RoHS

Available on commercial versions

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.

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

TO-204AA (TO-3) Package

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 = +25ºC 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		$R_{\Theta JC}$	1.67	°C/W
Total Power Dissipation	@ T_A = +25 °C @ T_C = +25 °C (1)	P_T	4 75	W
Drain-Source Voltage, dc	2N6756 2N6758 2N6760 2N6762	V_{DS}	100 200 400 500	V
Gate-Source Voltage, dc		V_{GS}	± 20	V
Drain Current, dc @ T_C = +25 ºC (2)	2N6756 2N6758 2N6760 2N6762	I_{D1}	14.0 9.0 5.5 4.5	A
Drain Current, dc @ T_C = +100 ºC (2)	2N6756 2N6758 2N6760 2N6762	I_{D2}	9.0 6.0 3.5 3.0	A
Off-State Current (Peak Total Value) (3)	2N6756 2N6758 2N6760 2N6762	I_{DM}	56 36 22 18	A
Source Current	2N6756 2N6758 2N6760 2N6762	I_S	14.0 9.0 5.5 4.5	A

Notes featured on next page.

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NOTES:
1. Derated linearly by 0.6 W/ºC for T_C > +25 ºC.
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:

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

3. I_{DM} = 4 x 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

JAN 2N6756 (e3)

Reliability Level
JAN = JAN Level
JANTX = JANTX Level
JANTXV = JANTXV Level
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_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

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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	2N6756	$V_{(BR)DSS}$	100		V
	2N6758		200		
	2N6760		400		
	2N6762		500		
Gate-Source Voltage (Threshold)					
$V_{DS} \geq V_{GS}$, I_D = 0.25 mA		$V_{GS(th)1}$	2.0	4.0	V
$V_{DS} \geq V_{GS}$, I_D = 0.25 mA, T_J = +125°C		$V_{GS(th)2}$	1.0		
$V_{DS} \geq V_{GS}$, I_D = 0.25 mA, T_J = -55°C		$V_{GS(th)3}$		5.0	
Gate Current					
V_{GS} = ± 20 V, V_{DS} = 0 V		I_{GSS1}		±100	nA
V_{GS} = ± 20 V, V_{DS} = 0 V, T_J = +125°C		I_{GSS2}		±200	
Drain Current					
V_{GS} = 0 V, V_{DS} = 80 V	2N6756	I_{DSS1}		25	µA
V_{GS} = 0 V, V_{DS} = 160 V	2N6758				
V_{GS} = 0 V, V_{DS} = 320 V	2N6760				
V_{GS} = 0 V, V_{DS} = 400 V	2N6762				
Drain Current					
V_{GS} = 0 V, V_{DS} = 100 V, T_J = +125 °C	2N6756	I_{DSS2}		1.0	mA
V_{GS} = 0 V, V_{DS} = 200 V, T_J = +125 °C	2N6758				
V_{GS} = 0 V, V_{DS} = 400 V, T_J = +125 °C	2N6760				
V_{GS} = 0 V, V_{DS} = 500 V, T_J = +125 °C	2N6762				
Drain Current					
V_{GS} = 0 V, V_{DS} = 80 V, T_J = +125 °C	2N6756	I_{DSS3}		0.25	mA
V_{GS} = 0 V, V_{DS} = 160 V, T_J = +125 °C	2N6758				
V_{GS} = 0 V, V_{DS} = 320 V, T_J = +125 °C	2N6760				
V_{GS} = 0 V, V_{DS} = 400 V, T_J = +125 °C	2N6762				
Static Drain-Source On-State Resistance					
V_{GS} = 10 V, I_D = 9.0 A pulsed	2N6756	$r_{DS(on)1}$		0.18	Ω
V_{GS} = 10 V, I_D = 6.0 A pulsed	2N6758			0.40	
V_{GS} = 10 V, I_D = 3.5 A pulsed	2N6760			1.00	
V_{GS} = 10 V, I_D = 3.0 A pulsed	2N6762			1.50	
Static Drain-Source On-State Resistance					
V_{GS} = 10 V, I_D = 14.0 A pulsed	2N6756	$r_{DS(on)2}$		.21	Ω
V_{GS} = 10 V, I_D = 9.0 A pulsed	2N6758			.49	
V_{GS} = 10 V, I_D = 5.5 A pulsed	2N6760			1.22	
V_{GS} = 10 V, I_D = 4.5 A pulsed	2N6762			1.80	
Static Drain-Source On-State Resistance					
T_J = +125°C					
V_{GS} = 10 V, I_D = 9.0 A pulsed	2N6756	$r_{DS(on)3}$		0.34	Ω
V_{GS} = 10 V, I_D = 6.0 A pulsed	2N6758			0.8	
V_{GS} = 10 V, I_D = 3.5 A pulsed	2N6760			2.2	
V_{GS} = 10 V, I_D = 3.0 A pulsed	2N6762			3.3	
Diode Forward Voltage					
V_{GS} = 0 V, I_D = 14.0 A pulsed	2N6756	V_{SD}		1.8	V
V_{GS} = 0 V, I_D = 9.0 A pulsed	2N6758			1.6	
V_{GS} = 0 V, I_D = 5.5 A pulsed	2N6760			1.5	
V_{GS} = 0 V, I_D = 4.5 A pulsed	2N6762			1.4	

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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 = 14.0 A, V_{DS} = 80 V	2N6756	$Q_{g(on)}$		35	nC
V_{GS} = 10 V, I_D = 9.0 A, V_{DS} = 160 V	2N6758			39	
V_{GS} = 10 V, I_D = 5.5 A, V_{DS} = 320 V	2N6760			39	
V_{GS} = 10 V, I_D = 4.5 A, V_{DS} = 400 V	2N6762			40	
Gate to Source Charge					
V_{GS} = 10 V, I_D = 14.0 A, V_{DS} = 80 V	2N6756	Q_{gs}		10	nC
V_{GS} = 10 V, I_D = 9.0 A, V_{DS} = 160 V	2N6758			5.7	
V_{GS} = 10 V, I_D = 5.5 A, V_{DS} = 320 V	2N6760			6.0	
V_{GS} = 10 V, I_D = 4.5 A, V_{DS} = 400 V	2N6762			6.0	
Gate to Drain Charge					
V_{GS} = 10 V, I_D = 14.0 A, V_{DS} = 80 V	2N6756	Q_{gd}		15	nC
V_{GS} = 10 V, I_D = 9.0 A, V_{DS} = 160 V	2N6758			20	
V_{GS} = 10 V, I_D = 5.5 A, V_{DS} = 320 V	2N6760			20	
V_{GS} = 10 V, I_D = 4.5 A, V_{DS} = 400 V	2N6762			20	

SWITCHING CHARACTERISTICS

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

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GRAPHS

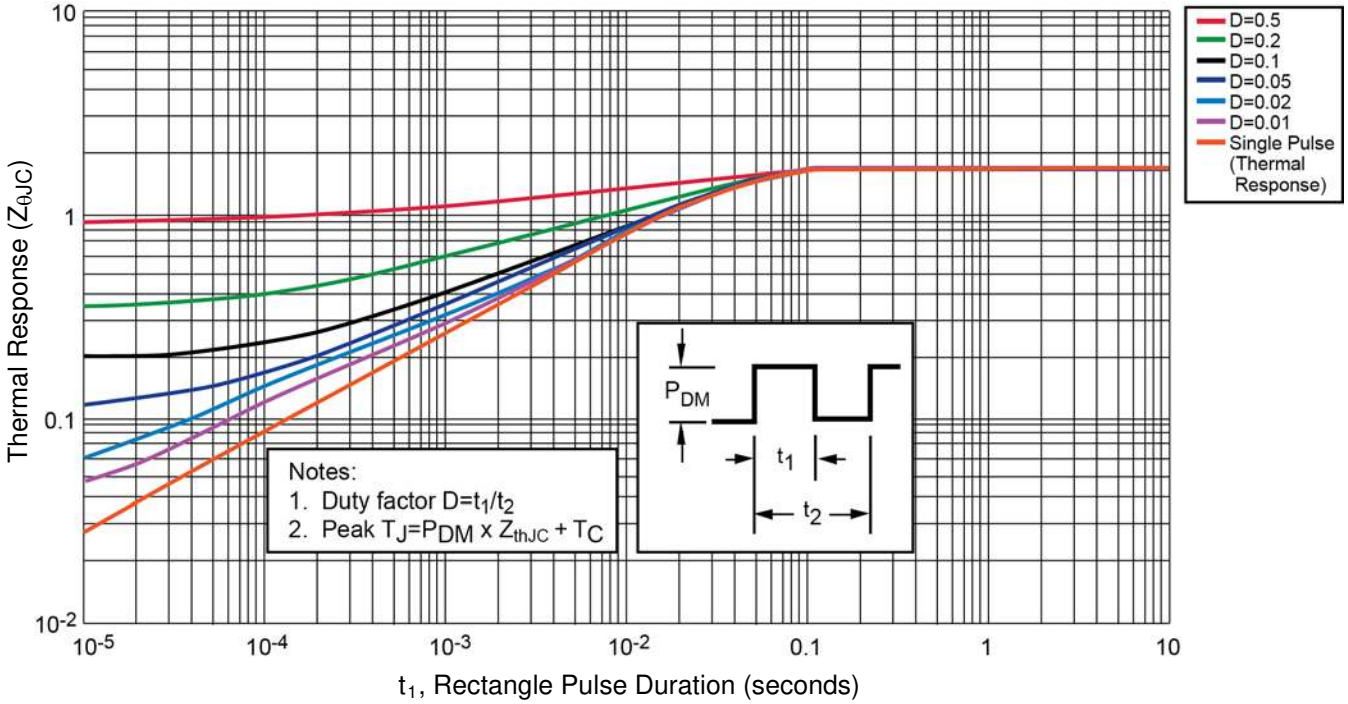

FIGURE 1
Thermal Response Curves

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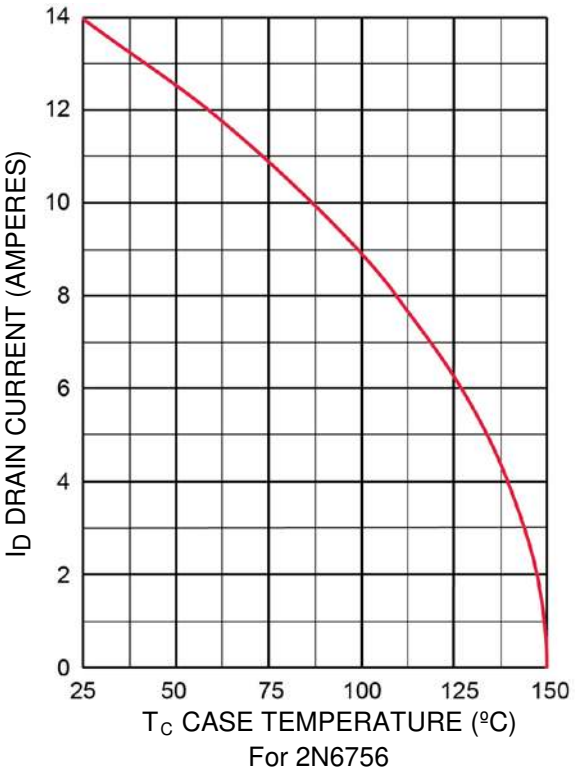
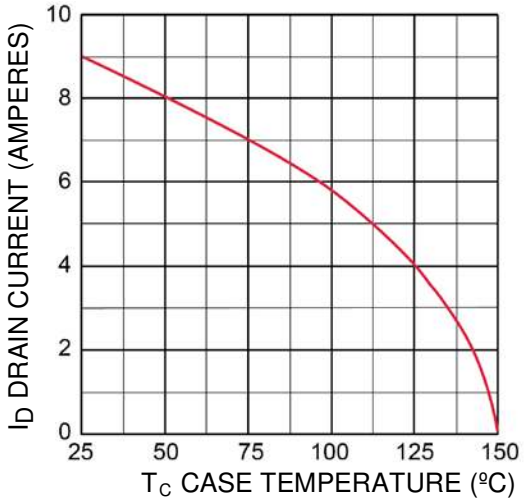
GRAPHS (continued)

FIGURE 2
Maximum Drain Current vs Case Temperature



For 2N6756



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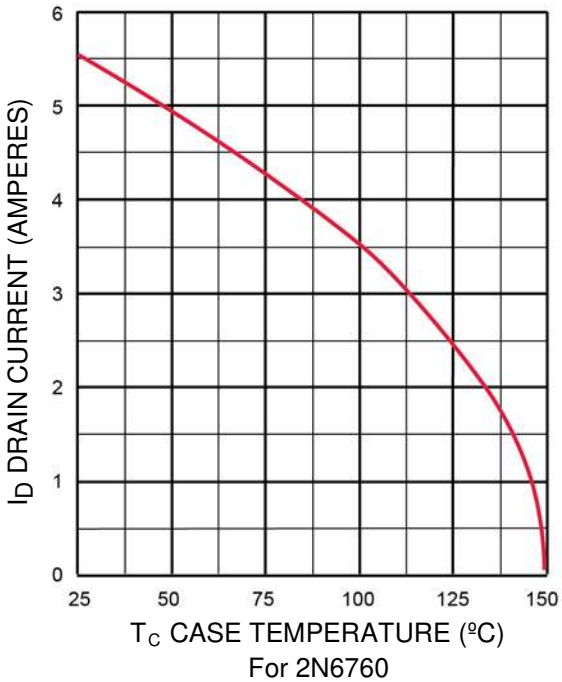
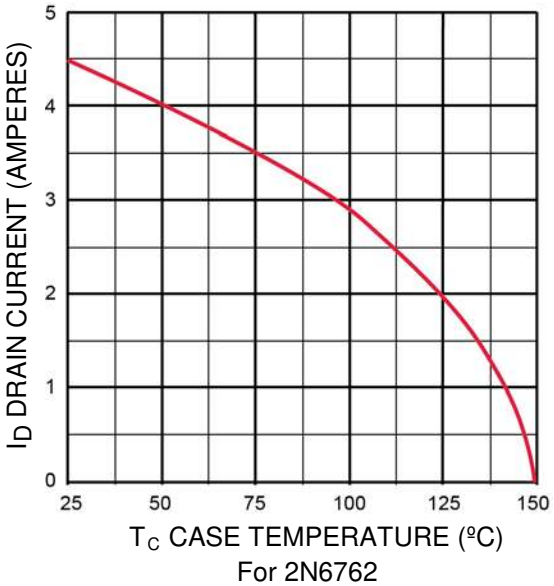


For 2N6760



For 2N6762

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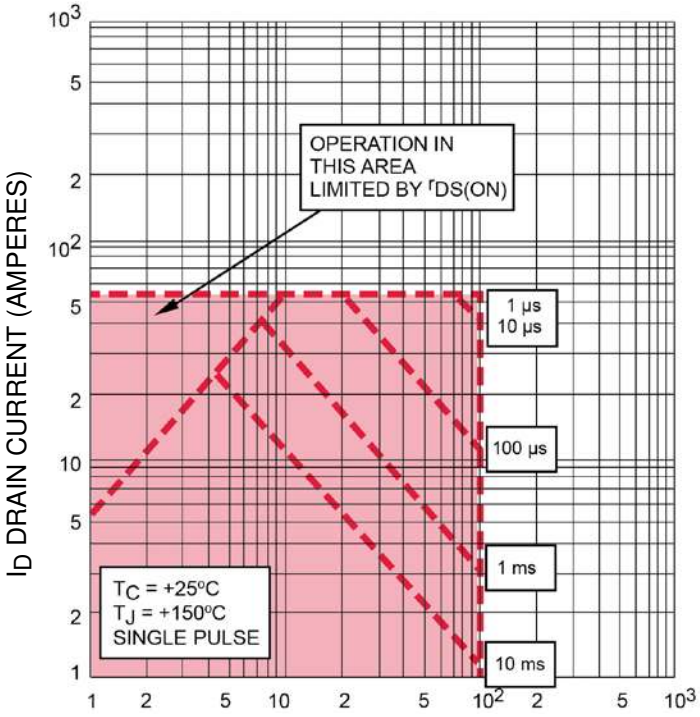
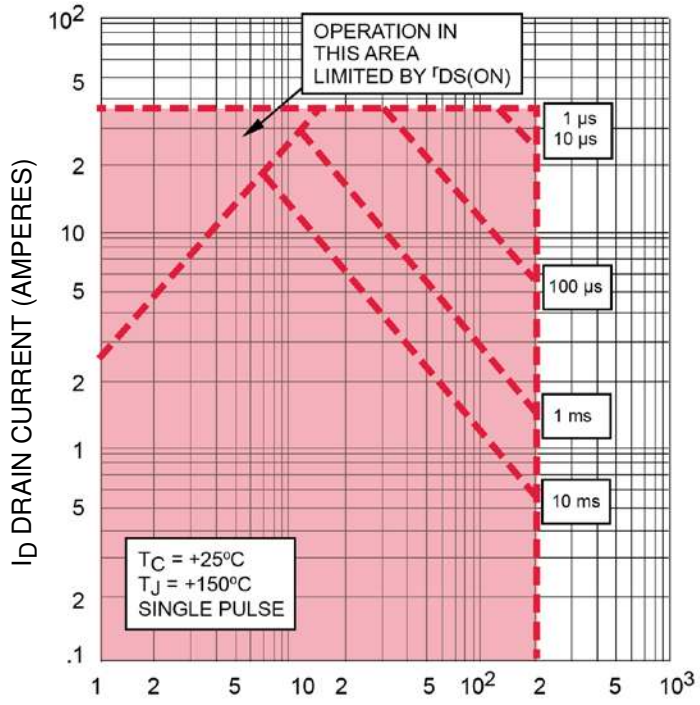
GRAPHS (continued)

FIGURE 3

Safe Operating Area





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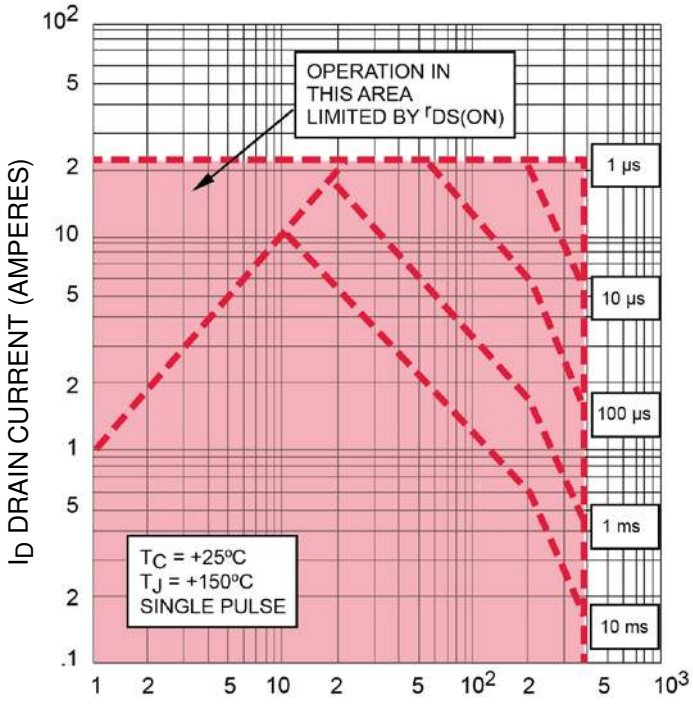
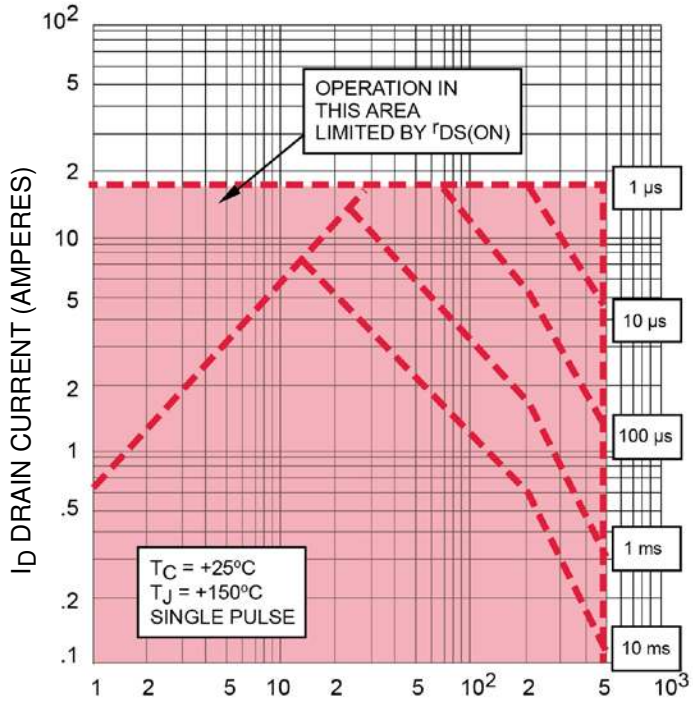
GRAPHS (continued)

FIGURE 3

Safe Operating Area





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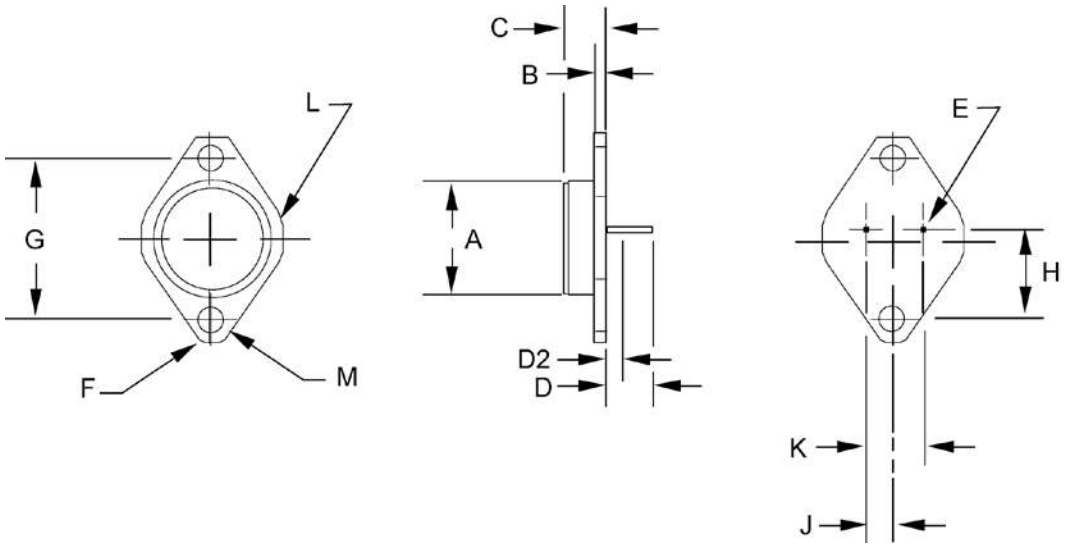
PACKAGE DIMENSIONS

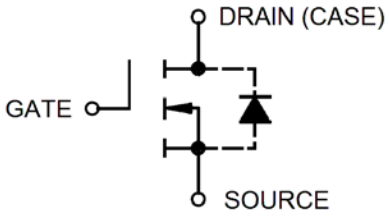


NOTE:

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 Φx 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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