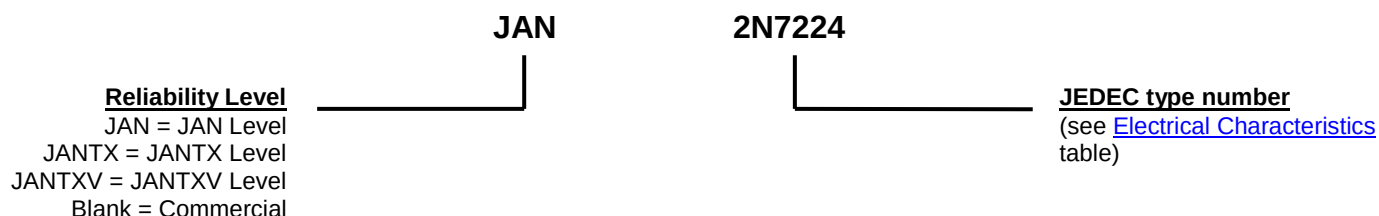


MECHANICAL and PACKAGING

- CASE: Ceramic and gold over nickel plated steel.
- TERMINALS: Gold over nickel plated tungsten/copper.
- MARKING: Part number, date code, and polarity symbol.
- WEIGHT: 6.5 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 @ $T_A = +25^\circ\text{C}$, unless otherwise noted

Parameters / Test Conditions		Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS					
Drain-Source Breakdown Voltage $V_{GS} = 0\text{ V}, I_D = 1.0\text{ mA}$	2N7224 2N7225 2N7227 2N7228	$V_{(BR)DSS}$	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 $V_{GS} = 0\text{ V}, V_{DS} = 80\text{ V}$ $V_{GS} = 0\text{ V}, V_{DS} = 160\text{ V}$ $V_{GS} = 0\text{ V}, V_{DS} = 320\text{ V}$ $V_{GS} = 0\text{ V}, V_{DS} = 400\text{ V}$	2N7224 2N7225 2N7227 2N7228	I_{DSS1}		25	μA
Drain Current $V_{GS} = 0\text{ V}, V_{DS} = 80\text{ V}, T_J = +125^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 160\text{ V}, T_J = +125^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 320\text{ V}, T_J = +125^\circ\text{C}$ $V_{GS} = 0\text{ V}, V_{DS} = 400\text{ V}, T_J = +125^\circ\text{C}$	2N7224 2N7225 2N7227 2N7228	I_{DSS2}		0.25	mA
Static Drain-Source On-State Resistance $V_{GS} = 10\text{ V}, I_D = 21.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 17.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 9.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 8.0\text{ A pulsed}$	2N7224 2N7225 2N7227 2N7228	$r_{DS(on)1}$		0.070 0.100 0.315 0.415	Ω
Static Drain-Source On-State Resistance $V_{GS} = 10\text{ V}, I_D = 34.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 27.4\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 14.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 12.0\text{ A pulsed}$	2N7224 2N7225 2N7227 2N7228	$r_{DS(on)2}$		0.081 0.105 0.415 0.515	Ω
Static Drain-Source On-State Resistance $T_J = +125^\circ\text{C}$ $V_{GS} = 10\text{ V}, I_D = 21.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 17.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 9.0\text{ A pulsed}$ $V_{GS} = 10\text{ V}, I_D = 8.0\text{ A pulsed}$	2N7224 2N7225 2N7227 2N7228	$r_{DS(on)3}$		0.11 0.17 0.68 0.90	Ω
Diode Forward Voltage $V_{GS} = 0\text{ V}, I_D = 34.0\text{ A pulsed}$ $V_{GS} = 0\text{ V}, I_D = 27.4\text{ A pulsed}$ $V_{GS} = 0\text{ V}, I_D = 14.0\text{ A pulsed}$ $V_{GS} = 0\text{ V}, I_D = 12.0\text{ A pulsed}$	2N7224 2N7225 2N7227 2N7228	V_{SD}		1.8 1.9 1.7 1.7	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	$Q_{g(on)}$			nC
$V_{GS} = 10\text{ V}$, $I_D = 34.0\text{ A}$, $V_{DS} = 50\text{ V}$ 2N7224			125	
$V_{GS} = 10\text{ V}$, $I_D = 27.4\text{ A}$, $V_{DS} = 50\text{ V}$ 2N7225			115	
$V_{GS} = 10\text{ V}$, $I_D = 14.0\text{ A}$, $V_{DS} = 50\text{ V}$ 2N7227			110	
$V_{GS} = 10\text{ V}$, $I_D = 12.0\text{ A}$, $V_{DS} = 50\text{ V}$ 2N7228			120	
Gate to Source Charge	Q_{gs}			nC
$V_{GS} = 10\text{ V}$, $I_D = 34.0\text{ A}$, $V_{DS} = 50\text{ V}$ 2N7224			22	
$V_{GS} = 10\text{ V}$, $I_D = 27.4\text{ A}$, $V_{DS} = 50\text{ V}$ 2N7225			22	
$V_{GS} = 10\text{ V}$, $I_D = 14.0\text{ A}$, $V_{DS} = 50\text{ V}$ 2N7227			18	
$V_{GS} = 10\text{ V}$, $I_D = 12.0\text{ A}$, $V_{DS} = 50\text{ V}$ 2N7228			19	
Gate to Drain Charge	Q_{gd}			nC
$V_{GS} = 10\text{ V}$, $I_D = 34.0\text{ A}$, $V_{DS} = 50\text{ V}$ 2N7224			65	
$V_{GS} = 10\text{ V}$, $I_D = 27.4\text{ A}$, $V_{DS} = 50\text{ V}$ 2N7225			60	
$V_{GS} = 10\text{ V}$, $I_D = 14.0\text{ A}$, $V_{DS} = 50\text{ V}$ 2N7227			65	
$V_{GS} = 10\text{ V}$, $I_D = 12.0\text{ A}$, $V_{DS} = 50\text{ V}$ 2N7228			70	

SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Turn-on delay time	$t_{d(on)}$			ns
$I_D = 34.0\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 50\text{ V}$ 2N7224				
$I_D = 27.4\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 100\text{ V}$ 2N7225			35	
$I_D = 14.0\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 200\text{ V}$ 2N7227				
$I_D = 12.0\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 250\text{ V}$ 2N7228				
Rinse time	t_r			ns
$I_D = 34.0\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 50\text{ V}$ 2N7224				
$I_D = 27.4\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 100\text{ V}$ 2N7225			190	
$I_D = 14.0\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 200\text{ V}$ 2N7227				
$I_D = 12.0\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 250\text{ V}$ 2N7228				
Turn-off delay time	$t_{d(off)}$			ns
$I_D = 34.0\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 50\text{ V}$ 2N7224				
$I_D = 27.4\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 100\text{ V}$ 2N7225			170	
$I_D = 14.0\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 200\text{ V}$ 2N7227				
$I_D = 12.0\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 250\text{ V}$ 2N7228				
Fall time	t_f			ns
$I_D = 34.0\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 50\text{ V}$ 2N7224				
$I_D = 27.4\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 100\text{ V}$ 2N7225			130	
$I_D = 14.0\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 200\text{ V}$ 2N7227				
$I_D = 12.0\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 2.35\text{ }\Omega$, $V_{DD} = 250\text{ V}$ 2N7228				
Diode Reverse Recovery Time	t_{rr}			ns
$di/dt \leq 100\text{ A}/\mu\text{s}$, $V_{DD} \leq 30\text{ V}$, $I_F = 34.0\text{ A}$ 2N7224			500	
$di/dt \leq 100\text{ A}/\mu\text{s}$, $V_{DD} \leq 30\text{ V}$, $I_F = 27.4\text{ A}$ 2N7225			950	
$di/dt \leq 100\text{ A}/\mu\text{s}$, $V_{DD} \leq 30\text{ V}$, $I_F = 14.0\text{ A}$ 2N7227			1200	
$di/dt \leq 100\text{ A}/\mu\text{s}$, $V_{DD} \leq 30\text{ V}$, $I_F = 12.0\text{ A}$ 2N7228			1600	

GRAPHS

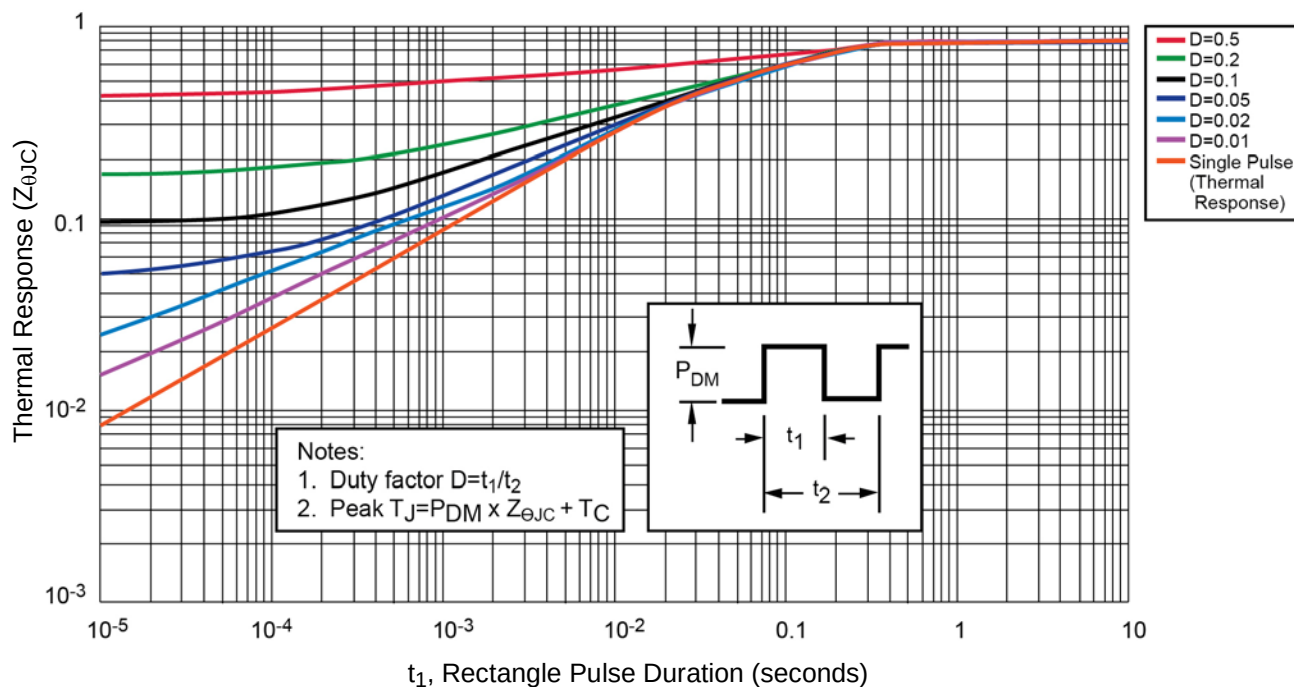
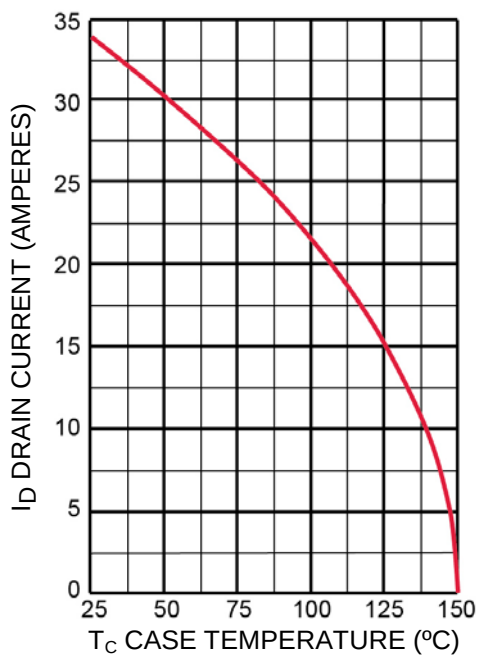
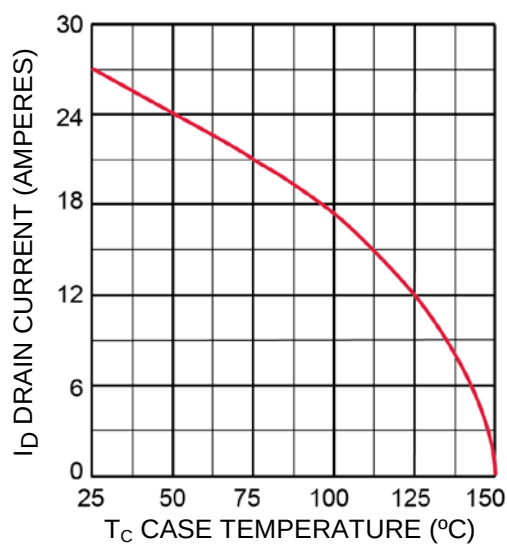


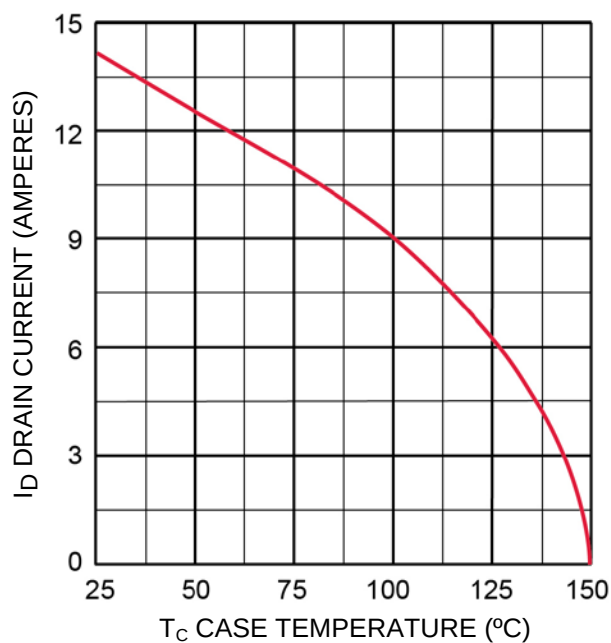
FIGURE 1
Thermal Impedance Curves

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


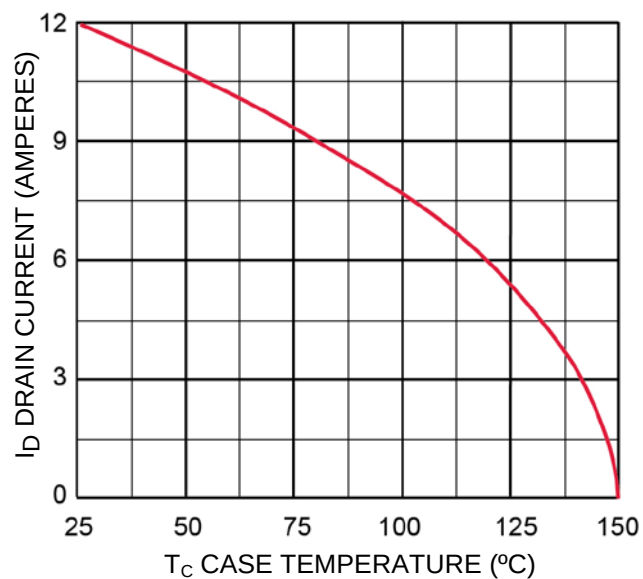
For 2N7224



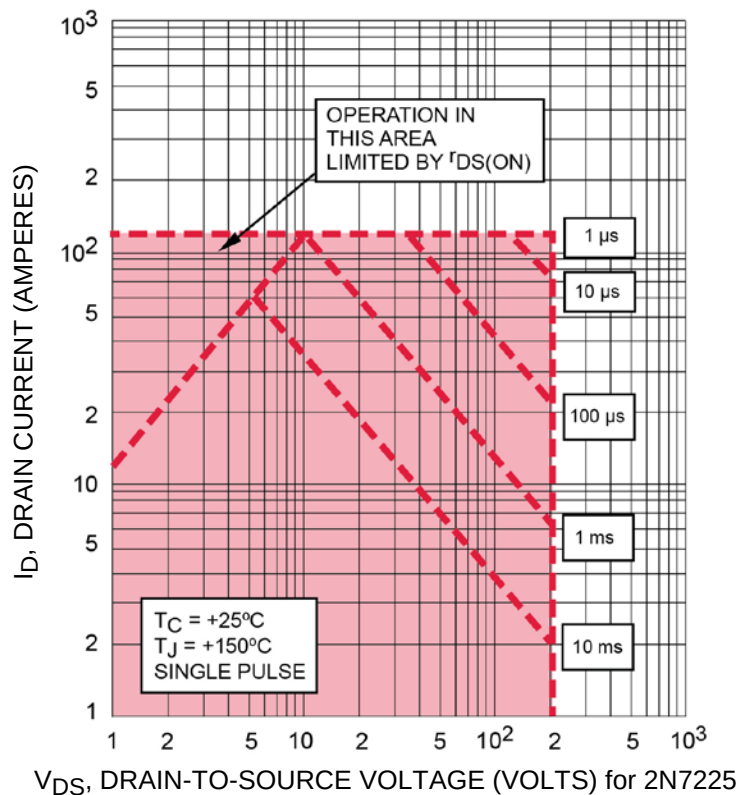
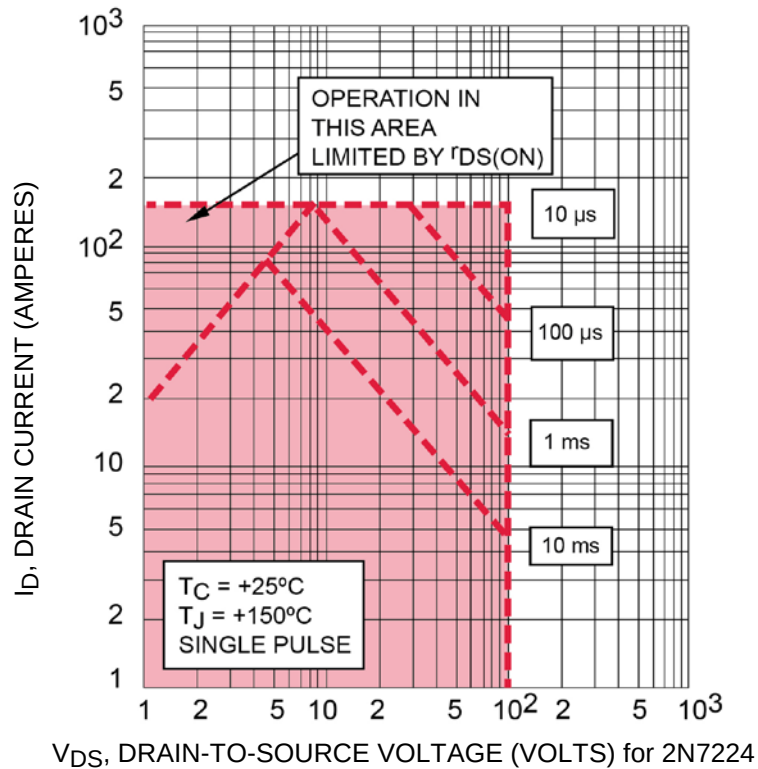
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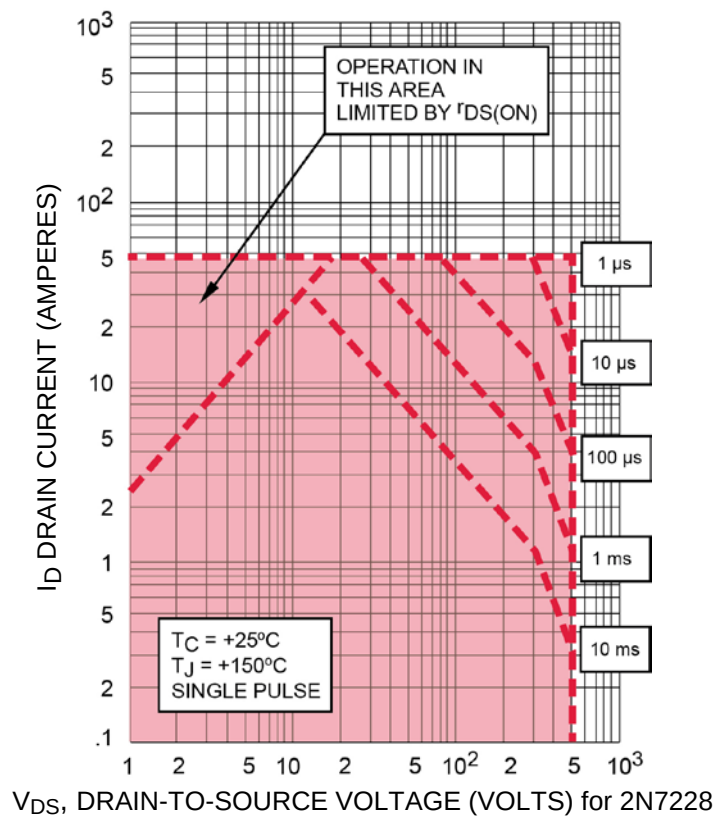
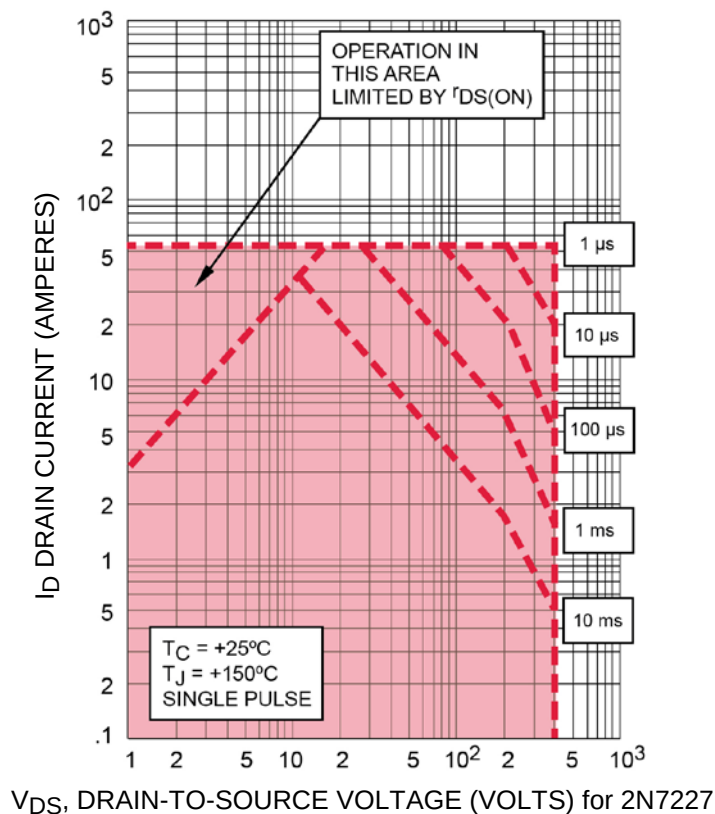


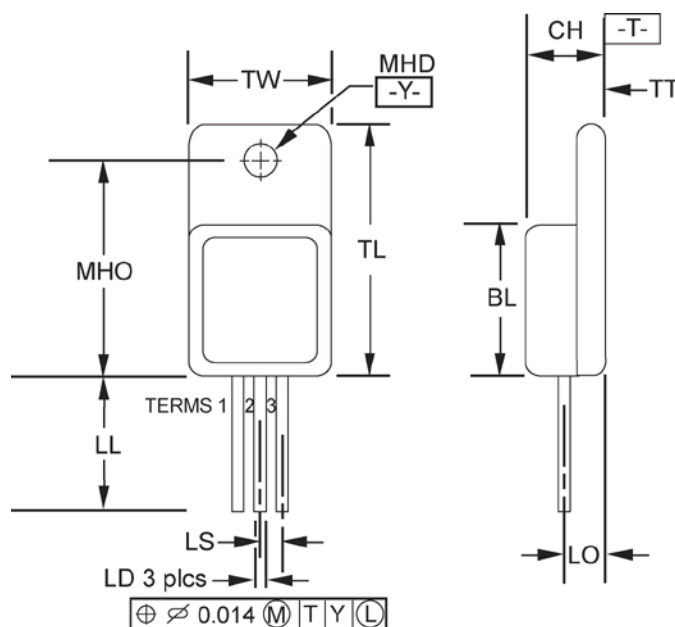
For 2N7227



For 2N7228

GRAPHS (continued)
FIGURE 3 – Maximum Safe Operating Area


GRAPHS (continued)


PACKAGE DIMENSIONS

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Glass meniscus included in dimension D and E.
4. All terminals are isolated from case.
5. In accordance with ASME Y14.5M, diameters are equivalent to Φ x symbology.

Ltr	Dimensions				Notes
	Inch		Millimeters		
	Min	Max	Min	Max	
BL	.535	.545	13.59	13.84	
CH	.249	.260	6.32	6.60	
LD	.035	.045	0.89	1.14	
LL	.510	.570	12.95	14.48	
LO	.150 BSC		3.81 BSC		
LS	.150 BSC		3.81 BSC		
MHD	.139	.149	3.53	3.78	
MHO	.665	.685	16.89	17.40	
TL	.790	.800	20.07	20.32	3, 4
TT	.040	.050	1.02	1.27	
TW	.535	.545	13.59	13.84	3, 4
Term 1	Drain				
Term 2	Source				
Term 3	Gate				