



**XYD068N70**

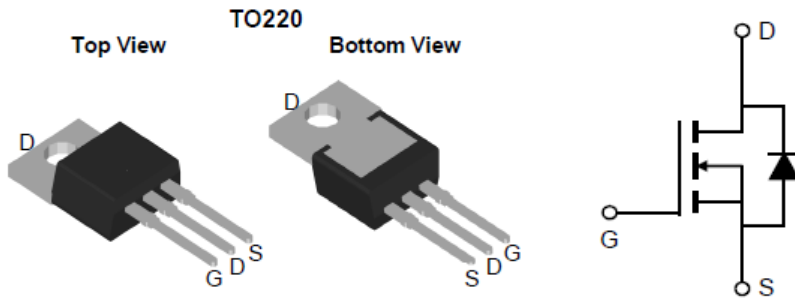
**70V N-channel Shielding Gate MOSFET**

**Features**

- N-channel, normal level
- Excellent Gate charge  $\times R_{DS(on)}$  (FOM)
- Very low on-resistance  $R_{DS(on)}$

**This chip is used for:**

- Industrial power supplies
- Boost converters
- Rectifier
- Telecom
- Industrial power supplies



Symbol	Parameter	Value	Units
V <sub>DS</sub>	Drain-Source Voltage	70	V
I <sub>D</sub>	Drain Current - Continuous (TC= 25°C)	110	A
	Drain Current - Continuous (TC= 100°C)	78	A
I <sub>DM</sub>	Drain Current - Pulsed (Note 1)	305	A
V <sub>GS</sub>	Gate-Source Voltage	± 20	V
E <sub>AS</sub>	Single Pulsed Avalanche Energy (Note 2)	160	mJ
P <sub>D</sub>	Power Dissipation (TC = 25°C)	93	W
T <sub>j</sub> , T <sub>stg</sub>	Operating and Storage Temperature Range	-55 to +175	°C

\* Drain current limited by maximum junction temperature

**Thermal Characteristics**

Symbol	Parameter	Value	Units
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case	1.33	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

## Electrical Characteristics TC = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	70			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 68\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
$I_{GSSF}$	Gate Leakage Current, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$			100	nA
$I_{GSSR}$	Gate Leakage Current, Reverse	$V_{GS} = -12\text{ V}, V_{DS} = 0\text{ V}$			-100	nA
<b>On Characteristics</b>						
$V_{GS(TH)}$	Gate Threshold voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	2	3	4	V
$R_{DS(on)}$	Drain-Source on-state resistance	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$		6.0	7.0	m $\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 5\text{ V}, I_D = 30\text{ A}$ (Note 3)		-		S
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input capacitance	$V_{DS}=30\text{V}, V_{GS}=0\text{V},$ $F=1.0\text{Mhz}$		1466		pF
$C_{oss}$	Output capacitance			770		pF
$C_{rss}$	Reverse transfer capacitance			55		pF
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn On Delay Time	$V_{DD}=15\text{V}, I_D=3\text{A},$ $V_{GS}=10\text{V}, R_G=60\Omega$ (Note 3, 4)		8.4		ns
$t_r$	Rising Time			9.0		ns
$t_{d(off)}$	Turn Off Delay Time			23.6		ns
$t_f$	Fall Time			18.0		ns
$Q_g$	Total Gate Charge	$V_{DD}=48\text{V}, I_D=12\text{A},$ $V_{GS}=10\text{V}$ (Note 3, 4)		28		nC
$Q_{gs}$	Gate-Source Charge			5.2		nC
$Q_{gd}$	Gate-Drain Charge			6.0		nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain-Source Diode Forward Current				110	A
$I_{SM}$	Maximum Pulsed Drain-Source Diode Forward Current				305	A
$V_{SD}$	Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 1\text{ A}$			1.2	V

**Notes:**

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2.  $L = 0.5\text{ mH}, I_{AS} = 30\text{ A}, V_{DD} = 15\text{ V}, R_G = 25\ \Omega,$  Starting  $T_j = 25^\circ\text{C}$
3.  $I_{SD} \leq 40\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, V_{DD} \leq BV_{DSS},$  Starting  $T_j = 25^\circ\text{C}$
4. Pulse Test : Pulse width  $\leq 300\ \mu\text{s},$  Duty cycle  $\leq 2\%$
5. Essentially independent of operating temperature

# Typical Electronic and Thermal Characteristics

Table 7 Reverse diode characteristics

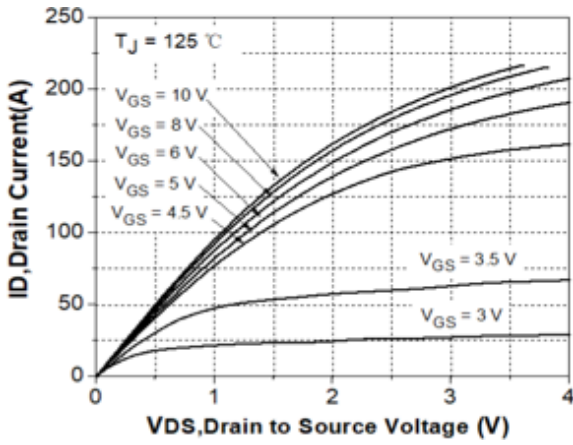


Figure 1. On-Region Characteristics

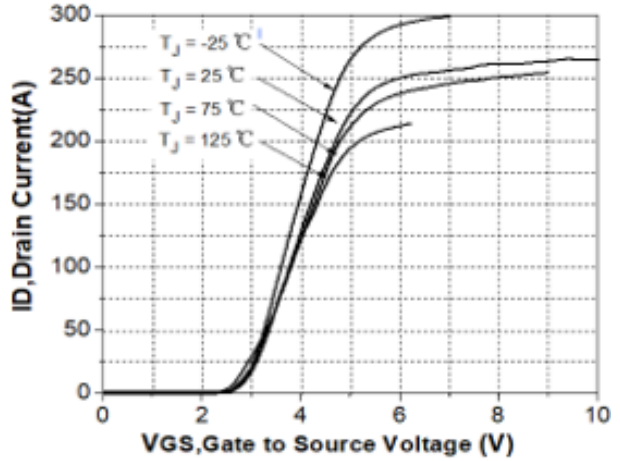


Figure 2. Transfer Characteristics

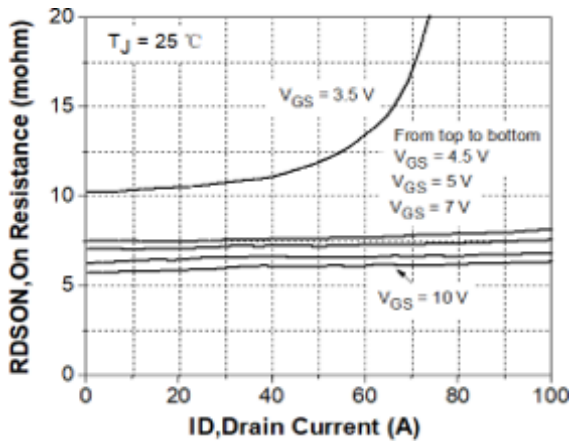


Figure 3. On-Resistance Variation vs Drain Current

Figure 4. Body Diode Forward Voltage Vs Reverse Drain Current

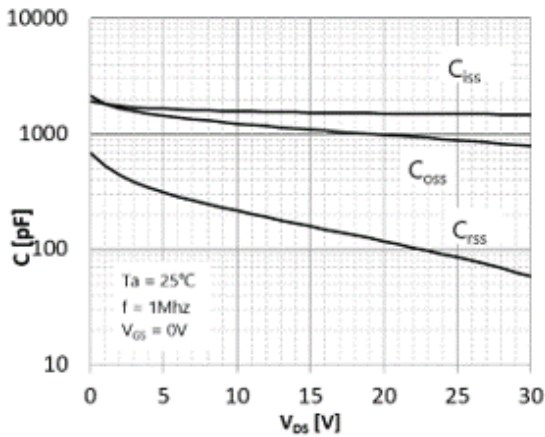


Figure 5. Capacitance Characteristics

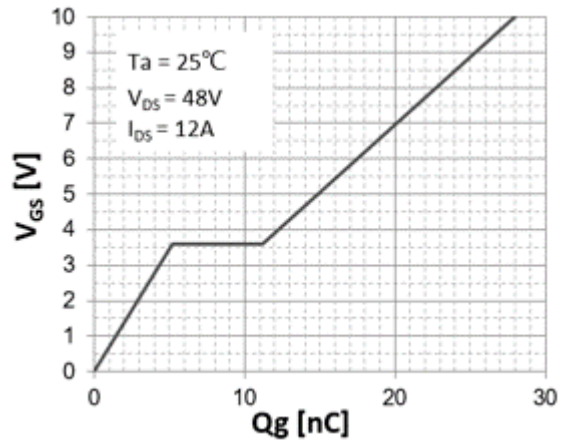


Figure 6. Gate Charge Characteristics

Typical Electronic and Thermal Characteristics

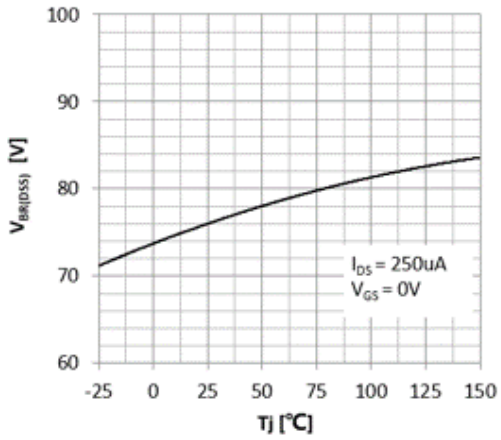


Figure 7. Breakdown Voltage Variation vs Temperature

Figure 8. On-Resistance Variation vs Temperature

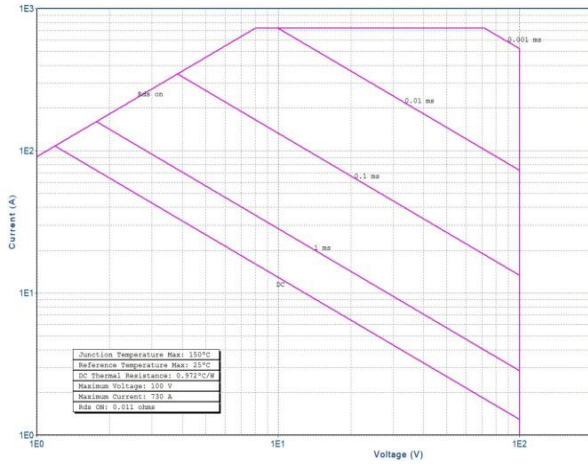


Figure 9. Maximum Safe Operating Area

Figure 10. Maximum Drain Current vs Case Temperature

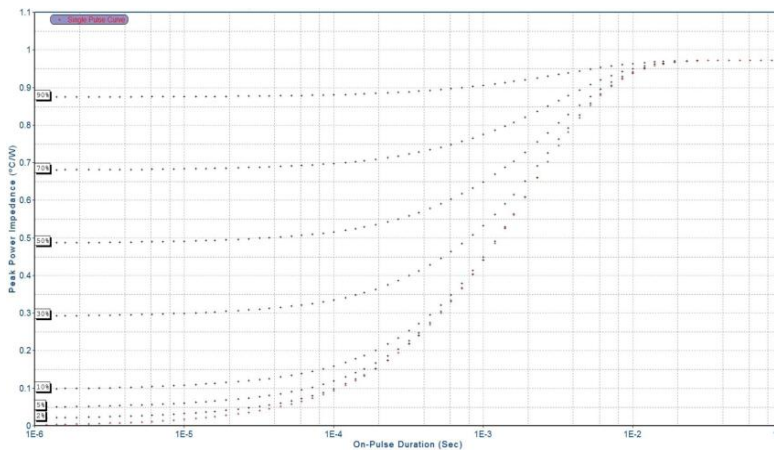
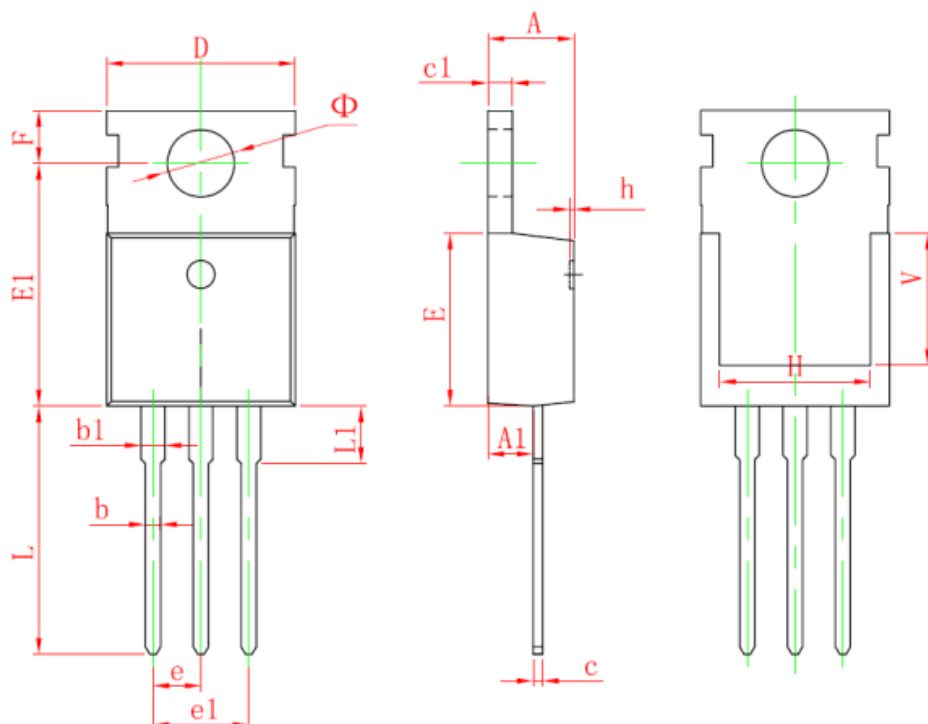


Figure 11. Transient Thermal Response Curve

### Package Dimensions : TO-220-3L(T0.5mm) PACKAGE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
$\Phi$	3.400	3.800	0.134	0.150