RoHS
Available on commercial versions

N-CHANNEL MOSFET

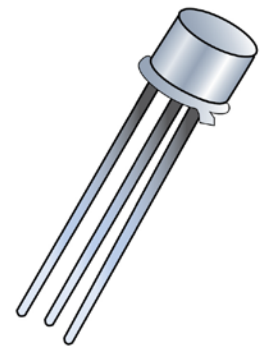
Qualified per MIL-PRF-19500/557

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.



TO-205AF (TO-39) Package

Also available in:

U-18 LCC package
(surface mount)
2N6796U, 2N6798U, 2N6800U & 2N6802U

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_A = +25 ºC unless otherwise stated

Parameters / Test Conditions		Symbol	Value	Unit
Operating & Storage Junction Temperature Range		T_J & T_{stg}	-55 to +150	°C
Thermal Resistance Junction-to-Case		$R_{ΘJC}$	5.0	°C/W
Total Power Dissipation	@ T_A = +25 °C @ T_C = +25 °C (1)	P_T	0.8 25	W
Drain-Source Voltage, dc	2N6796 2N6798 2N6800 2N6802	V_{DS}	100 200 400 500	V
Gate-Source Voltage, dc		V_{GS}	± 20	V
Drain Current, dc @ T_C = +25 ºC (2)	2N6796 2N6798 2N6800 2N6802	I_{D1}	8.0 5.5 3.0 2.5	A
Drain Current, dc @ T_C = +100 ºC (2)	2N6796 2N6798 2N6800 2N6802	I_{D2}	5.0 3.5 2.0 1.5	A
Off-State Current (Peak Total Value) (3)	2N6796 2N6798 2N6800 2N6802	I_{DM}	32 22 14 11	A (pk)
Source Current	2N6796 2N6798 2N6800 2N6802	I_S	8.0 5.5 3.0 2.5	A

See notes on next page.

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

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

JAN 2N6796 (e3)

Reliability Level
JAN = JAN Level
JANTX = JANTX Level
JANTXV = JANTXV Level
JANS = JANS level (2N6798)
Blank = Commercial

JEDEC type number
(see Electrical Characteristics table)

RoHS Compliance
e3 = RoHS compliant (available on commercial grade only)
Blank = non-RoHS compliant

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 °C, unless otherwise noted

Parameters / Test Conditions		Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS					
Drain-Source Breakdown Voltage V_{GS} = 0 V, I_D = 1.0 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 mA $V_{DS} \geq V_{GS}$, I_D = 0.25 mA, T_J = +125°C $V_{DS} \geq V_{GS}$, I_D = 0.25 mA, T_J = -55°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} = ± 20 V, V_{DS} = 0 V V_{GS} = ± 20 V, V_{DS} = 0 V, T_J = +125°C		I_{GSS1} I_{GSS2}		±100 ±200	nA
Drain Current V_{GS} = 0 V, V_{DS} = 80 V V_{GS} = 0 V, V_{DS} = 160 V V_{GS} = 0 V, V_{DS} = 320 V V_{GS} = 0 V, V_{DS} = 400 V	2N6796 2N6798 2N6800 2N6802	I_{DSS1}		25	µA
Drain Current V_{GS} = 0 V, V_{DS} = 80 V, T_J = +125 °C V_{GS} = 0 V, V_{DS} = 160 V, T_J = +125 °C V_{GS} = 0 V, V_{DS} = 320 V, T_J = +125 °C V_{GS} = 0 V, V_{DS} = 400 V, T_J = +125 °C	2N6796 2N6798 2N6800 2N6802	I_{DSS2}		0.25	mA
Static Drain-Source On-State Resistance V_{GS} = 10 V, I_D = 5.0 A pulsed V_{GS} = 10 V, I_D = 3.5 A pulsed V_{GS} = 10 V, I_D = 2.0 A pulsed V_{GS} = 10 V, I_D = 1.5 A pulsed	2N6796 2N6798 2N6800 2N6802	$r_{DS(on)1}$		0.18 0.40 1.00 1.50	Ω
Static Drain-Source On-State Resistance V_{GS} = 10 V, I_D = 8.0 A pulsed V_{GS} = 10 V, I_D = 5.5 A pulsed V_{GS} = 10 V, I_D = 3.0 A pulsed V_{GS} = 10 V, I_D = 2.5 A pulsed	2N6796 2N6798 2N6800 2N6802	$r_{DS(on)2}$		0.195 0.420 1.100 1.600	Ω
Static Drain-Source On-State Resistance T_J = +125°C V_{GS} = 10 V, I_D = 5.0 A pulsed V_{GS} = 10 V, I_D = 3.5 A pulsed V_{GS} = 10 V, I_D = 2.0 A pulsed V_{GS} = 10 V, I_D = 1.5 A pulsed	 2N6796 2N6798 2N6800 2N6802	$r_{DS(on)3}$		0.35 0.75 2.40 3.50	Ω
Diode Forward Voltage V_{GS} = 0 V, I_D = 8.0 A pulsed V_{GS} = 0 V, I_D = 5.5 A pulsed V_{GS} = 0 V, I_D = 3.0 A pulsed V_{GS} = 0 V, I_D = 2.5 A pulsed	2N6796 2N6798 2N6800 2N6802	V_{SD}		1.5 1.4 1.4 1.4	V

ELECTRICAL CHARACTERISTICS @ T_A = +25 °C, unless otherwise noted (continued)

DYNAMIC CHARACTERISTICS

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

SWITCHING CHARACTERISTICS

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

GRAPHS

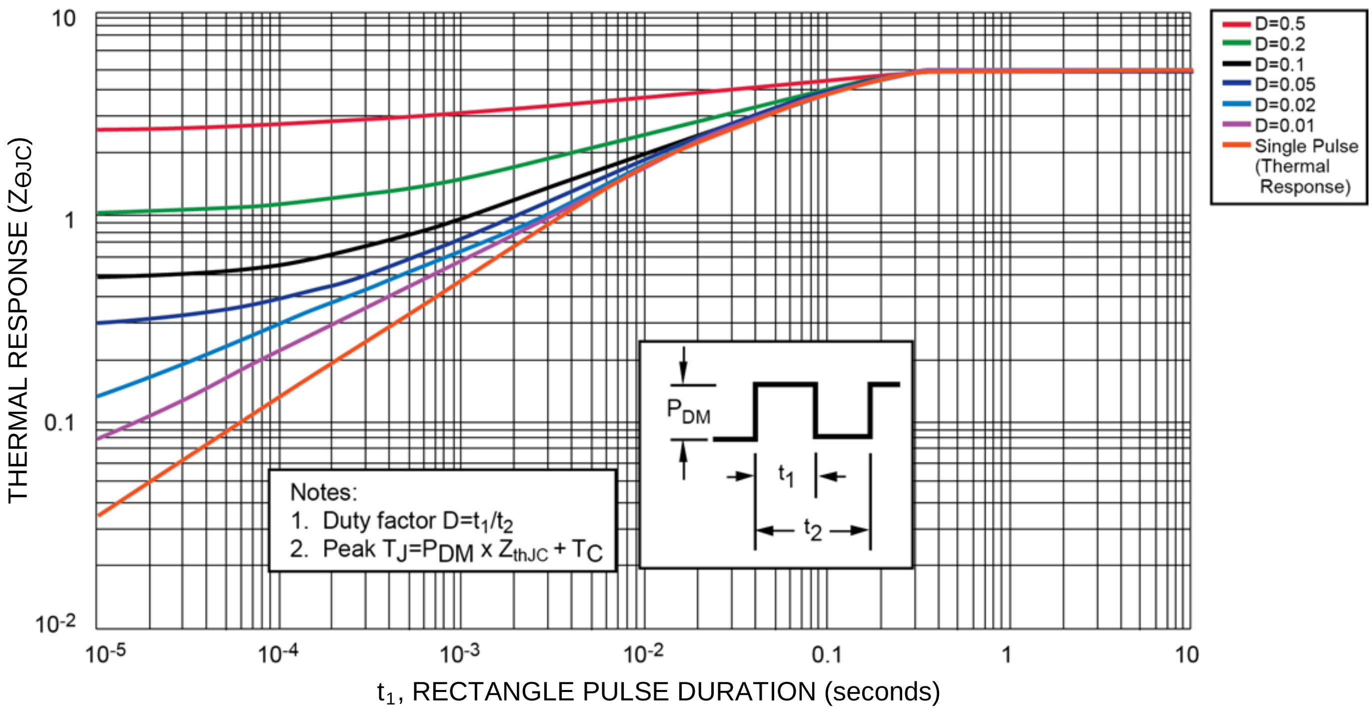
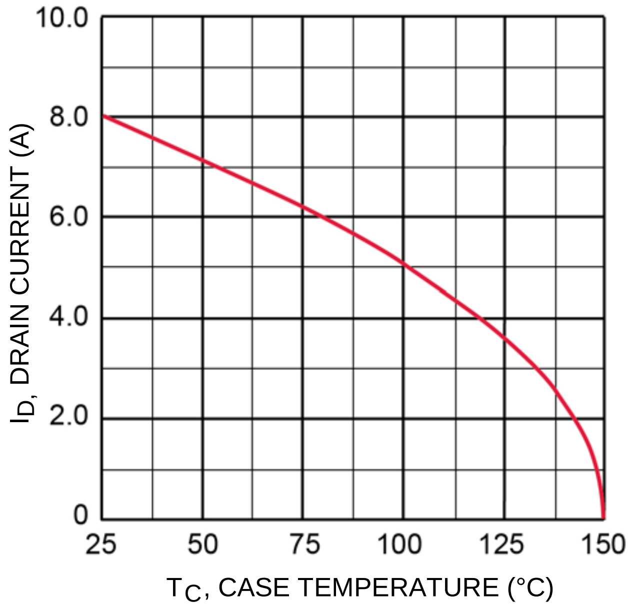


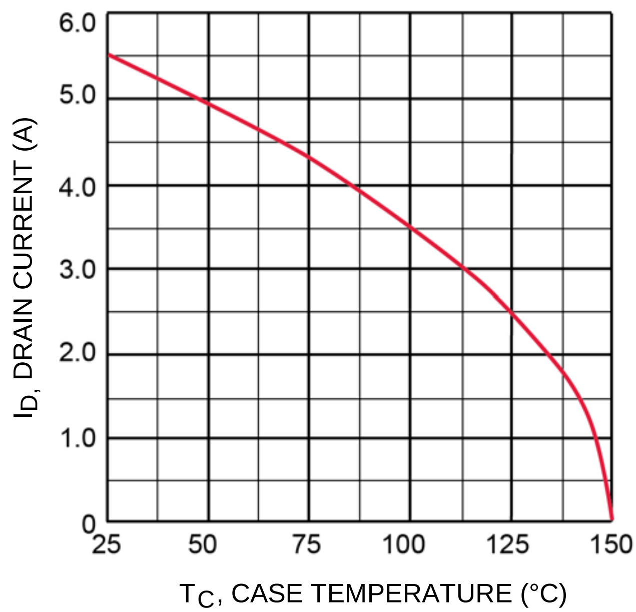
FIGURE 1 – Normalized Transient Thermal Impedance

GRAPHS (continued)

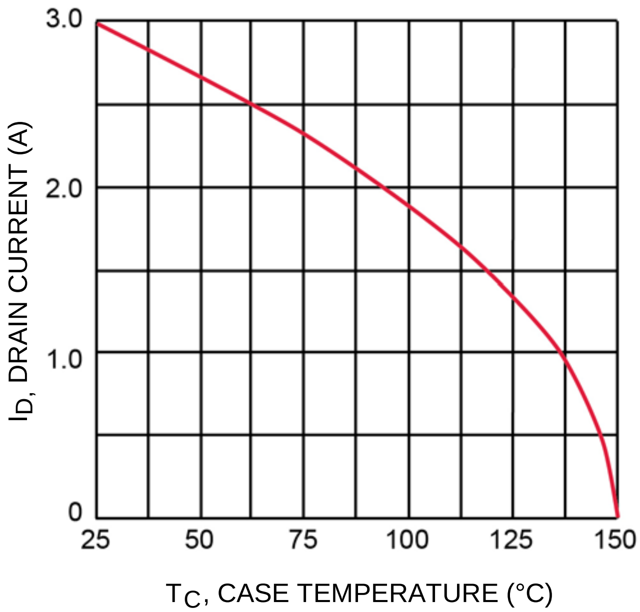
FIGURE 2 – Maximum Drain Current versus Case Temperature Graphs



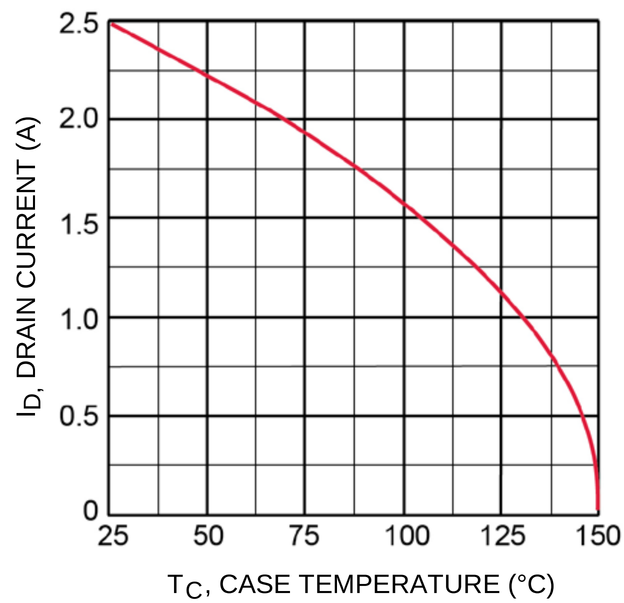
For 2N6796



For 2N6798



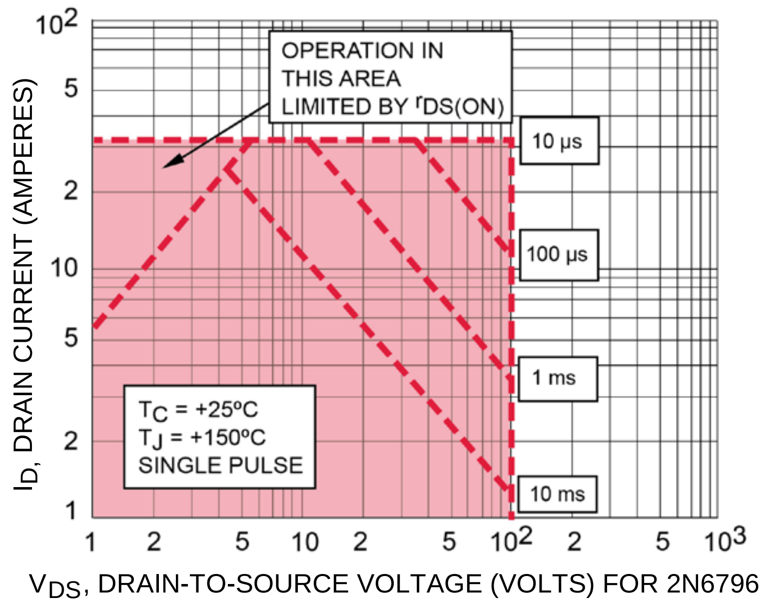
2N6800

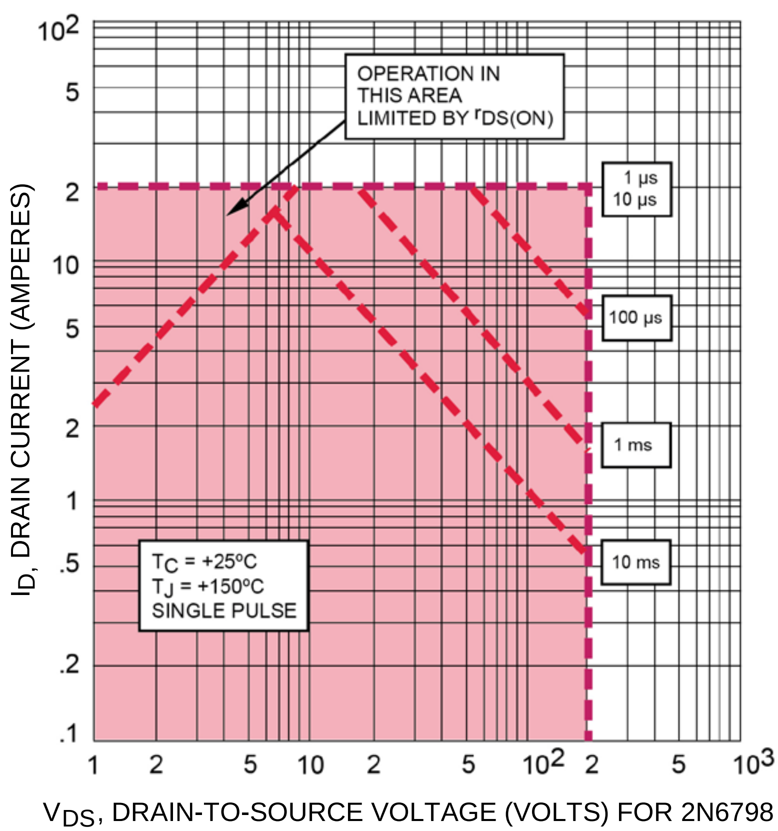


2N6802

GRAPHS (continued)

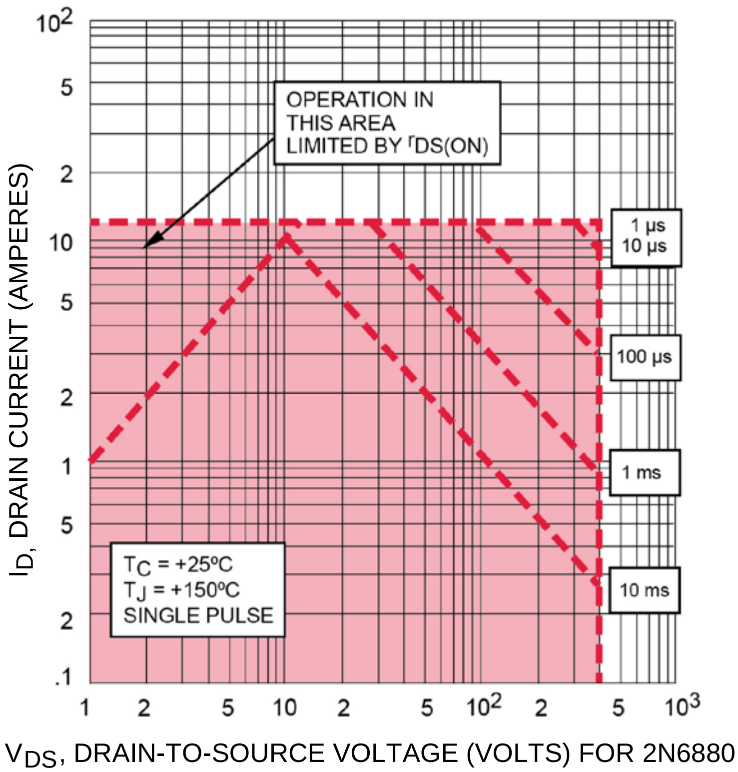
FIGURE 3 – Maximum Safe Operating Area

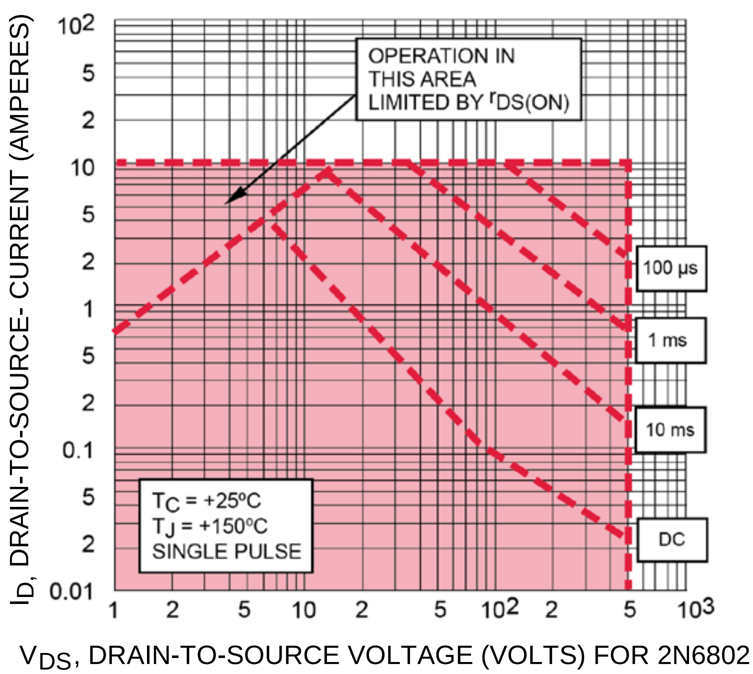




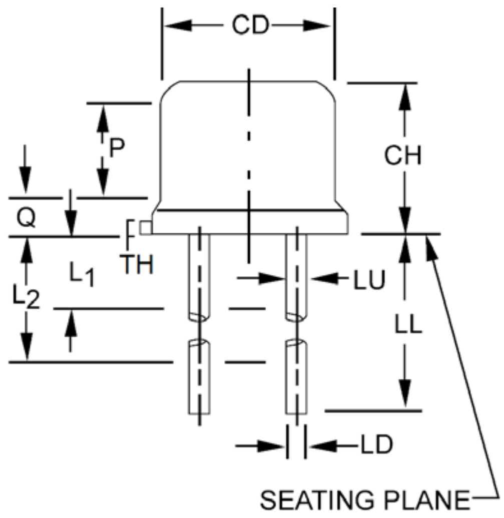
GRAPHS (continued)

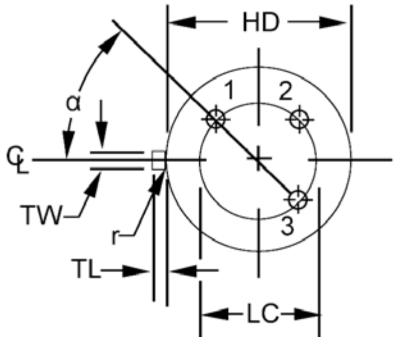
FIGURE 3 – Maximum Safe Operating Area (continued)





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
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 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 Φx symbology.