



N-CHANNEL MOSFET
Qualified per MIL-PRF-19500/542

Qualified Levels:
 JAN, JANTX, and
 JANTXV

DESCRIPTION

This family of 2N6756, 2N6758, 2N6760 and 2N6762 switching transistors are military qualified up to the JANTXV level for high-reliability applications. 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.

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FEATURES

- JEDEC registered 2N6756, 2N6758, 2N6760 and 2N6762 number series.
- JAN, JANTX, and JANTXV qualifications are available per MIL-PRF-19500/542. (See [part nomenclature](#) for all available options.)
- RoHS compliant versions available (commercial grade only).

APPLICATIONS / BENEFITS

- Low-profile metal can design.
- Military and other high-reliability applications.

MAXIMUM RATINGS @ T_A = +25°C 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}	1.67	°C/W
Total Power Dissipation	P _T	4 75	W
		@ T _A = +25 °C @ T _C = +25 °C ⁽¹⁾	
Drain-Source Voltage, dc	V _{DS}	100 200 400 500	V
		2N6756 2N6758 2N6760 2N6762	
Gate-Source Voltage, dc	V _{GS}	± 20	V
Drain Current, dc @ T _C = +25 °C ⁽²⁾	I _{D1}	14.0 9.0 5.5 4.5	A
		2N6756 2N6758 2N6760 2N6762	
Drain Current, dc @ T _C = +100 °C ⁽²⁾	I _{D2}	9.0 6.0 3.5 3.0	A
		2N6756 2N6758 2N6760 2N6762	
Off-State Current (Peak Total Value) ⁽³⁾	I _{DM}	56 36 22 18	A
		2N6756 2N6758 2N6760 2N6762	
Source Current	I _S	14.0 9.0 5.5 4.5	A
		2N6756 2N6758 2N6760 2N6762	



**TO-204AA (TO-3)
 Package**

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Notes featured on next page.

- NOTES:**
1. Derated linearly by 0.6 W/°C for $T_C > +25\text{ }^\circ\text{C}$.
 2. The following formula derives the maximum theoretical ID limit. ID is limited by package and internal wires and may be limited by pin diameter:

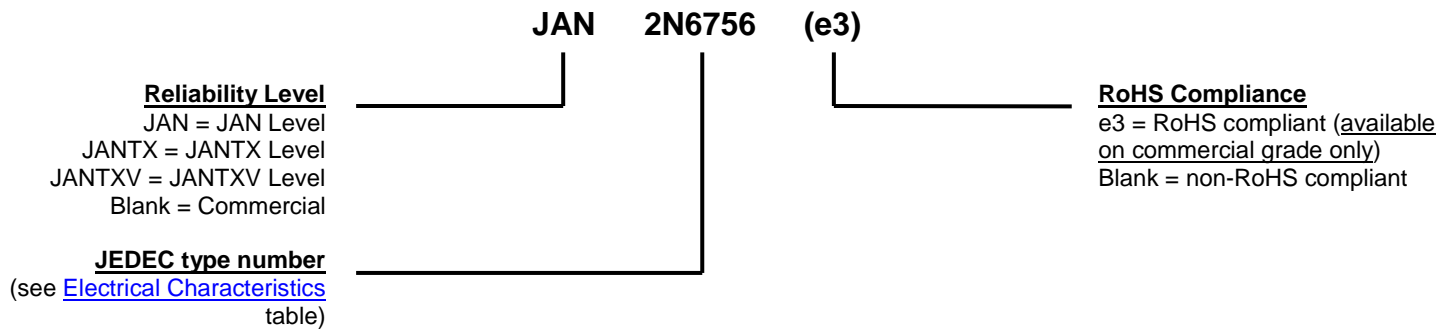
$$I_D = \sqrt{\frac{T_J(\text{max}) - T_C}{R_{\theta JC} \times R_{DS(on)} @ T_J(\text{max})}}$$

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

MECHANICAL and PACKAGING

- CASE: TO-3 metal can.
- TERMINALS: Solder dipped (Sn63/Pb37) over nickel plated alloy 52. RoHS compliant matte-tin plating is available on commercial grade only.
- MARKING: Manufacturer's ID, part number, date code.
- WEIGHT: Approximately 12.7 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_D	Drain current
I_F	Forward current
R_G	Gate drive impedance
T_C	Case Temperature
V_{DD}	Drain supply voltage
V_{DS}	Drain source voltage
V_{GS}	Gate source voltage

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

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Drain-Source Breakdown Voltage $V_{GS} = 0\text{ V}, I_D = 1.0\text{ mA}$	2N6756 2N6758 2N6760 2N6762 $V_{(BR)DSS}$	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 $V_{GS} = 0\text{ V}, V_{DS} = 80\text{ V}$ $V_{GS} = 0\text{ V}, V_{DS} = 160\text{ V}$ $V_{GS} = 0\text{ V}, V_{DS} = 320\text{ V}$ $V_{GS} = 0\text{ V}, V_{DS} = 400\text{ V}$	2N6756 2N6758 2N6760 2N6762 I_{DSS1}		25	μA
Drain Current $V_{GS} = 0\text{ V}, V_{DS} = 100\text{ V}, T_J = +125^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 200\text{ V}, T_J = +125^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 400\text{ V}, T_J = +125^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 500\text{ V}, T_J = +125^\circ\text{C}$	2N6756 2N6758 2N6760 2N6762 I_{DSS2}		1.0	mA
Drain Current $V_{GS} = 0\text{ V}, V_{DS} = 80\text{ V}, T_J = +125^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 160\text{ V}, T_J = +125^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 320\text{ V}, T_J = +125^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 400\text{ V}, T_J = +125^\circ\text{C}$	2N6756 2N6758 2N6760 2N6762 I_{DSS3}		0.25	mA
Static Drain-Source On-State Resistance $V_{GS} = 10\text{ V}, I_D = 9.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 6.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 3.5\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 3.0\text{ A pulsed}$	2N6756 2N6758 2N6760 2N6762 $r_{DS(on)1}$		0.18 0.40 1.00 1.50	Ω
Static Drain-Source On-State Resistance $V_{GS} = 10\text{ V}, I_D = 14.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 9.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 5.5\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 4.5\text{ A pulsed}$	2N6756 2N6758 2N6760 2N6762 $r_{DS(on)2}$.21 .49 1.22 1.80	Ω
Static Drain-Source On-State Resistance $T_J = +125^\circ\text{C}$ $V_{GS} = 10\text{ V}, I_D = 9.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 6.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 3.5\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 3.0\text{ A pulsed}$	2N6756 2N6758 2N6760 2N6762 $r_{DS(on)3}$		0.34 0.8 2.2 3.3	Ω
Diode Forward Voltage $V_{GS} = 0\text{ V}, I_D = 14.0\text{ A pulsed}$ $V_{GS} = 0\text{ V}, I_D = 9.0\text{ A pulsed}$ $V_{GS} = 0\text{ V}, I_D = 5.5\text{ A pulsed}$ $V_{GS} = 0\text{ V}, I_D = 4.5\text{ A pulsed}$	2N6756 2N6758 2N6760 2N6762 V_{SD}		1.8 1.6 1.5 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
Gate Charge:				
On-State Gate Charge				
$V_{GS} = 10\text{ V}, I_D = 14.0\text{ A}, V_{DS} = 80\text{ V}$ 2N6756	$Q_{g(on)}$		35	nC
$V_{GS} = 10\text{ V}, I_D = 9.0\text{ A}, V_{DS} = 160\text{ V}$ 2N6758			39	
$V_{GS} = 10\text{ V}, I_D = 5.5\text{ A}, V_{DS} = 320\text{ V}$ 2N6760			39	
$V_{GS} = 10\text{ V}, I_D = 4.5\text{ A}, V_{DS} = 400\text{ V}$ 2N6762			40	
Gate to Source Charge				
$V_{GS} = 10\text{ V}, I_D = 14.0\text{ A}, V_{DS} = 80\text{ V}$ 2N6756	Q_{gs}		10	nC
$V_{GS} = 10\text{ V}, I_D = 9.0\text{ A}, V_{DS} = 160\text{ V}$ 2N6758			5.7	
$V_{GS} = 10\text{ V}, I_D = 5.5\text{ A}, V_{DS} = 320\text{ V}$ 2N6760			6.0	
$V_{GS} = 10\text{ V}, I_D = 4.5\text{ A}, V_{DS} = 400\text{ V}$ 2N6762			6.0	
Gate to Drain Charge				
$V_{GS} = 10\text{ V}, I_D = 14.0\text{ A}, V_{DS} = 80\text{ V}$ 2N6756	Q_{gd}		15	nC
$V_{GS} = 10\text{ V}, I_D = 9.0\text{ A}, V_{DS} = 160\text{ V}$ 2N6758			20	
$V_{GS} = 10\text{ V}, I_D = 5.5\text{ A}, V_{DS} = 320\text{ V}$ 2N6760			20	
$V_{GS} = 10\text{ V}, I_D = 4.5\text{ A}, V_{DS} = 400\text{ V}$ 2N6762			20	

SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Turn-on delay time				
$I_D = 14.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 50\text{ V}$ 2N6756	$t_{d(on)}$		35	ns
$I_D = 9.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 100\text{ V}$ 2N6758			35	
$I_D = 5.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 200\text{ V}$ 2N6760			30	
$I_D = 4.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 250\text{ V}$ 2N6762			30	
Rinse time				
$I_D = 14.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 50\text{ V}$ 2N6756	t_r		80	ns
$I_D = 9.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 100\text{ V}$ 2N6758			80	
$I_D = 5.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 200\text{ V}$ 2N6760			40	
$I_D = 4.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 250\text{ V}$ 2N6762			40	
Turn-off delay time				
$I_D = 14.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 50\text{ V}$ 2N6756	$t_{d(off)}$		60	ns
$I_D = 9.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 100\text{ V}$ 2N6758			60	
$I_D = 5.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 200\text{ V}$ 2N6760			80	
$I_D = 4.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 250\text{ V}$ 2N6762			80	
Fall time				
$I_D = 14.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 50\text{ V}$ 2N6756	t_f		45	ns
$I_D = 9.0\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 100\text{ V}$ 2N6758			40	
$I_D = 5.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 200\text{ V}$ 2N6760			35	
$I_D = 4.5\text{ A}, V_{GS} = +10\text{ V}, R_G = 7.5\text{ }\Omega, V_{DD} = 250\text{ V}$ 2N6762			30	
Diode Reverse Recovery Time				
$di/dt = 100\text{ A}/\mu\text{s}, V_{DD} \leq 30\text{ V}, I_D = 14.0\text{ A}$ 2N6756	t_{rr}		300	ns
$di/dt = 100\text{ A}/\mu\text{s}, V_{DD} \leq 30\text{ V}, I_D = 9.0\text{ A}$ 2N6758			500	
$di/dt = 100\text{ A}/\mu\text{s}, V_{DD} \leq 30\text{ V}, I_D = 5.5\text{ A}$ 2N6760			700	
$di/dt = 100\text{ A}/\mu\text{s}, V_{DD} \leq 30\text{ V}, I_D = 4.5\text{ A}$ 2N6762			900	

GRAPHS

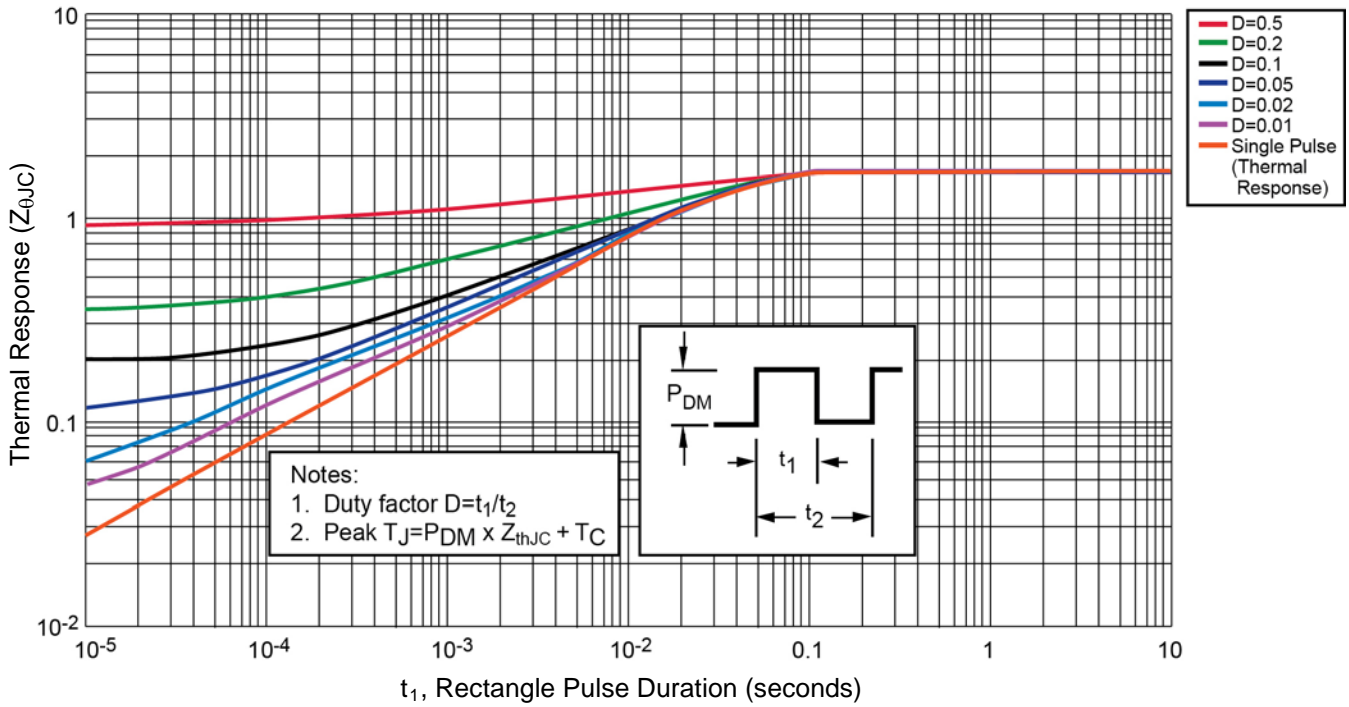
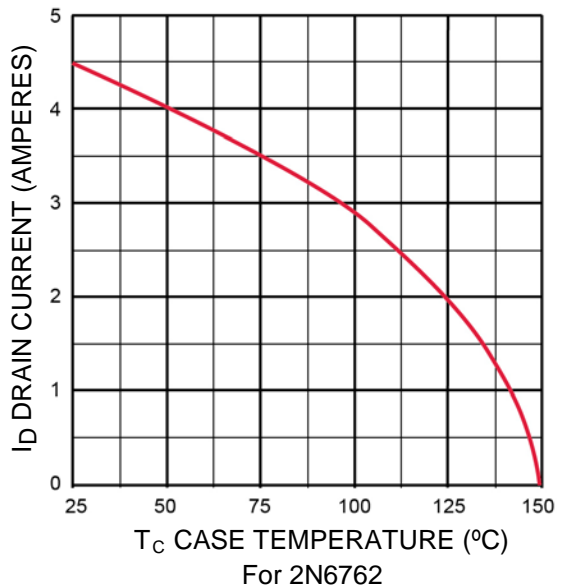
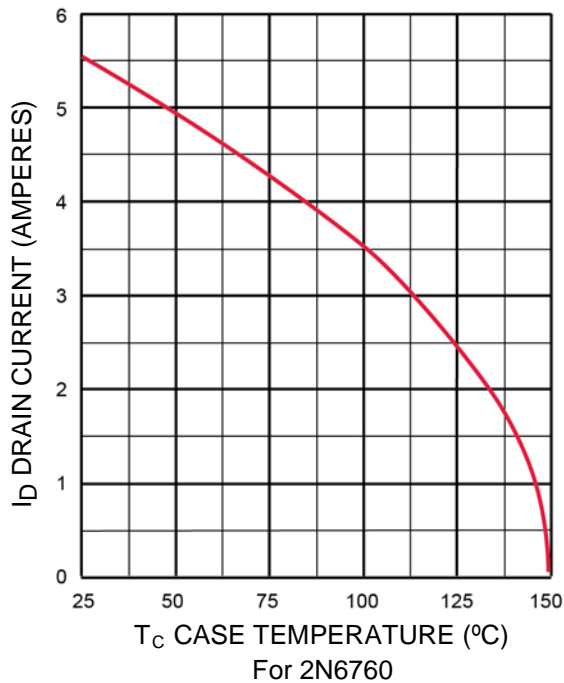
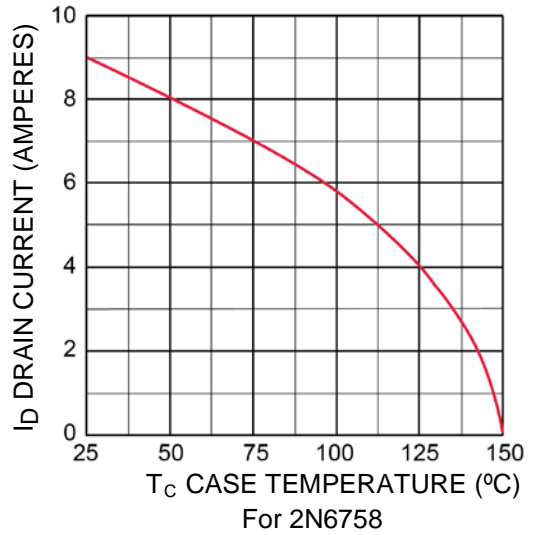
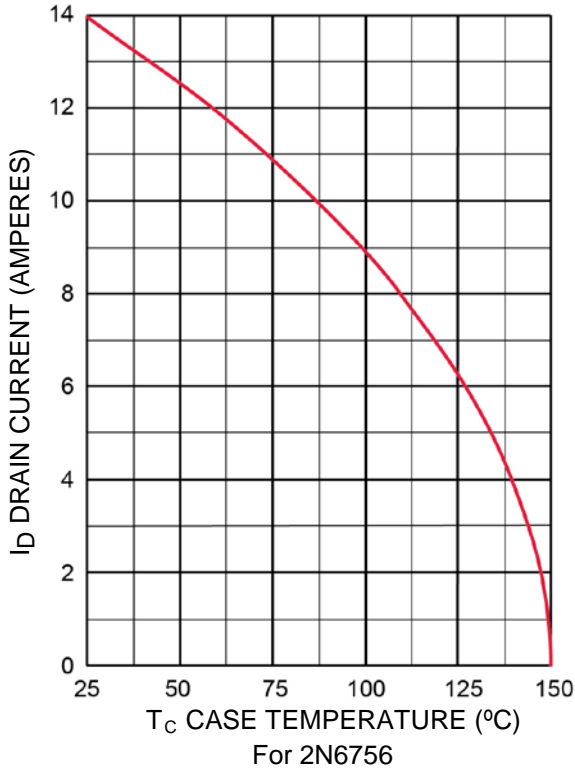


FIGURE 1
Thermal Response Curves

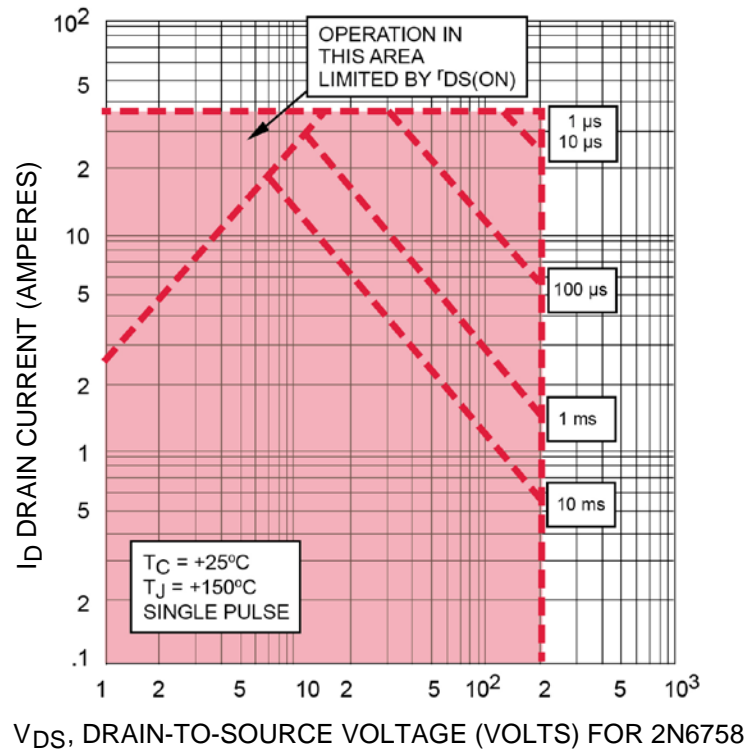
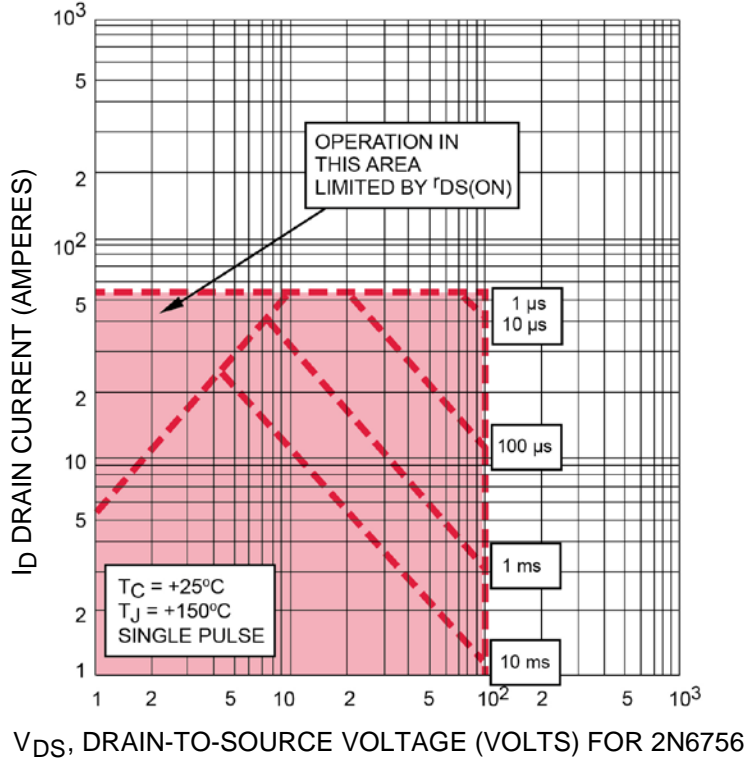
GRAPHS (continued)

FIGURE 2
Maximum Drain Current vs Case Temperature



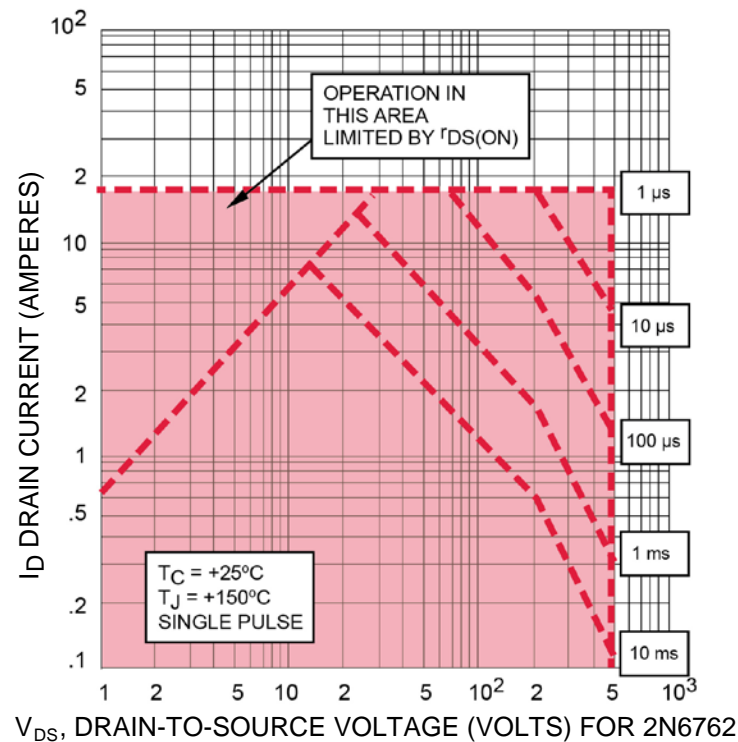
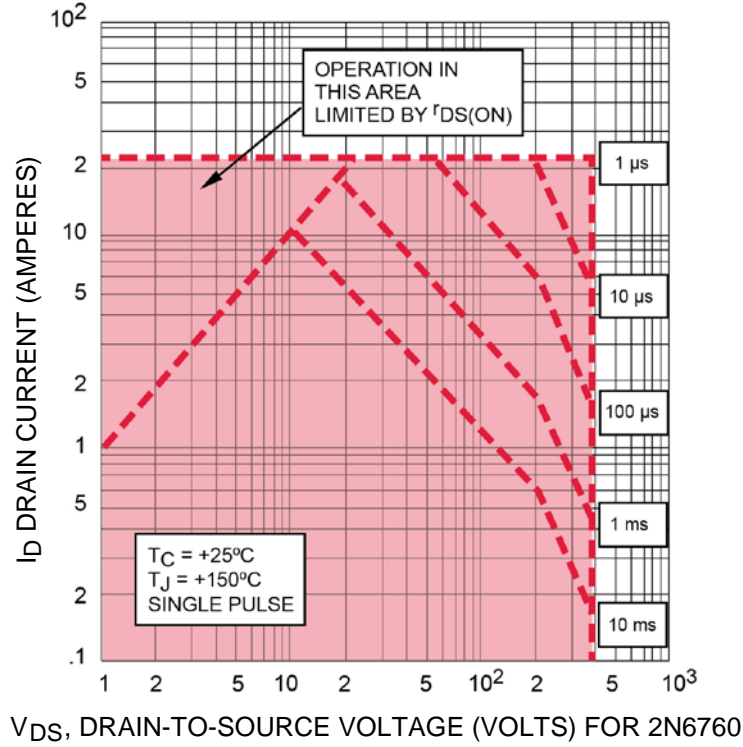
GRAPHS (continued)

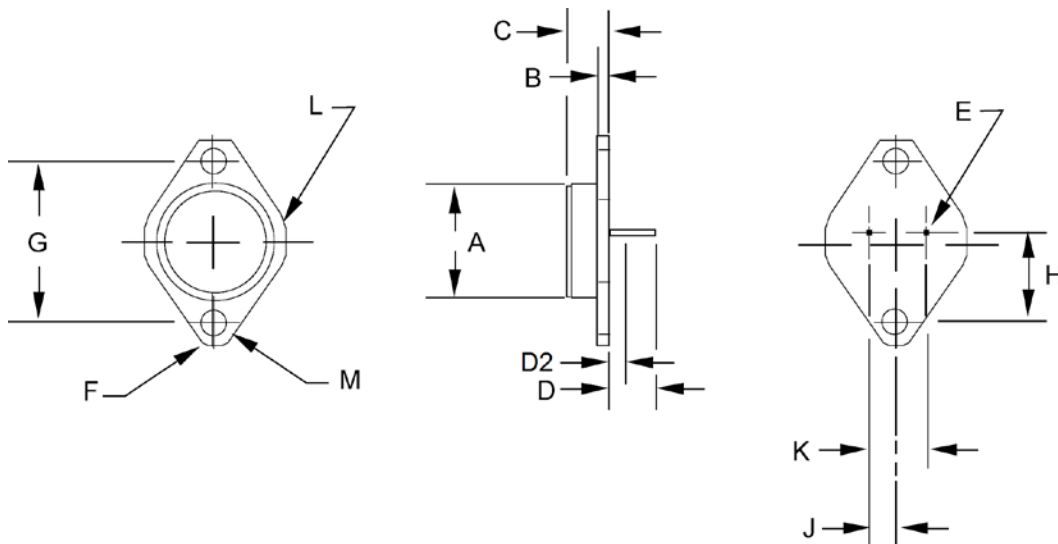
FIGURE 3
Safe Operating Area



GRAPHS (continued)

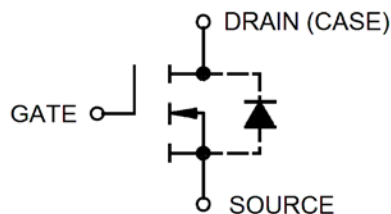
FIGURE 3
Safe Operating Area



PACKAGE DIMENSIONS

NOTE:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. These dimensions should be measured at points .050 inch (1.27 mm) and .055 inch (1.40 mm) below seating plane. When gauge is not used measurement will be made at the seating plane.
4. The seating plane of the header shall be flat within .001 inch (0.03 mm) concave to .004 inch (0.10 mm) convex inside a .930 inch (23.62 mm) diameter circle on the center of the header and flat within .001 inch (0.03 mm) concave to .006 inch (0.15 mm) convex overall.
5. Mounting holes shall be deburred on the seating plane side.
6. Drain is electrically connected to the case.
7. In accordance with ASME Y14.5M, diameters are equivalent to Φ x symbology.

DIM	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	-	.875	-	22.23	
B	.060	.135	1.52	3.43	
C	.250	.360	6.35	9.14	
D	.312	.500	7.92	12.70	
D2	-	.050	-	1.27	
E	.038	.043	0.97	1.09	DIA.
F	.131	.188	3.33	4.78	Radius
G	1.177	1.197	29.90	30.40	
H	.655	.675	16.64	17.15	
J	.205	.225	5.21	5.72	3, 5
K	.420	.440	10.67	11.18	3, 5
L	.495	.525	12.57	13.34	Radius
M	.151	.161	3.84	4.09	DIA.

SCHEMATIC


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