



## N-CHANNEL MOSFET

**Qualified per MIL-PRF-19500/557**

*Qualified Levels:  
JAN, JANTX, JANTXV  
and JANS\**

### DESCRIPTION

This family of switching transistors is military qualified up to the JANTXV level for high-reliability applications. The 2N6798 part number is also qualified to the JANS level. These devices are also available in a low profile U-18 LCC surface mount package. Microsemi also offers numerous other transistor products to meet higher and lower power ratings with various switching speed requirements in both through-hole and surface-mount packages.

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

### FEATURES

- JEDEC registered 2N6796, 2N6798, 2N6800 and 2N6802 number series.
- JAN, JANTX, and JANTXV qualifications are available per MIL-PRF-19500/557.  
\*JANS qualification is available on 2N6798 only.  
(See [part nomenclature](#) for all available options.)
- RoHS compliant versions available (commercial grade only).

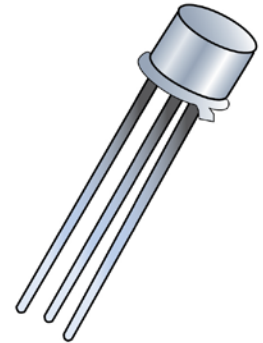
### APPLICATIONS / BENEFITS

- Lightweight top-hat design with flexible terminals offers a variety of mounting flexibility.
- Military and other high-reliability applications.

### MAXIMUM RATINGS @ T<sub>A</sub> = +25 °C unless otherwise stated

Parameters / Test Conditions	Symbol	Value	Unit
Operating & Storage Junction Temperature Range	T <sub>J</sub> & T <sub>stg</sub>	-55 to +150	°C
Thermal Resistance Junction-to-Case	R <sub>θJC</sub>	5.0	°C/W
Total Power Dissipation	P <sub>T</sub>	@ T <sub>A</sub> = +25 °C	0.8
		@ T <sub>C</sub> = +25 °C <sup>(1)</sup>	25
Drain-Source Voltage, dc	V <sub>DS</sub>	2N6796	100
		2N6798	200
		2N6800	400
		2N6802	500
Gate-Source Voltage, dc	V <sub>GS</sub>	± 20	V
Drain Current, dc @ T <sub>C</sub> = +25 °C <sup>(2)</sup>	I <sub>D1</sub>	2N6796	8.0
		2N6798	5.5
		2N6800	3.0
		2N6802	2.5
Drain Current, dc @ T <sub>C</sub> = +100 °C <sup>(2)</sup>	I <sub>D2</sub>	2N6796	5.0
		2N6798	3.5
		2N6800	2.0
		2N6802	1.5
Off-State Current (Peak Total Value) <sup>(3)</sup>	I <sub>DM</sub>	2N6796	32
		2N6798	22
		2N6800	14
		2N6802	11
Source Current	I <sub>S</sub>	2N6796	8.0
		2N6798	5.5
		2N6800	3.0
		2N6802	2.5


See notes on next page.



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

Also available in:

#### **U-18 LCC package**

(surface mount)  
 2N6796U, 2N6798U,  
2N6800U & 2N6802U

#### **MSC – Lawrence**

6 Lake Street,  
Lawrence, MA 01841  
Tel: 1-800-446-1158 or  
(978) 620-2600  
Fax: (978) 689-0803

#### **MSC – Ireland**

Gort Road Business Park,  
Ennis, Co. Clare, Ireland  
Tel: +353 (0) 65 6840044  
Fax: +353 (0) 65 6822298

**Website:**

[www.microsemi.com](http://www.microsemi.com)

- Notes:**
- Derate linearly 0.2 W/°C for  $T_C > +25$  °C.
  - The following formula derives the maximum theoretical  $I_D$  limit.  $I_D$  is also limited by package and internal wires and may be limited due to pin diameter.

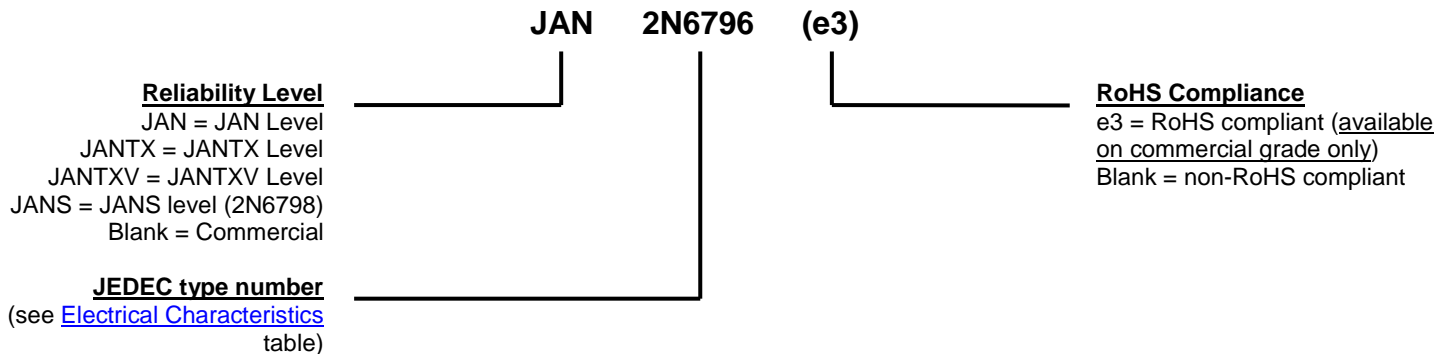
$$I_D = \sqrt{\frac{T_J(\max) - T_C}{R_{\theta JC} \times R_{DS(on)} @ T_J(\max)}}$$

- $I_{DM} = 4 \times I_{D1}$  as calculated in note 2.

### MECHANICAL and PACKAGING

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

### PART NOMENCLATURE



### SYMBOLS & DEFINITIONS

Symbol	Definition
di/dt	Rate of change of diode current while in reverse-recovery mode, recorded as maximum value.
$I_F$	Forward current
$R_G$	Gate drive impedance
$V_{DD}$	Drain supply voltage
$V_{DS}$	Drain source voltage, dc
$V_{GS}$	Gate source voltage, dc

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

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>OFF CHARACTERISTICS</b>				
Drain-Source Breakdown Voltage $V_{GS} = 0\text{ V}, I_D = 1.0\text{ mA}$	2N6796 2N6798 2N6800 2N6802 $V_{(BR)DSS}$	100 200 400 500		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 $V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$ $V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}, T_J = +125\text{ }^\circ\text{C}$	$I_{GSS1}$ $I_{GSS2}$		$\pm 100$ $\pm 200$	nA
Drain Current $V_{GS} = 0\text{ V}, V_{DS} = 80\text{ V}$ $V_{GS} = 0\text{ V}, V_{DS} = 160\text{ V}$ $V_{GS} = 0\text{ V}, V_{DS} = 320\text{ V}$ $V_{GS} = 0\text{ V}, V_{DS} = 400\text{ V}$	2N6796 2N6798 2N6800 2N6802 $I_{DSS1}$		25	$\mu\text{A}$
Drain Current $V_{GS} = 0\text{ V}, V_{DS} = 80\text{ V}, T_J = +125\text{ }^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 160\text{ V}, T_J = +125\text{ }^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 320\text{ V}, T_J = +125\text{ }^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 400\text{ V}, T_J = +125\text{ }^\circ\text{C}$	2N6796 2N6798 2N6800 2N6802 $I_{DSS2}$		0.25	mA
Static Drain-Source On-State Resistance $V_{GS} = 10\text{ V}, I_D = 5.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 3.5\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 2.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 1.5\text{ A pulsed}$	2N6796 2N6798 2N6800 2N6802 $r_{DS(on)1}$		0.18 0.40 1.00 1.50	$\Omega$
Static Drain-Source On-State Resistance $V_{GS} = 10\text{ V}, I_D = 8.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 5.5\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 3.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 2.5\text{ A pulsed}$	2N6796 2N6798 2N6800 2N6802 $r_{DS(on)2}$		0.195 0.420 1.100 1.600	$\Omega$
Static Drain-Source On-State Resistance $T_J = +125\text{ }^\circ\text{C}$ $V_{GS} = 10\text{ V}, I_D = 5.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 3.5\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 2.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 1.5\text{ A pulsed}$	2N6796 2N6798 2N6800 2N6802 $r_{DS(on)3}$		0.35 0.75 2.40 3.50	$\Omega$
Diode Forward Voltage $V_{GS} = 0\text{ V}, I_D = 8.0\text{ A pulsed}$ $V_{GS} = 0\text{ V}, I_D = 5.5\text{ A pulsed}$ $V_{GS} = 0\text{ V}, I_D = 3.0\text{ A pulsed}$ $V_{GS} = 0\text{ V}, I_D = 2.5\text{ A pulsed}$	2N6796 2N6798 2N6800 2N6802 $V_{SD}$		1.5 1.4 1.4 1.4	V

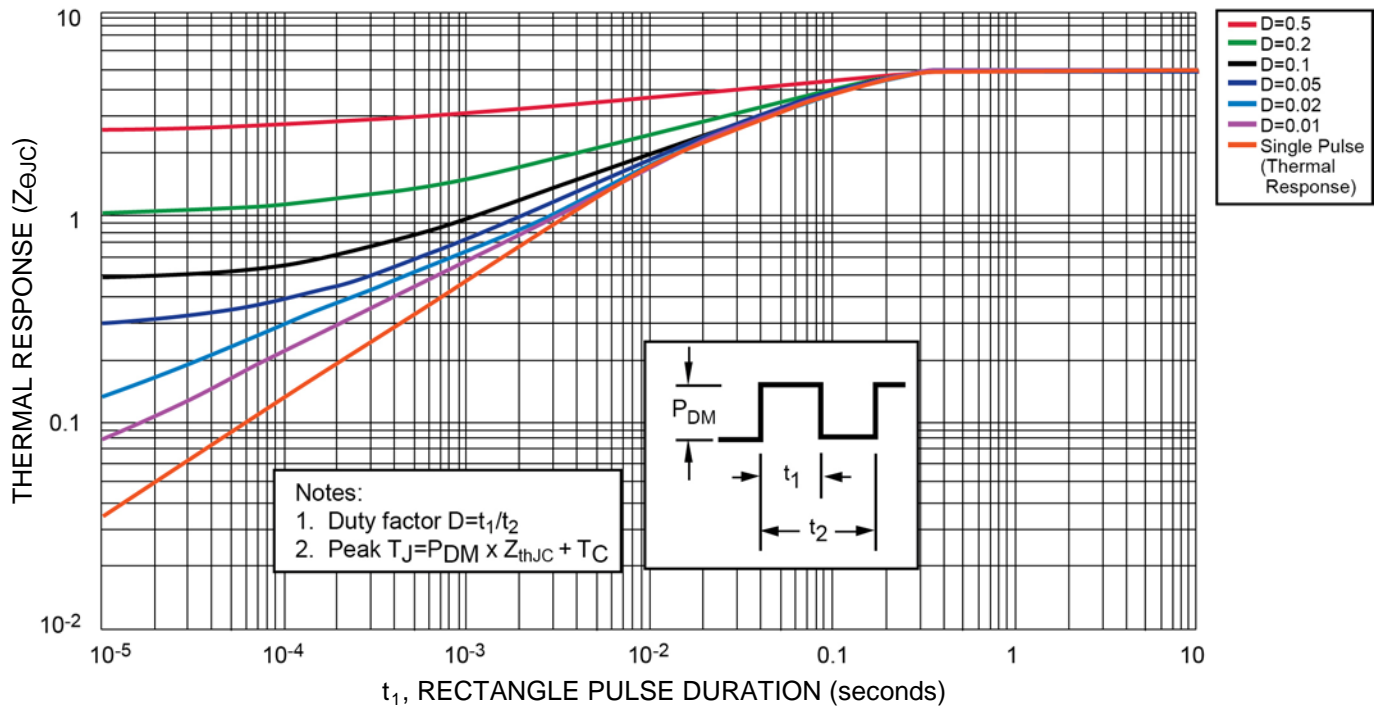
**ELECTRICAL CHARACTERISTICS @ T<sub>A</sub> = +25 °C, unless otherwise noted (continued)**
**DYNAMIC CHARACTERISTICS**

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>Gate Charge:</b>				
<b>On-State Gate Charge</b>				
V <sub>GS</sub> = 10 V, I <sub>D</sub> = 8.0 A, V <sub>DS</sub> = 50 V	2N6796		28.51	nC
V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5.5 A, V <sub>DS</sub> = 50 V	2N6798		42.07	
V <sub>GS</sub> = 10 V, I <sub>D</sub> = 3.0 A, V <sub>DS</sub> = 50 V	2N6800		34.75	
V <sub>GS</sub> = 10 V, I <sub>D</sub> = 2.5 A, V <sub>DS</sub> = 50 V	2N6802		33.00	
<b>Gate to Source Charge</b>				
V <sub>GS</sub> = 10 V, I <sub>D</sub> = 8.0 A, V <sub>DS</sub> = 50 V	2N6796		6.34	nC
V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5.5 A, V <sub>DS</sub> = 50 V	2N6798		5.29	
V <sub>GS</sub> = 10 V, I <sub>D</sub> = 3.0 A, V <sub>DS</sub> = 50 V	2N6800		5.75	
V <sub>GS</sub> = 10 V, I <sub>D</sub> = 2.5 A, V <sub>DS</sub> = 50 V	2N6802		4.46	
<b>Gate to Drain Charge</b>				
V <sub>GS</sub> = 10 V, I <sub>D</sub> = 8.0 A, V <sub>DS</sub> = 50 V	2N6796		16.59	nC
V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5.5 A, V <sub>DS</sub> = 50 V	2N6798		28.11	
V <sub>GS</sub> = 10 V, I <sub>D</sub> = 3.0 A, V <sub>DS</sub> = 50 V	2N6800		16.59	
V <sub>GS</sub> = 10 V, I <sub>D</sub> = 2.5 A, V <sub>DS</sub> = 50 V	2N6802		28.11	

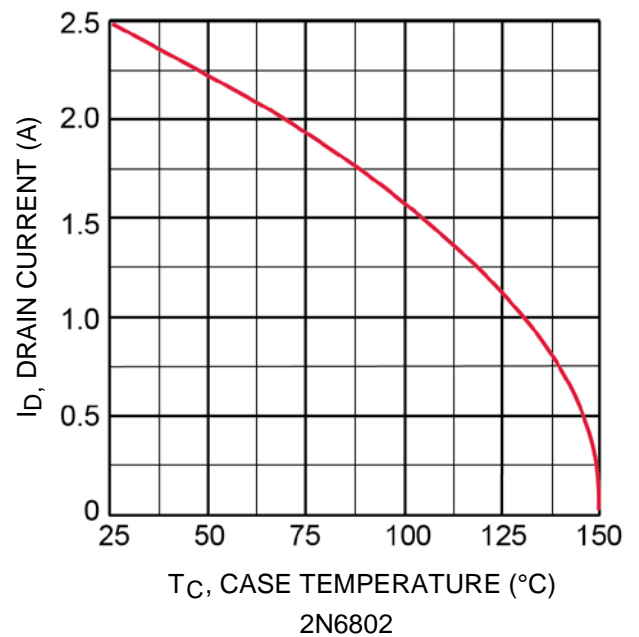
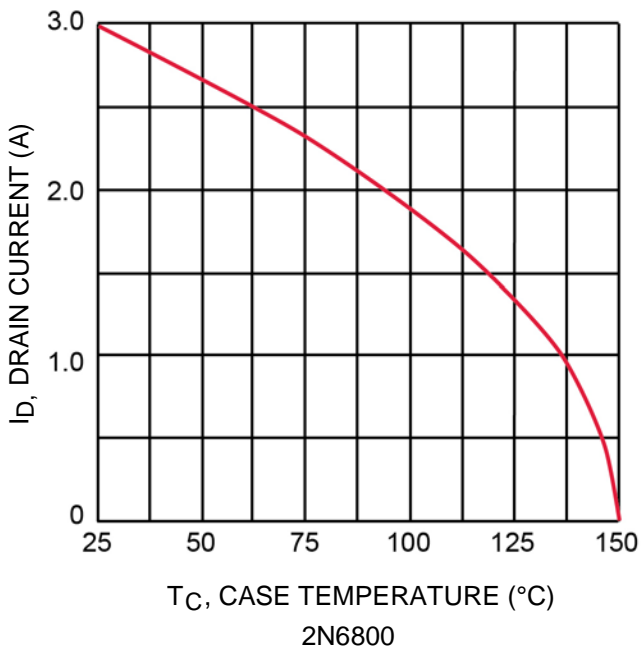
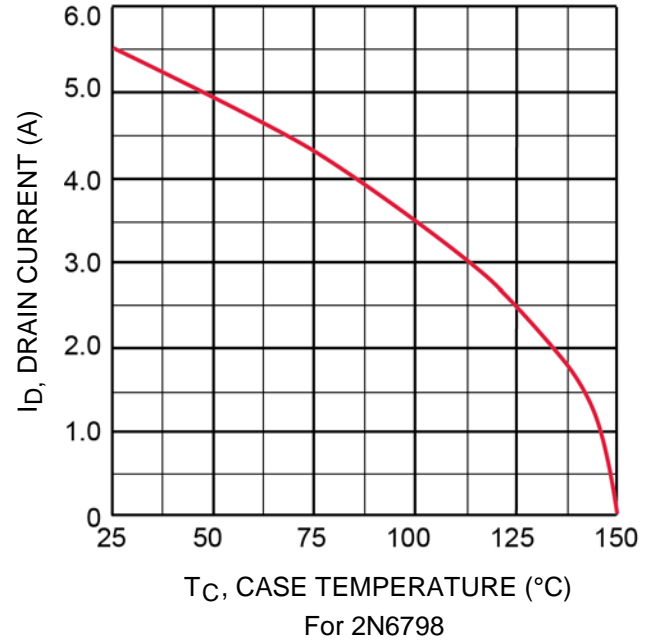
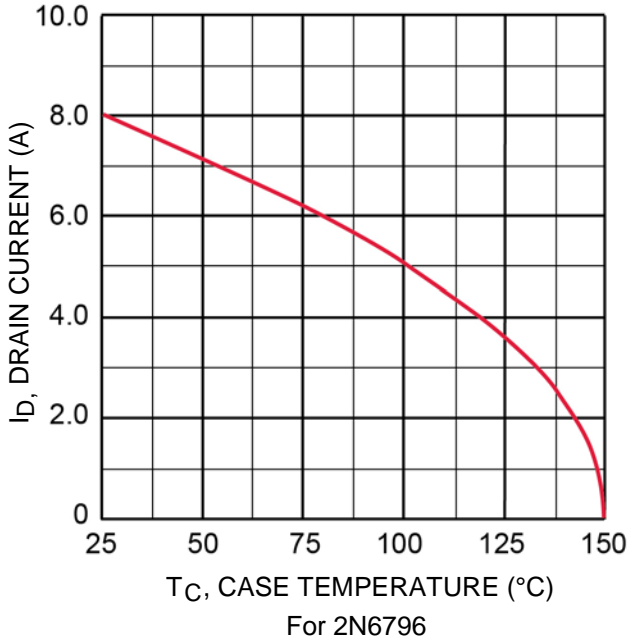
**SWITCHING CHARACTERISTICS**

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>Turn-on delay time</b>				
I <sub>D</sub> = 8.0 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 30 V	2N6796		30	ns
I <sub>D</sub> = 5.5 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 77 V	2N6798			
I <sub>D</sub> = 3.0 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 176 V	2N6800			
I <sub>D</sub> = 2.5 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 225 V	2N6802			
<b>Rinse time</b>				
I <sub>D</sub> = 8.0 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 30 V	2N6796		75	ns
I <sub>D</sub> = 5.5 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 77 V	2N6798		50	
I <sub>D</sub> = 3.0 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 176 V	2N6800		35	
I <sub>D</sub> = 2.5 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 225 V	2N6802		30	
<b>Turn-off delay time</b>				
I <sub>D</sub> = 8.0 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 30 V	2N6796		40	ns
I <sub>D</sub> = 5.5 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 77 V	2N6798		50	
I <sub>D</sub> = 3.0 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 176 V	2N6800		55	
I <sub>D</sub> = 2.5 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 225 V	2N6802		55	
<b>Fall time</b>				
I <sub>D</sub> = 8.0 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 30 V	2N6796		45	ns
I <sub>D</sub> = 5.5 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 77 V	2N6798		40	
I <sub>D</sub> = 3.0 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 176 V	2N6800		35	
I <sub>D</sub> = 2.5 A, V <sub>GS</sub> = +10 V, R <sub>G</sub> = 7.5 Ω, V <sub>DD</sub> = 225 V	2N6802		30	
<b>Diode Reverse Recovery Time</b>				
di/dt ≤ 100 A/μs, V <sub>DD</sub> ≤ 50 V, I <sub>F</sub> = 8.0 A	2N6796		300	ns
di/dt ≤ 100 A/μs, V <sub>DD</sub> ≤ 50 V, I <sub>F</sub> = 5.5 A	2N6798		500	
di/dt ≤ 100 A/μs, V <sub>DD</sub> ≤ 50 V, I <sub>F</sub> = 3.0 A	2N6800		700	
di/dt ≤ 100 A/μs, V <sub>DD</sub> ≤ 50 V, I <sub>F</sub> = 2.5 A	2N6802		900	

GRAPHS

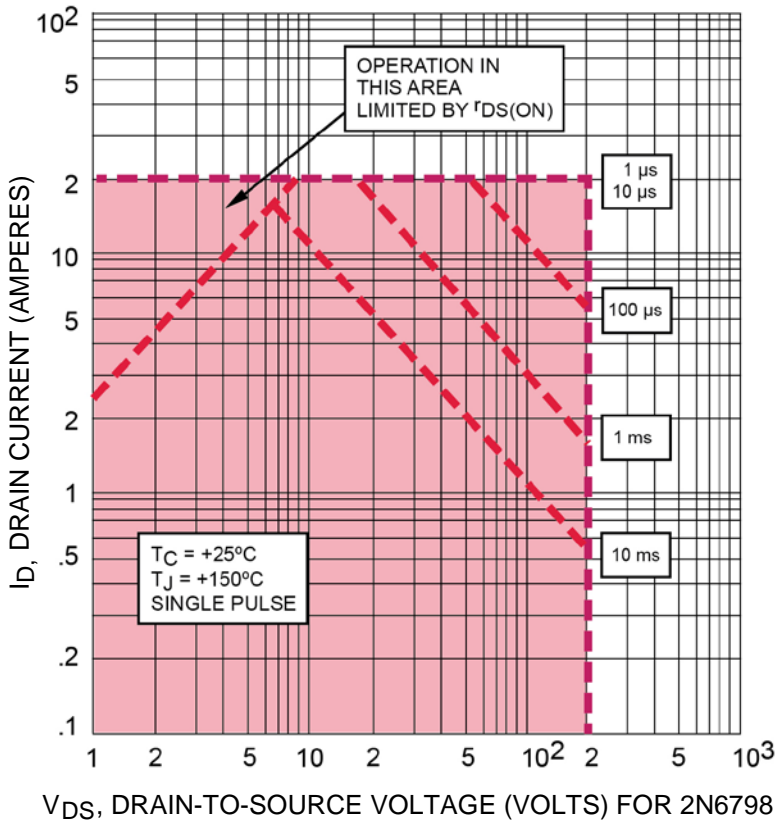
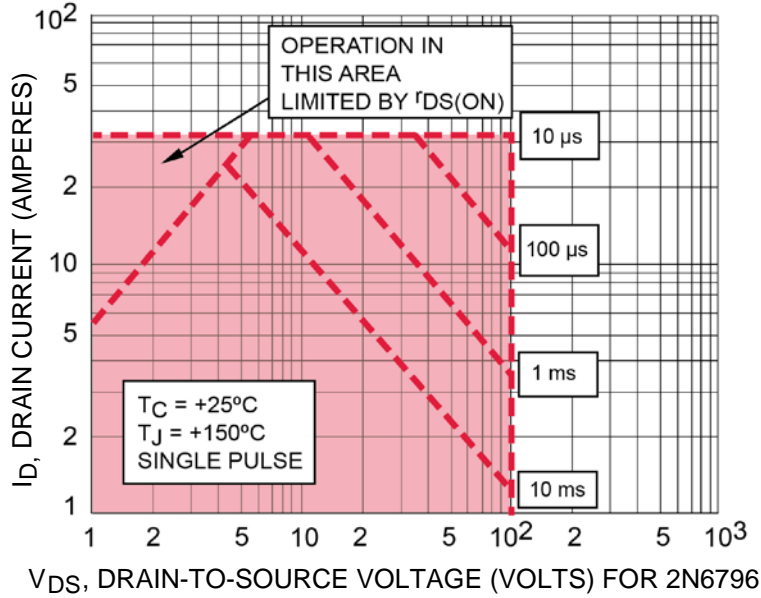


**FIGURE 1 – Normalized Transient Thermal Impedance**

**GRAPHS (continued)**
**FIGURE 2 – Maximum Drain Current versus Case Temperature Graphs**


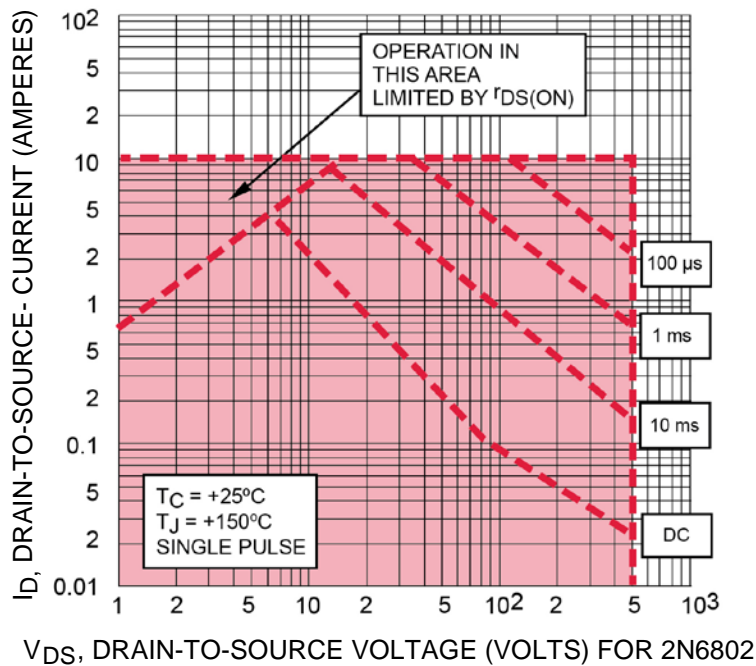
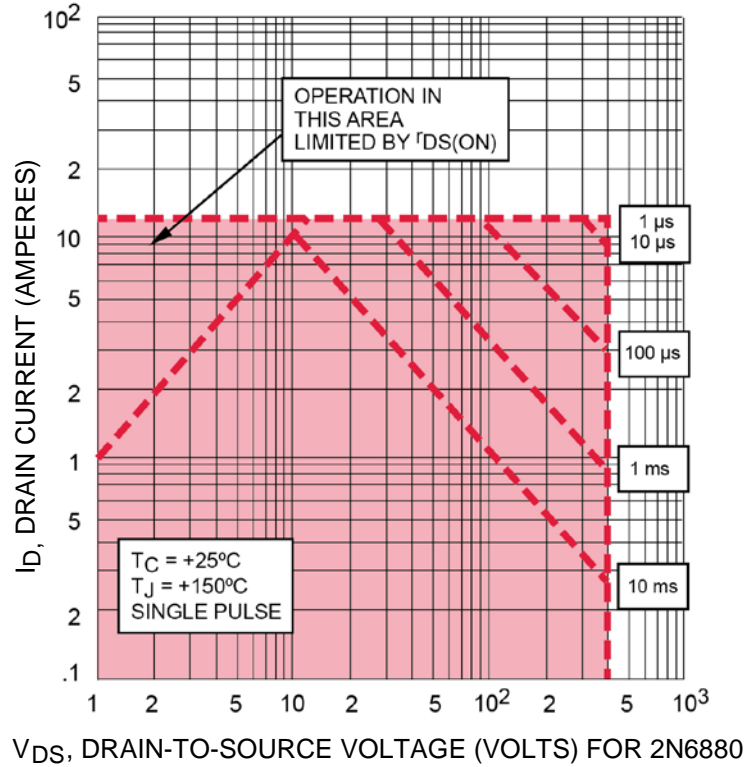
GRAPHS (continued)

FIGURE 3 – Maximum Safe Operating Area

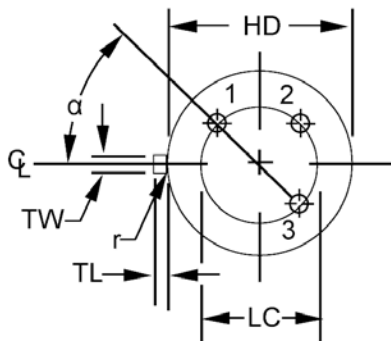
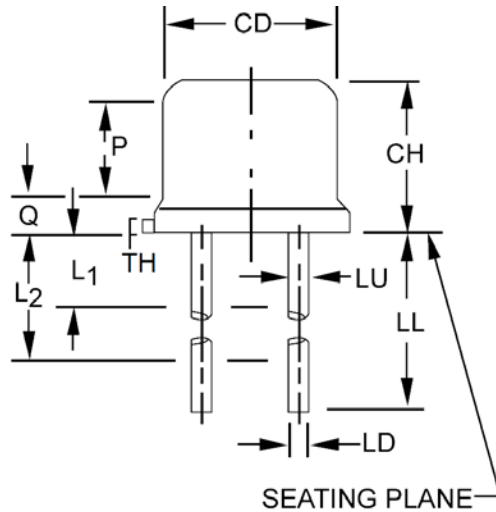


GRAPHS (continued)

FIGURE 3 – Maximum Safe Operating Area (continued)





**PACKAGE DIMENSIONS**


Symbol	Dimensions				Note
	Inch		Millimeters		
	Min	Max	Min	Max	
CD	0.305	0.355	7.75	9.02	
CH	0.160	.180	4.07	4.57	
HD	0.335	0.370	8.51	9.39	
LC	0.200 TP		5.08 TP		6
LD	0.016	0.021	0.41	0.53	7, 8
LL	0.500	0.750	12.70	19.05	7, 8
LU	0.016	0.019	0.41	0.48	7, 8
L1		0.050		1.27	7, 8
L2	0.250		6.35		7, 8
P	.070		1.78		5
Q		0.050		1.27	4
TL	0.029	0.045	0.74	1.14	3
TW	0.028	0.034	0.72	0.86	2
TH	.009	.041	0.23	1.04	
r		0.010		0.25	9
$\alpha$	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 TL 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.