



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 2N6798U part number is also qualified to the JANS level. These devices are also available in a TO-205AF (TO-39) 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

- Surface mount equivalent of 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 2N6798U only.
(See [part nomenclature](#) for all available options.)
- RoHS compliant by design.

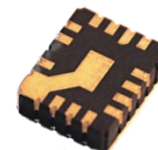
APPLICATIONS / BENEFITS

- Compact surface mount design enables mounting in crowded areas.
- Military and other high-reliability applications.

MAXIMUM RATINGS @ $T_A = +25^\circ\text{C}$ unless otherwise stated

Parameters / Test Conditions	Symbol	Value	Unit
Operating & Storage Junction Temperature Range	T_J & T_{stg}	-55 to +150	$^\circ\text{C}$
Thermal Resistance Junction-to-Case (see Figure 1)	$R_{\theta JC}$	5.0	$^\circ\text{C/W}$
Total Power Dissipation @ $T_A = +25^\circ\text{C}$ @ $T_C = +25^\circ\text{C}$ ⁽¹⁾	P_T	0.8 25	W
Drain-Source Voltage, dc 2N6796U 2N6798U 2N6800U 2N6802U	V_{DS}	100 200 400 500	V
Gate-Source Voltage, dc	V_{GS}	± 20	V
Drain Current, dc @ $T_C = +25^\circ\text{C}$ ⁽²⁾ 2N6796U 2N6798U 2N6800U 2N6802U	I_{D1}	8.0 5.5 3.0 2.5	A
Drain Current, dc @ $T_C = +100^\circ\text{C}$ ⁽²⁾ 2N6796U 2N6798U 2N6800U 2N6802U	I_{D2}	5.0 3.5 2.0 1.5	A
Off-State Current (Peak Total Value) ⁽³⁾ 2N6796U 2N6798U 2N6800U 2N6802U	I_{DM}	32 22 14 11	A (pk)
Source Current 2N6796U 2N6798U 2N6800U 2N6802U	I_S	8.0 5.5 3.0 2.5	A

See notes on next page.



U-18 LCC Package

Also available in:

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

 (Leaded Top Hat)
2N6796, 2N6798,
2N6800 & 2N6802

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:**
- Derate linearly 0.2 W/°C for $T_C > +25\text{ }^\circ\text{C}$.
 - 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.

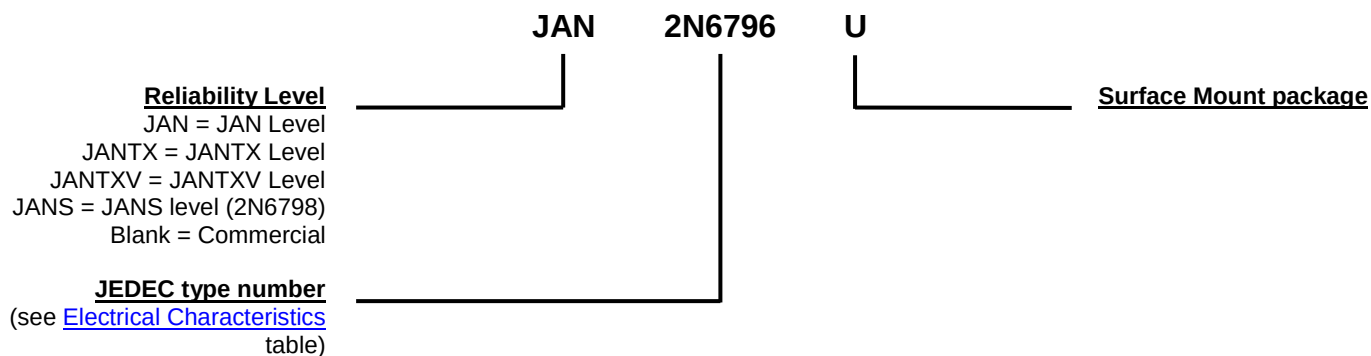
$$I_D = \sqrt{\frac{T_J(\text{max}) - T_C}{R_{\theta JC} \times R_{DS(on)} @ T_J(\text{max})}}$$

- $I_{DM} = 4 \times I_{D1}$ as calculated in note 1.

MECHANICAL and PACKAGING

- CASE: Ceramic LCC-18 with kovar gold plated lid.
- TERMINALS: Gold plating over nickel.
- MARKING: Manufacturer's ID, part number, date code, ESD symbol at Pin 1 location.
- TAPE & REEL option: Standard per EIA-481-D. Consult factory for quantities.
- 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 @ $T_A = +25^\circ\text{C}$, unless otherwise noted

Parameters / Test Conditions		Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS					
Drain-Source Breakdown Voltage $V_{GS} = 0\text{ V}, I_D = 1.0\text{ mA}$	2N6796U 2N6798U 2N6800U 2N6802U	$V_{(BR)DSS}$	100 200 400 500		V
Gate-Source Voltage (Threshold) $V_{DS} \geq V_{GS}, I_D = 0.25\text{ mA}$ $V_{DS} \geq V_{GS}, I_D = 0.25\text{ mA}, T_J = +125^\circ\text{C}$ $V_{DS} \geq V_{GS}, I_D = 0.25\text{ mA}, T_J = -55^\circ\text{C}$		$V_{GS(th)1}$ $V_{GS(th)2}$ $V_{GS(th)3}$	2.0 1.0	4.0 5.0	V
Gate Current $V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$ $V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}, T_J = +125^\circ\text{C}$		I_{GSS1} I_{GSS2}		± 100 ± 200	nA
Drain Current $V_{GS} = 0\text{ V}, V_{DS} = 80\text{ V}$ $V_{GS} = 0\text{ V}, V_{DS} = 160\text{ V}$ $V_{GS} = 0\text{ V}, V_{DS} = 320\text{ V}$ $V_{GS} = 0\text{ V}, V_{DS} = 400\text{ V}$	2N6796U 2N6798U 2N6800U 2N6802U	I_{DSS1}		25	μA
Drain Current $V_{GS} = 0\text{ V}, V_{DS} = 80\text{ V}, T_J = +125^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 160\text{ V}, T_J = +125^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 320\text{ V}, T_J = +125^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 400\text{ V}, T_J = +125^\circ\text{C}$	2N6796U 2N6798U 2N6800U 2N6802U	I_{DSS2}		0.25	mA
Static Drain-Source On-State Resistance $V_{GS} = 10\text{ V}, I_D = 5.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 3.5\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 2.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 1.5\text{ A pulsed}$	2N6796U 2N6798U 2N6800U 2N6802U	$r_{DS(on)1}$		0.18 0.40 1.00 1.50	Ω
Static Drain-Source On-State Resistance $V_{GS} = 10\text{ V}, I_D = 8.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 5.5\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 3.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 2.5\text{ A pulsed}$	2N6796U 2N6798U 2N6800U 2N6802U	$r_{DS(on)2}$		0.195 0.420 1.100 1.600	Ω
Static Drain-Source On-State Resistance $T_J = +125^\circ\text{C}$ $V_{GS} = 10\text{ V}, I_D = 5.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 3.5\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 2.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 1.5\text{ A pulsed}$	2N6796U 2N6798U 2N6800U 2N6802U	$r_{DS(on)3}$		0.35 0.75 2.40 3.50	Ω
Diode Forward Voltage $V_{GS} = 0\text{ V}, I_D = 8.0\text{ A pulsed}$ $V_{GS} = 0\text{ V}, I_D = 5.5\text{ A pulsed}$ $V_{GS} = 0\text{ V}, I_D = 3.0\text{ A pulsed}$ $V_{GS} = 0\text{ V}, I_D = 2.5\text{ A pulsed}$	2N6796U 2N6798U 2N6800U 2N6802U	V_{SD}		1.5 1.4 1.4 1.4	V

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

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Gate Charge:				
On-State Gate Charge	$Q_{g(\text{on})}$			
$V_{GS} = 10\text{ V}, I_D = 8.0\text{ A}, V_{DS} = 50\text{ V}$ 2N6796U			28.51	nC
$V_{GS} = 10\text{ V}, I_D = 5.5\text{ A}, V_{DS} = 50\text{ V}$ 2N6798U			42.07	
$V_{GS} = 10\text{ V}, I_D = 3.0\text{ A}, V_{DS} = 50\text{ V}$ 2N6800U			34.75	
$V_{GS} = 10\text{ V}, I_D = 2.5\text{ A}, V_{DS} = 50\text{ V}$ 2N6802U			33.00	
Gate to Source Charge	Q_{gs}			
$V_{GS} = 10\text{ V}, I_D = 8.0\text{ A}, V_{DS} = 50\text{ V}$ 2N6796U			6.34	nC
$V_{GS} = 10\text{ V}, I_D = 5.5\text{ A}, V_{DS} = 50\text{ V}$ 2N6798U			5.29	
$V_{GS} = 10\text{ V}, I_D = 3.0\text{ A}, V_{DS} = 50\text{ V}$ 2N6800U			5.75	
$V_{GS} = 10\text{ V}, I_D = 2.5\text{ A}, V_{DS} = 50\text{ V}$ 2N6802U			4.46	
Gate to Drain Charge	Q_{gd}			
$V_{GS} = 10\text{ V}, I_D = 8.0\text{ A}, V_{DS} = 50\text{ V}$ 2N6796U			16.59	nC
$V_{GS} = 10\text{ V}, I_D = 5.5\text{ A}, V_{DS} = 50\text{ V}$ 2N6798U			28.11	
$V_{GS} = 10\text{ V}, I_D = 3.0\text{ A}, V_{DS} = 50\text{ V}$ 2N6800U			16.59	
$V_{GS} = 10\text{ V}, I_D = 2.5\text{ A}, V_{DS} = 50\text{ V}$ 2N6802U			28.11	

SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Turn-on delay time	$t_{d(\text{on})}$			
$I_D = 8.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 30\text{ V}$ 2N6796U				ns
$I_D = 5.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 77\text{ V}$ 2N6798U			30	
$I_D = 3.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 176\text{ V}$ 2N6800U				
$I_D = 2.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 225\text{ V}$ 2N6802U				
Rinse time	t_r			
$I_D = 8.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 30\text{ V}$ 2N6796U			75	ns
$I_D = 5.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 77\text{ V}$ 2N6798U			50	
$I_D = 3.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 176\text{ V}$ 2N6800U			35	
$I_D = 2.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 225\text{ V}$ 2N6802U			30	
Turn-off delay time	$t_{d(\text{off})}$			
$I_D = 8.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 30\text{ V}$ 2N6796U			40	ns
$I_D = 5.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 77\text{ V}$ 2N6798U			50	
$I_D = 3.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 176\text{ V}$ 2N6800U			55	
$I_D = 2.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 225\text{ V}$ 2N6802U			55	
Fall time	t_f			
$I_D = 8.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 30\text{ V}$ 2N6796U			45	ns
$I_D = 5.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 77\text{ V}$ 2N6798U			40	
$I_D = 3.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 176\text{ V}$ 2N6800U			35	
$I_D = 2.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\ \Omega, V_{DD} = 225\text{ V}$ 2N6802U			30	
Diode Reverse Recovery Time	t_{rr}			
$di/dt \leq 100\text{ A}/\mu\text{s}, V_{DD} \leq 50\text{ V}, I_F = 8.0\text{ A}$ 2N6796U			300	ns
$di/dt \leq 100\text{ A}/\mu\text{s}, V_{DD} \leq 50\text{ V}, I_F = 5.5\text{ A}$ 2N6798U			500	
$di/dt \leq 100\text{ A}/\mu\text{s}, V_{DD} \leq 50\text{ V}, I_F = 3.0\text{ A}$ 2N6800U			700	
$di/dt \leq 100\text{ A}/\mu\text{s}, V_{DD} \leq 50\text{ V}, I_F = 2.5\text{ A}$ 2N6802U			900	

GRAPHS

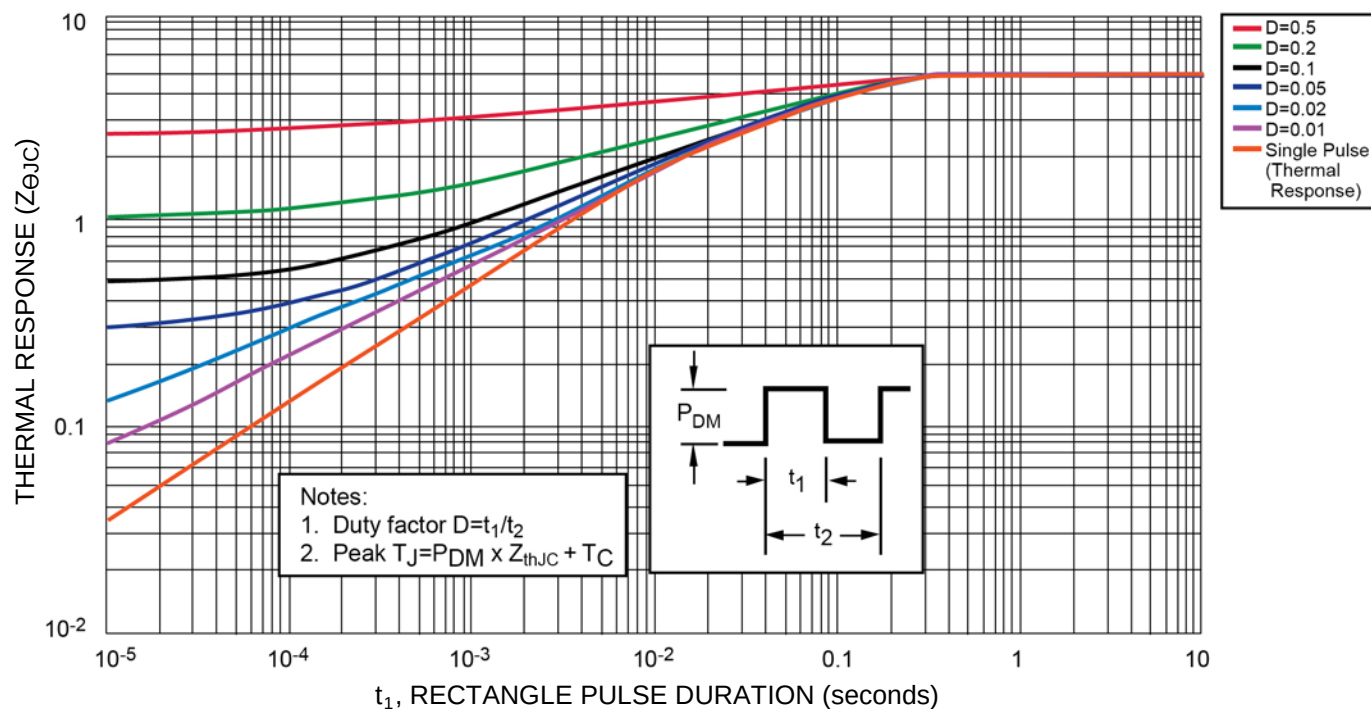
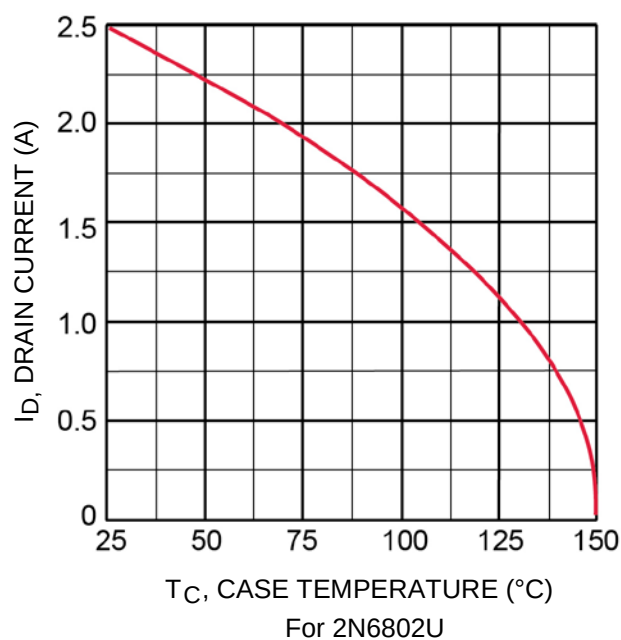
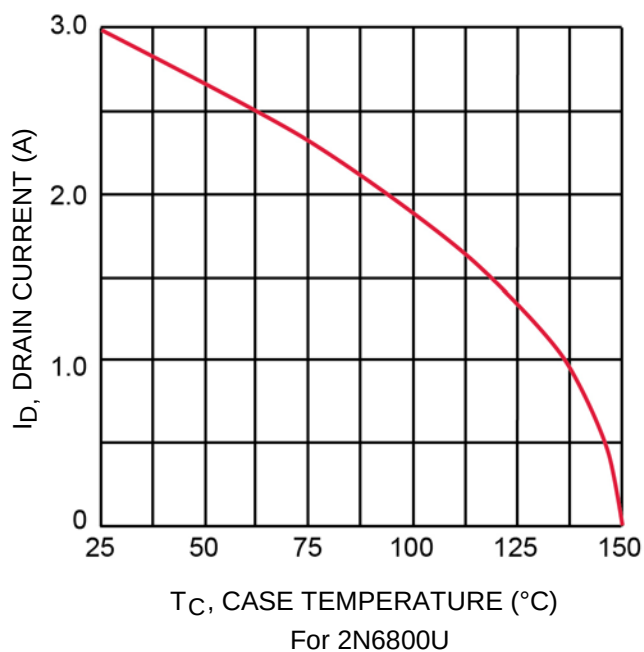
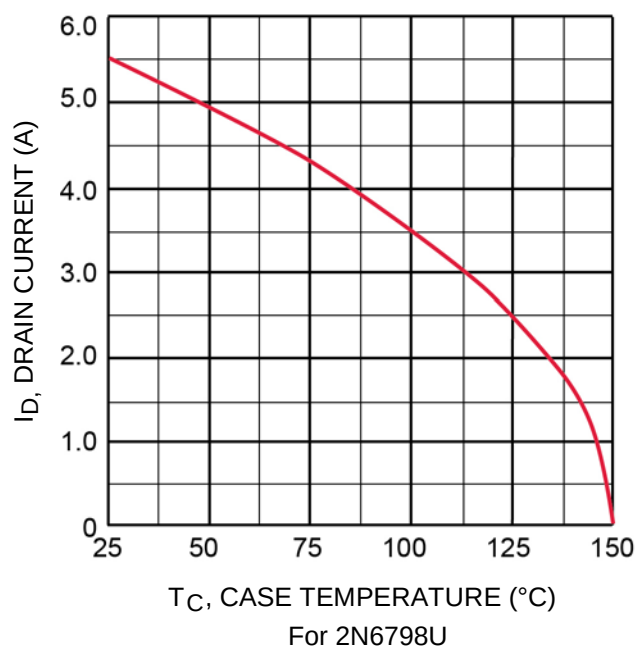
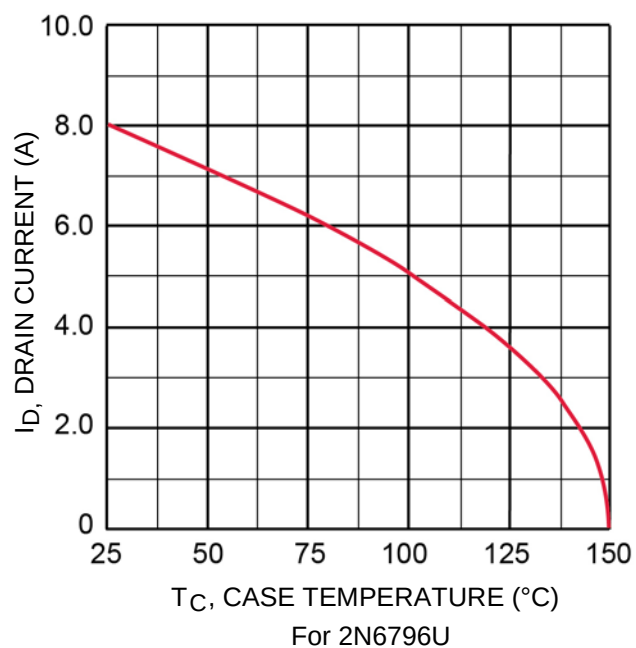
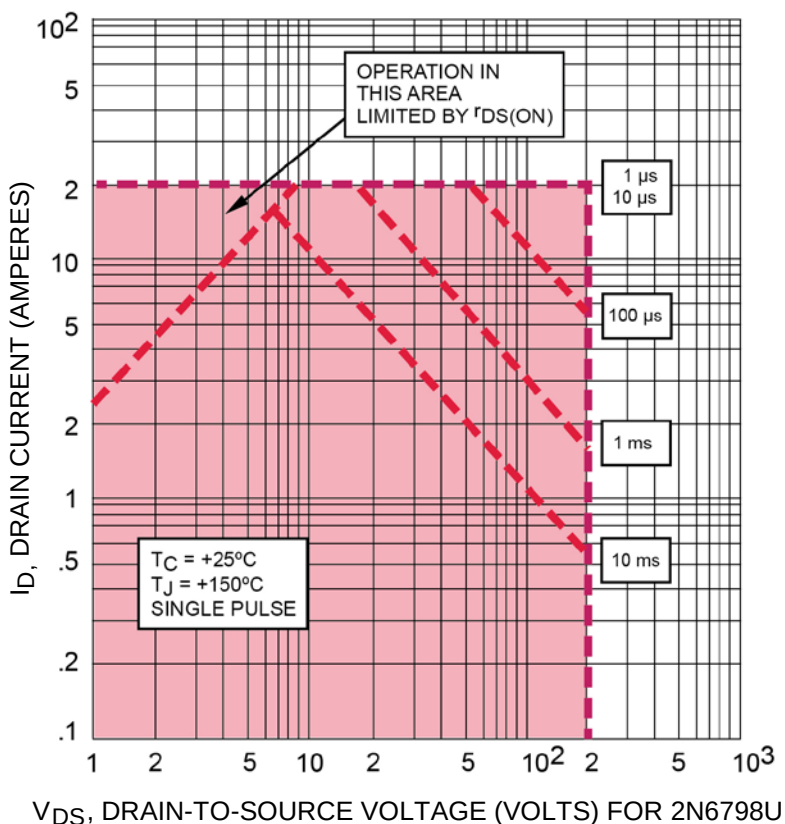
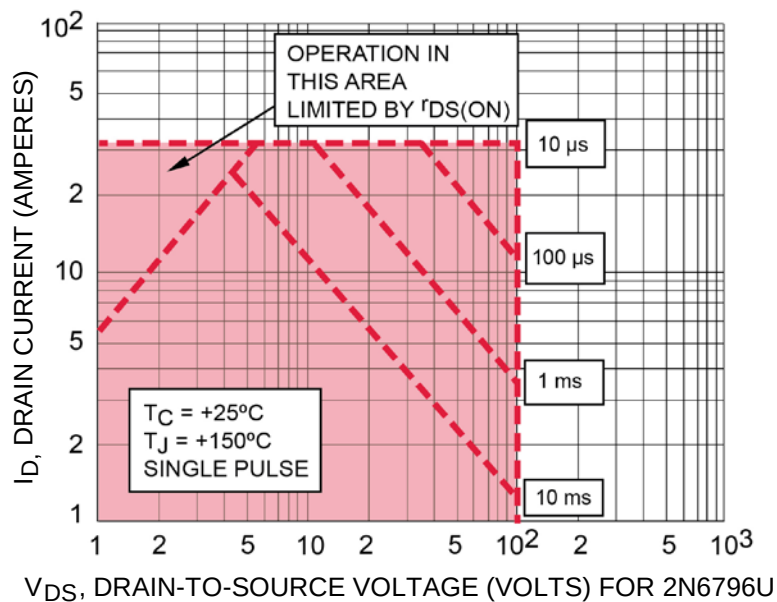


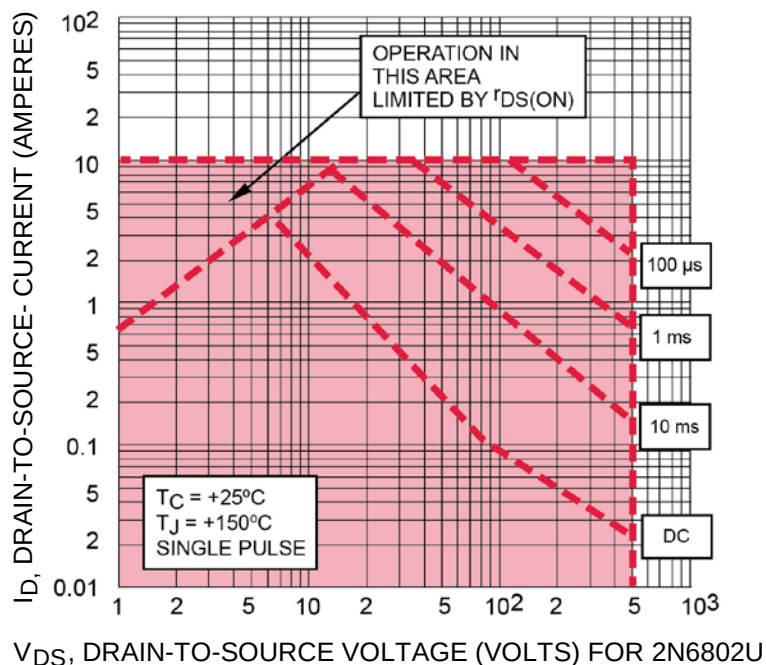
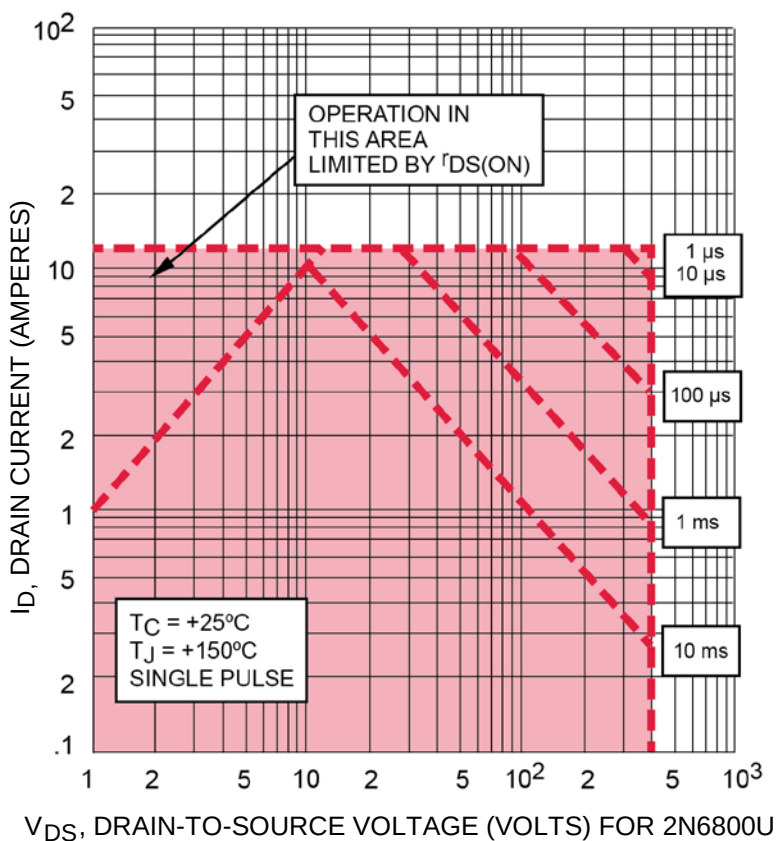
FIGURE 1 – Normalized Transient Thermal Impedance

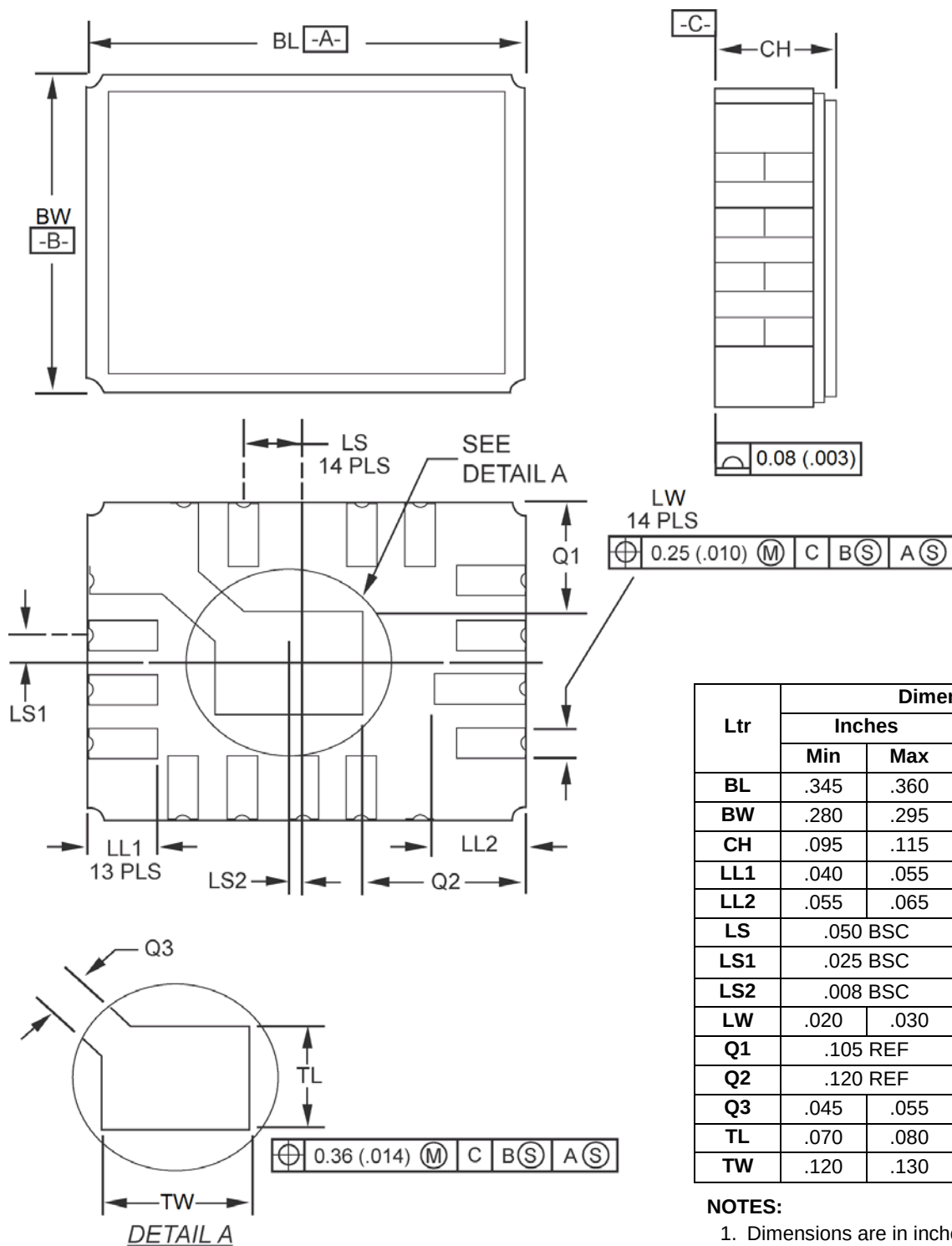
GRAPHS (continued)
FIGURE 2 – Maximum Drain Current vs Case Temperature Graphs


GRAPHS (continued)

FIGURE 3 – Maximum Safe Operating Area

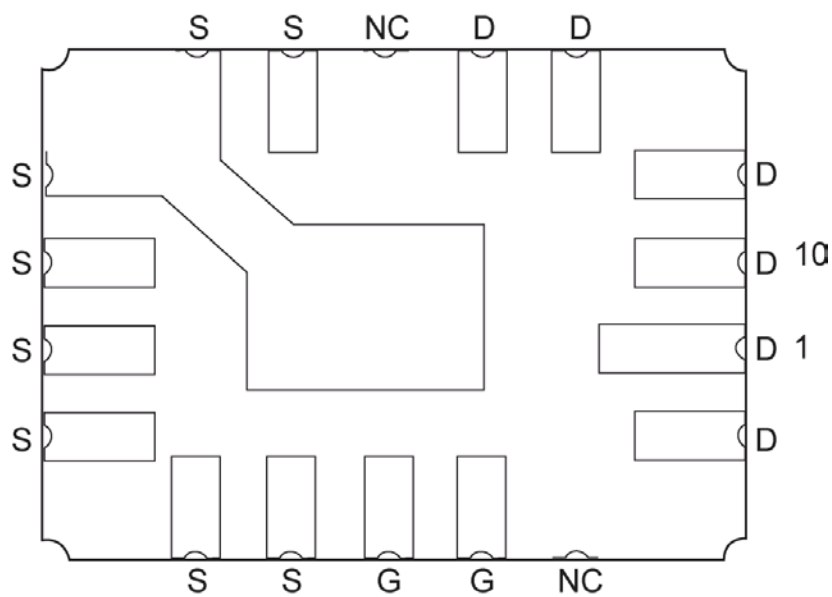


GRAPHS (continued)
FIGURE 3 – Maximum Safe Operating Area (continued)


PACKAGE DIMENSIONS

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 Φ x symbology.
4. Ceramic package only.

PAD LAYOUT



PAD ASSIGNMENTS