



## 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).

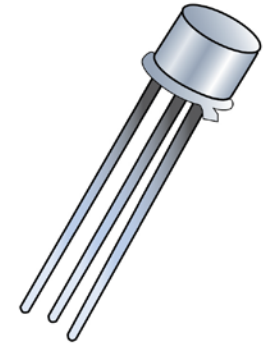
### APPLICATIONS / BENEFITS

- 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>	0.8 25	W
		@ T <sub>A</sub> = +25 °C @ T <sub>C</sub> = +25 °C <sup>(1)</sup>	
Drain-Source Voltage, dc	V <sub>DS</sub>	100 200 400 500	V
		2N6796 2N6798 2N6800 2N6802	
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>	8.0 5.5 3.0 2.5	A
		2N6796 2N6798 2N6800 2N6802	
Drain Current, dc @ T <sub>C</sub> = +100 °C <sup>(2)</sup>	I <sub>D2</sub>	5.0 3.5 2.0 1.5	A
		2N6796 2N6798 2N6800 2N6802	
Off-State Current (Peak Total Value) <sup>(3)</sup>	I <sub>DM</sub>	32 22 14 11	A (pk)
		2N6796 2N6798 2N6800 2N6802	
Source Current	I <sub>S</sub>	8.0 5.5 3.0 2.5	A
		2N6796 2N6798 2N6800 2N6802	

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:**
1. Derate linearly 0.2 W/°C for  $T_C > +25$  °C.
  2. 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.

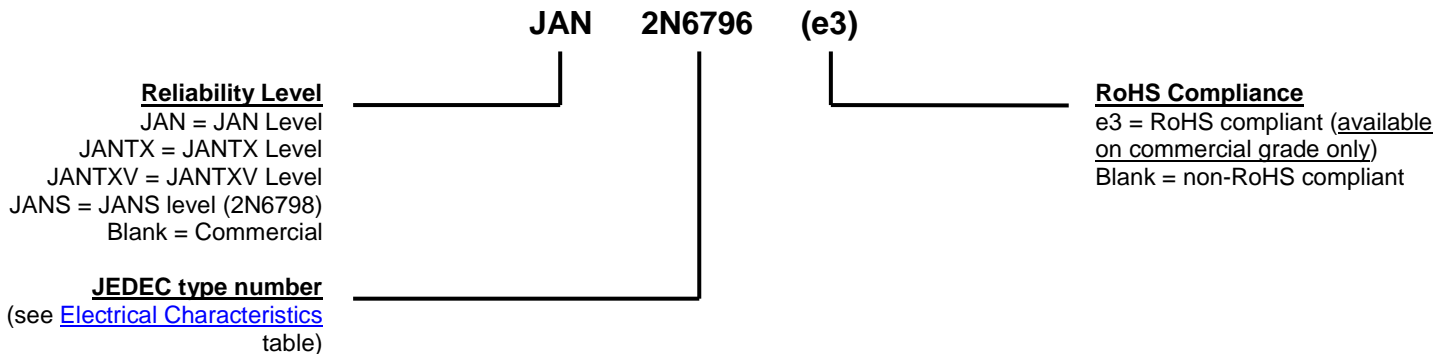
$$I_D = \sqrt{\frac{T_J(\max) - T_C}{R_{\theta JC} \times R_{DS(on)} @ T_J(\max)}}$$

3.  $I_{DM} = 4 \times I_{D1}$  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

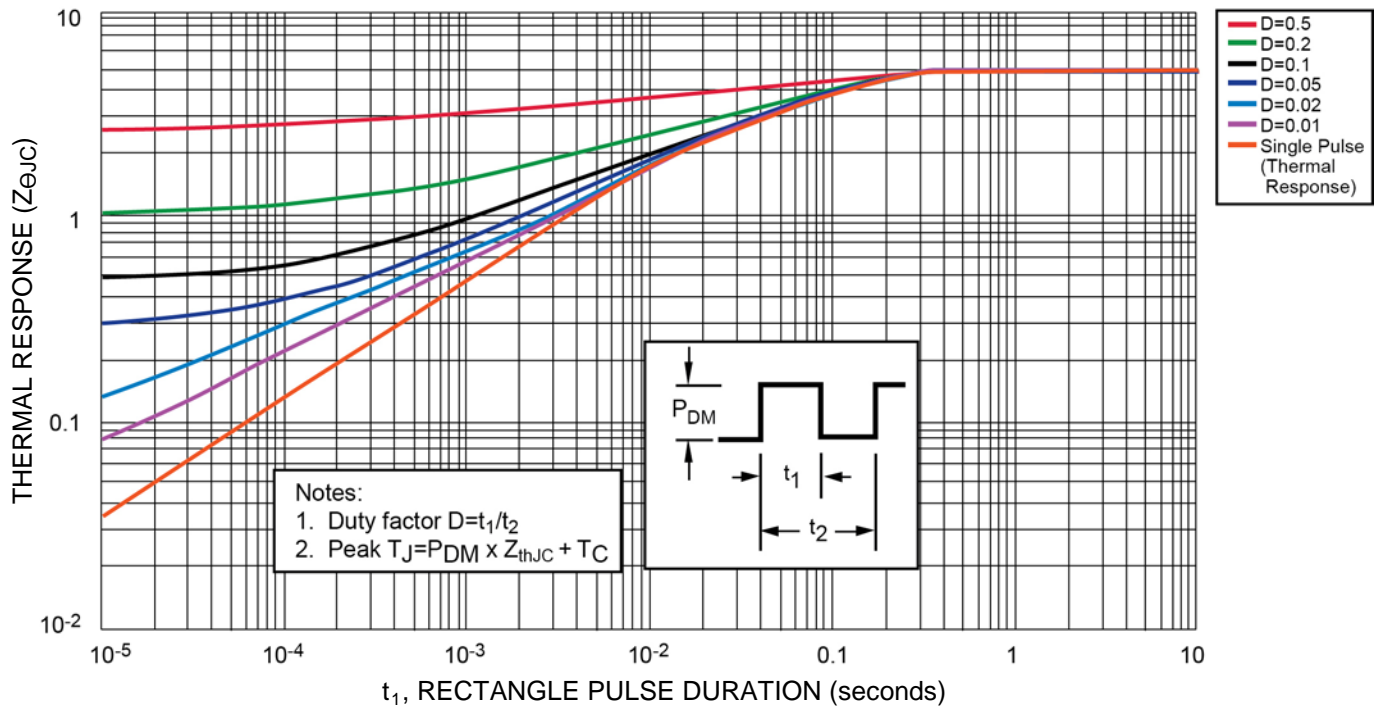
**ELECTRICAL CHARACTERISTICS @  $T_A = +25\text{ }^\circ\text{C}$ , unless otherwise noted (continued)**
**DYNAMIC CHARACTERISTICS**

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>Gate Charge:</b>				
<b>On-State Gate Charge</b>				
$V_{GS} = 10\text{ V}, I_D = 8.0\text{ A}, V_{DS} = 50\text{ V}$ 2N6796	$Q_{g(on)}$		28.51	nC
$V_{GS} = 10\text{ V}, I_D = 5.5\text{ A}, V_{DS} = 50\text{ V}$ 2N6798		42.07		
$V_{GS} = 10\text{ V}, I_D = 3.0\text{ A}, V_{DS} = 50\text{ V}$ 2N6800		34.75		
$V_{GS} = 10\text{ V}, I_D = 2.5\text{ A}, V_{DS} = 50\text{ V}$ 2N6802		33.00		
<b>Gate to Source Charge</b>				
$V_{GS} = 10\text{ V}, I_D = 8.0\text{ A}, V_{DS} = 50\text{ V}$ 2N6796	$Q_{gs}$		6.34	nC
$V_{GS} = 10\text{ V}, I_D = 5.5\text{ A}, V_{DS} = 50\text{ V}$ 2N6798		5.29		
$V_{GS} = 10\text{ V}, I_D = 3.0\text{ A}, V_{DS} = 50\text{ V}$ 2N6800		5.75		
$V_{GS} = 10\text{ V}, I_D = 2.5\text{ A}, V_{DS} = 50\text{ V}$ 2N6802		4.46		
<b>Gate to Drain Charge</b>				
$V_{GS} = 10\text{ V}, I_D = 8.0\text{ A}, V_{DS} = 50\text{ V}$ 2N6796	$Q_{gd}$		16.59	nC
$V_{GS} = 10\text{ V}, I_D = 5.5\text{ A}, V_{DS} = 50\text{ V}$ 2N6798		28.11		
$V_{GS} = 10\text{ V}, I_D = 3.0\text{ A}, V_{DS} = 50\text{ V}$ 2N6800		16.59		
$V_{GS} = 10\text{ V}, I_D = 2.5\text{ A}, V_{DS} = 50\text{ V}$ 2N6802		28.11		

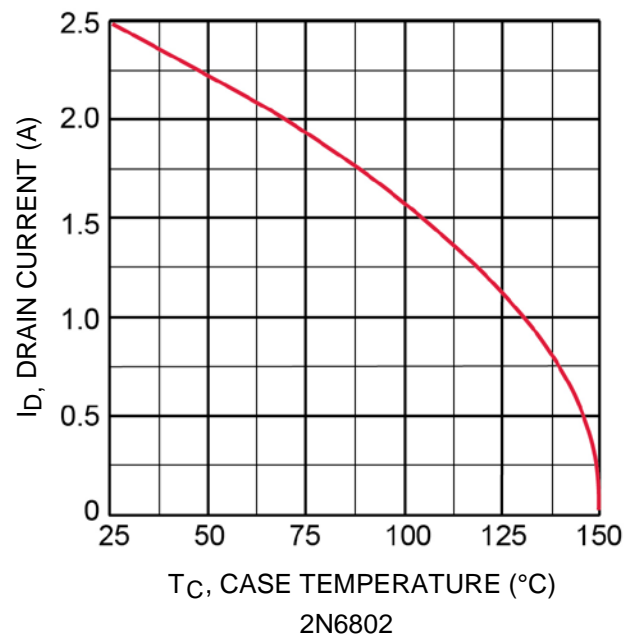
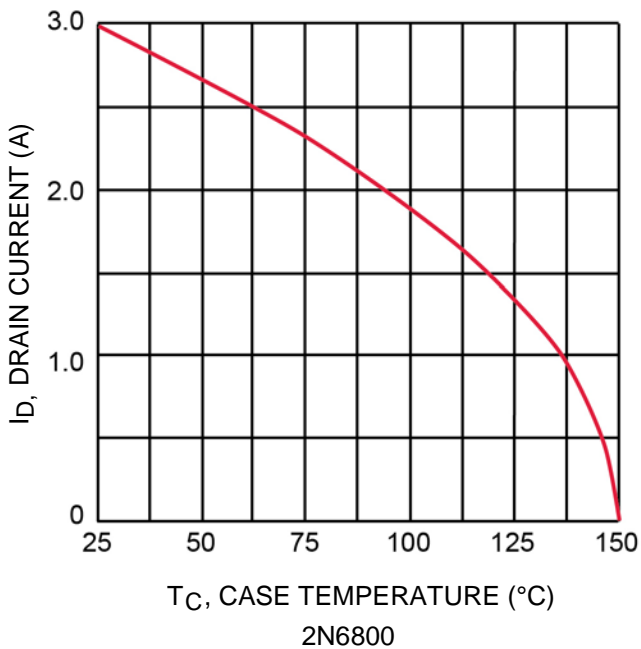
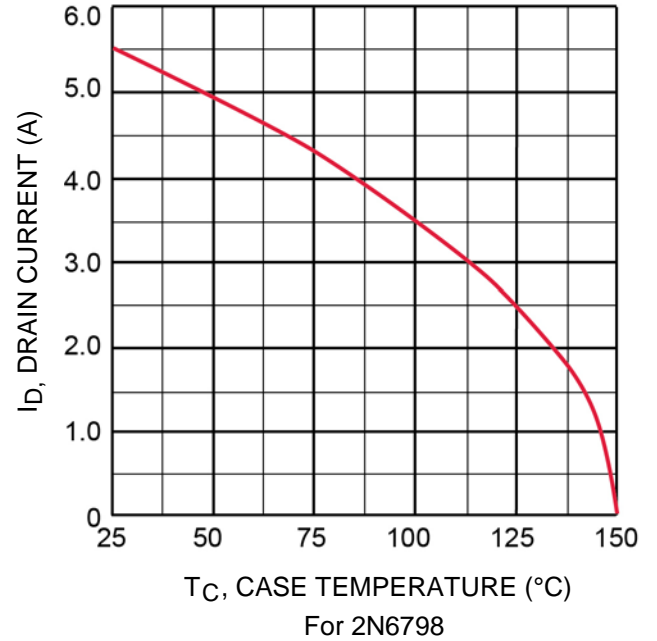
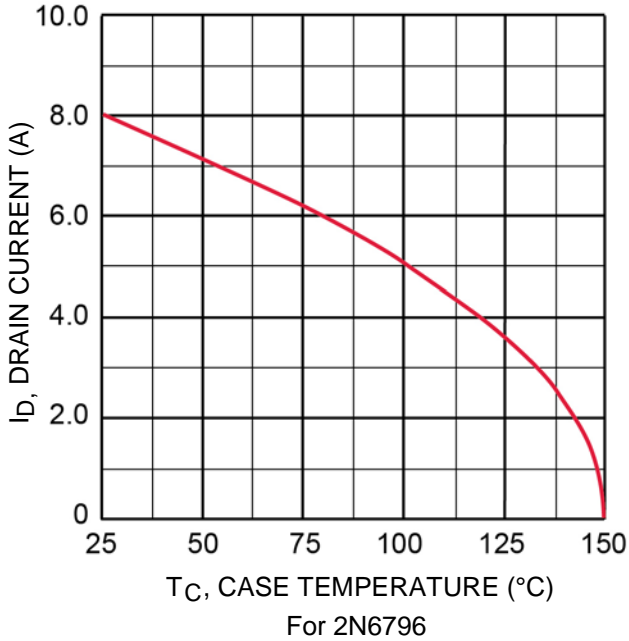
**SWITCHING CHARACTERISTICS**

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>Turn-on delay time</b>				
$I_D = 8.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 30\text{ V}$ 2N6796	$t_{d(on)}$		30	ns
$I_D = 5.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 77\text{ V}$ 2N6798				
$I_D = 3.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 176\text{ V}$ 2N6800				
$I_D = 2.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 225\text{ V}$ 2N6802				
<b>Rinse time</b>				
$I_D = 8.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 30\text{ V}$ 2N6796	$t_r$		75	ns
$I_D = 5.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 77\text{ V}$ 2N6798		50		
$I_D = 3.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 176\text{ V}$ 2N6800		35		
$I_D = 2.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 225\text{ V}$ 2N6802		30		
<b>Turn-off delay time</b>				
$I_D = 8.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 30\text{ V}$ 2N6796	$t_{d(off)}$		40	ns
$I_D = 5.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 77\text{ V}$ 2N6798		50		
$I_D = 3.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 176\text{ V}$ 2N6800		55		
$I_D = 2.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 225\text{ V}$ 2N6802		55		
<b>Fall time</b>				
$I_D = 8.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 30\text{ V}$ 2N6796	$t_f$		45	ns
$I_D = 5.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 77\text{ V}$ 2N6798		40		
$I_D = 3.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 176\text{ V}$ 2N6800		35		
$I_D = 2.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 225\text{ V}$ 2N6802		30		
<b>Diode Reverse Recovery Time</b>				
$di/dt \leq 100\text{ A}/\mu\text{s}, V_{DD} \leq 50\text{ V}, I_F = 8.0\text{ A}$ 2N6796	$t_{rr}$		300	ns
$di/dt \leq 100\text{ A}/\mu\text{s}, V_{DD} \leq 50\text{ V}, I_F = 5.5\text{ A}$ 2N6798		500		
$di/dt \leq 100\text{ A}/\mu\text{s}, V_{DD} \leq 50\text{ V}, I_F = 3.0\text{ A}$ 2N6800		700		
$di/dt \leq 100\text{ A}/\mu\text{s}, V_{DD} \leq 50\text{ V}, I_F = 2.5\text{ A}$ 2N6802		900		

GRAPHS

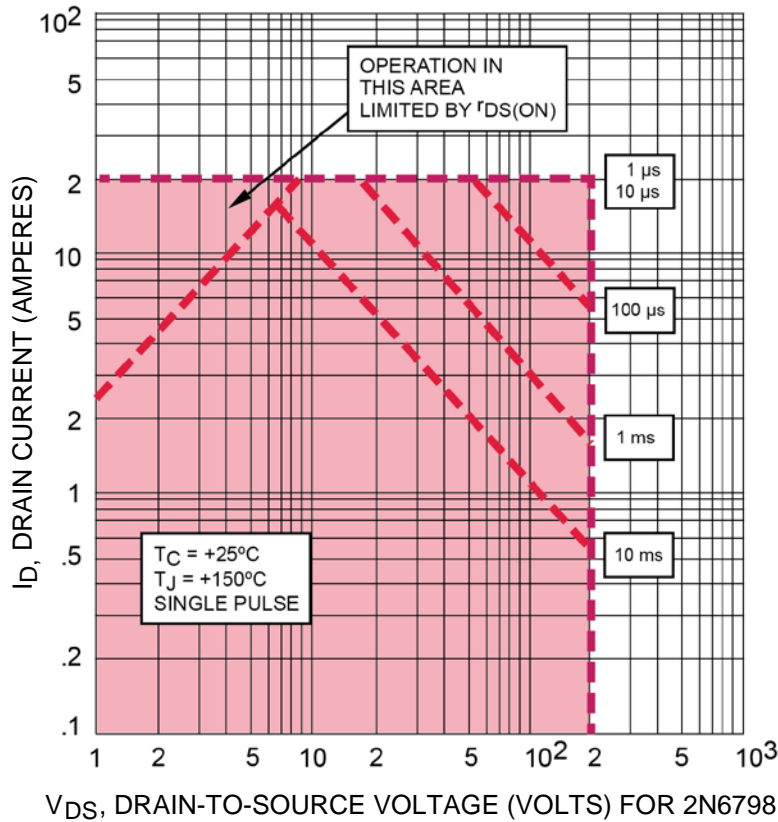
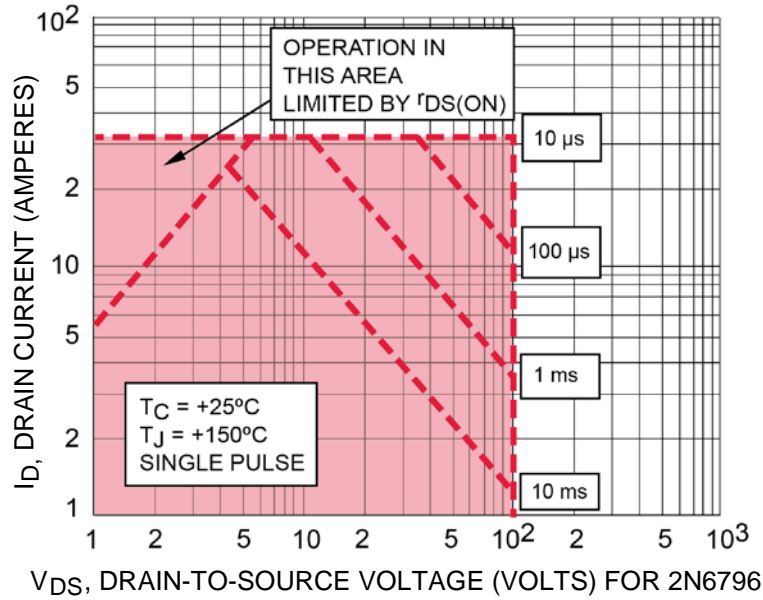


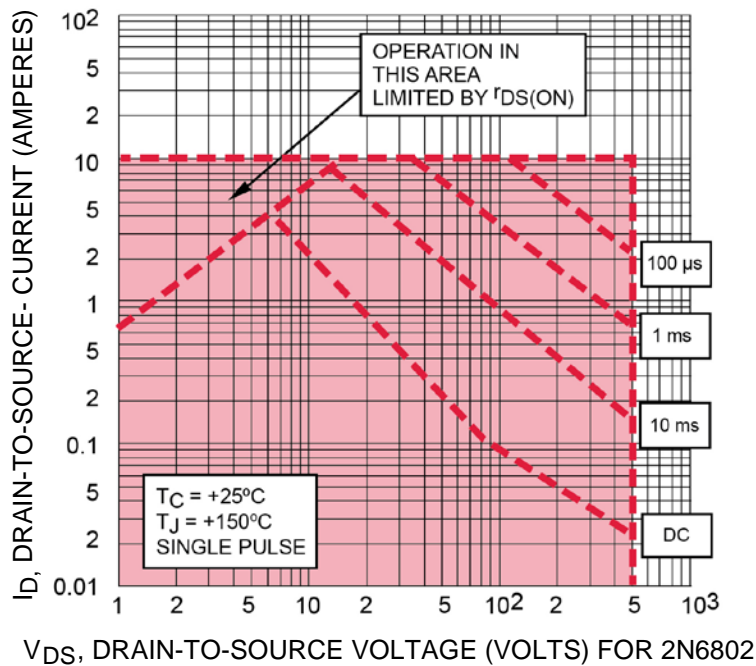
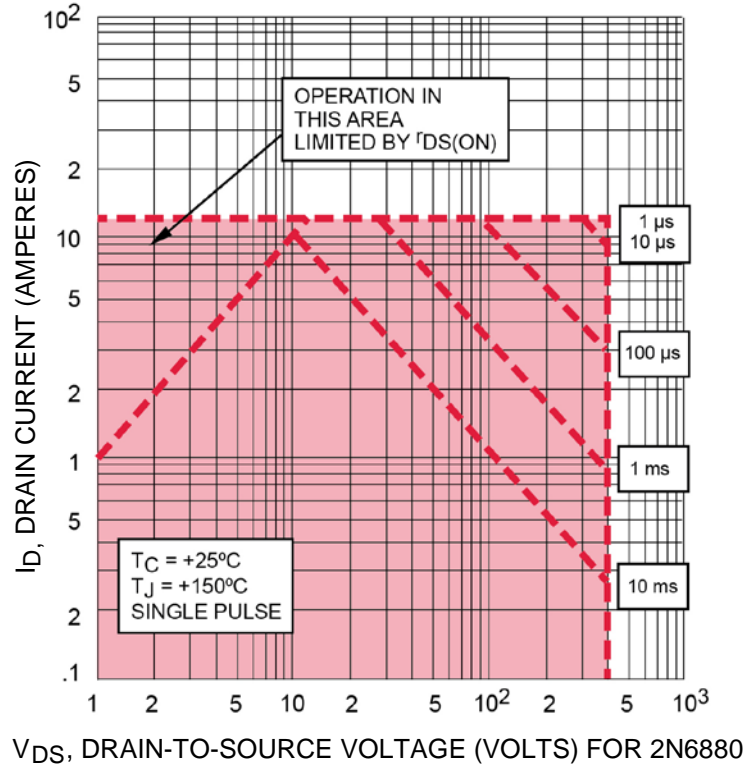
**FIGURE 1 – Normalized Transient Thermal Impedance**

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


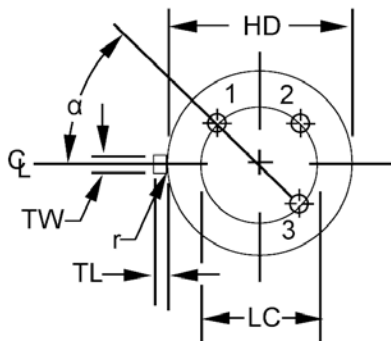
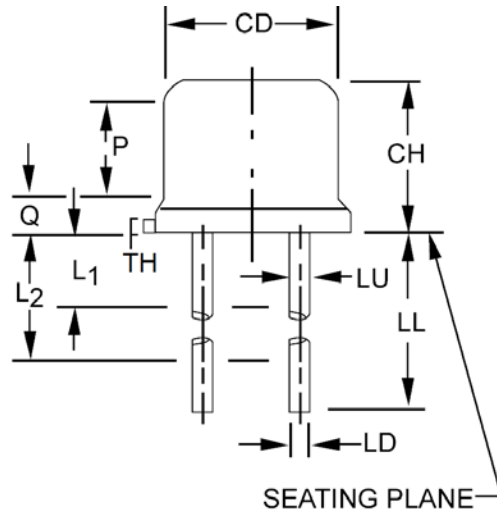
GRAPHS (continued)

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:**

- 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 TL 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  $\Phi$ x symbology.