**U – 18 LCC**



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# TECHNICAL DATA SHEET

## N-CHANNEL MOSFET

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### DYNAMIC CHARACTERISTICS

| Parameters / Test Conditions                                                          | Symbol                              | Min. | Max.                   | Unit |
|---------------------------------------------------------------------------------------|-------------------------------------|------|------------------------|------|
| Gate Charge:<br>On-State Gate Charge<br>Gate to Source Charge<br>Gate to Drain Charge | $Q_{g(on)}$<br>$Q_{gs}$<br>$Q_{gd}$ |      | 34.75<br>5.75<br>16.59 | nC   |
| $V_{GS} = 10V, I_D = 3.0A$<br>$V_{DS} = 200V$                                         |                                     |      |                        |      |

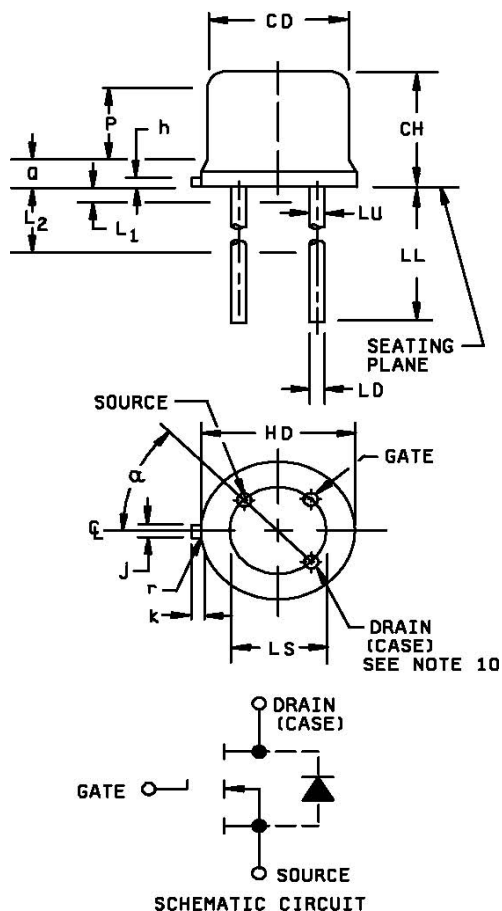
### SWITCHING CHARACTERISTICS

| Parameters / Test Conditions                                                                  | Symbol                                        | Min. | Max.                 | Unit |
|-----------------------------------------------------------------------------------------------|-----------------------------------------------|------|----------------------|------|
| Switching time tests:<br>Turn-on delay time<br>Rinse time<br>Turn-off delay time<br>Fall time | $t_{d(on)}$<br>$t_r$<br>$t_{d(off)}$<br>$t_f$ |      | 30<br>35<br>55<br>35 | ns   |
| $I_D = 3.0A, V_{GS} = 10Vdc,$<br>Gate drive impedance = $7.5\Omega,$<br>$V_{DD} = 176Vdc$     |                                               |      |                      |      |
| Diode Reverse Recovery Time                                                                   | $t_{rr}$                                      |      | 700                  | ns   |
| $di/dt \leq 100A/\mu s, V_{DD} \leq 50V,$<br>$I_F = 3.0A$                                     |                                               |      |                      |      |

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### PACKAGE DIMENSIONS



| Ltr | Dimensions |      |             |       |       |
|-----|------------|------|-------------|-------|-------|
|     | Inches     |      | Millimeters |       | Notes |
|     | 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     |

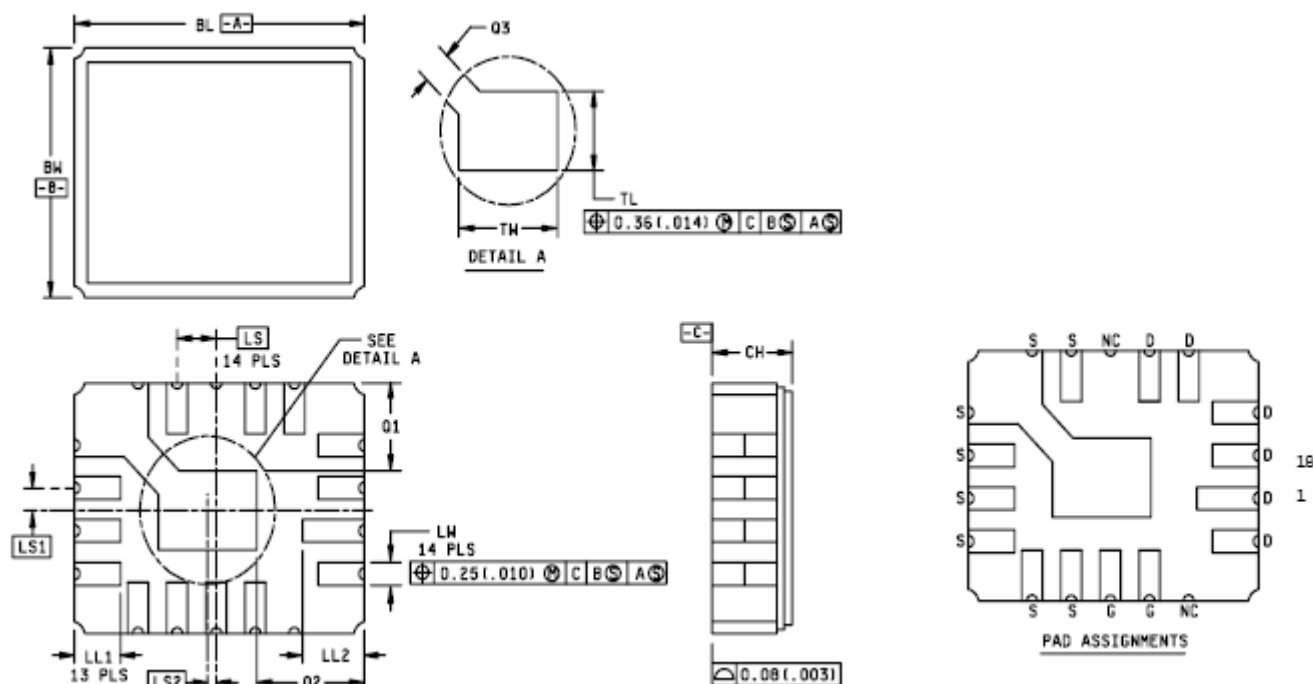
#### NOTES:

- Dimensions are in inches. Millimeters are given for general information only.
- Beyond radius (r) maximum, j shall be held for a minimum length of .011 (0.028 mm).
- Dimension k measured from maximum HD.
- Outline in this zone is not controlled.
- Dimension CD shall not vary more than .010 (0.25 mm) in zone P. This zone is controlled for automatic handling.
- 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.
- LU applies between L1 and L2. LD applies between L2 and L minimum. Diameter is uncontrolled in L1 and beyond LL minimum.
- All three leads.
- Radius (r) applies to both inside corners of tab.
- Drain is electrically connected to the case.
- In accordance with ASME Y14.5M, diameters are equivalent to øx 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 |