

# High Voltage Power MOSFET

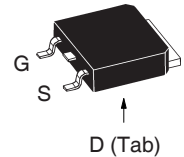
**IXTY02N50D**  
**IXTU02N50D**  
**IXTP02N50D**

$V_{DSX} = 500V$   
 $I_{D25} = 200mA$   
 $R_{DS(on)} \leq 30\Omega$

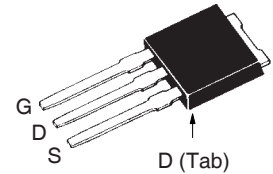
## N-Channel



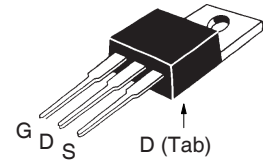
TO-252 (IXTY)



TO-251 (IXTU)



TO-220AB (IXTP)



G = Gate      D = Drain  
S = Source    Tab = Drain

Symbol	Test Conditions	Maximum Ratings	
$V_{DSX}$	$T_J = 25^\circ C$ to $150^\circ C$	500	V
$V_{DGX}$	$T_J = 25^\circ C$ to $150^\circ C$	500	V
$V_{GSX}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ C$	200	mA
$I_{DM}$	$T_C = 25^\circ C$ , Pulse Width Limited by $T_J$	800	mA
$P_D$	$T_C = 25^\circ C$	25	W
	$T_A = 25^\circ C$	1.1	W
$T_J$		- 55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		- 55 ... +150	$^\circ C$
$T_L$	Maximum Lead Temperature for Soldering	300	$^\circ C$
$T_{SOLD}$	1.6 mm (0.062in.) from Case for 10s	260	$^\circ C$
$M_d$	Mounting Torque (TO-220)	1.13 / 10	Nm/lb.in.
Weight	TO-252	0.35	g
	TO-251	0.40	g
	TO-220	3.00	g

Symbol	Test Conditions ( $T_J = 25^\circ C$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSX}$	$V_{GS} = -10V$ , $I_D = 25\mu A$	500		V
$V_{GS(off)}$	$V_{DS} = 25V$ , $I_D = 25\mu A$	- 2.5		- 5.0 V
$I_{GSX}$	$V_{GS} = \pm 20V$ , $V_{DS} = 0V$			$\pm 100$ nA
$I_{DSX(off)}$	$V_{DS} = V_{DSX}$ , $V_{GS} = -10V$ $T_J = 125^\circ C$			10 $\mu A$ 250 $\mu A$
$R_{DS(on)}$	$V_{GS} = 0V$ , $I_D = 50mA$ , Note 1		20	30 $\Omega$
$I_{D(on)}$	$V_{GS} = 0V$ , $V_{DS} = 25V$ , Note 1		250	mA

## Features

- Normally ON Mode
- International Standard Packages
- Low  $R_{DS(on)}$  HDMOS™ Process
- Rugged Polysilicon Gate Cell Structure
- Fast Switching Speed

## Advantages

- Easy to Mount
- Space Savings
- High Power Density

## Applications

- Level Shifting
- Triggers
- Solid State Relays
- Current Regulators

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 50\text{V}$ , $I_D = 200\text{mA}$ , Note 1	100	150	mS
$C_{iss}$	$V_{GS} = -10\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		120	pF
$C_{oss}$			25	pF
$C_{rss}$			5	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = \pm 5\text{V}$ , $V_{DS} = 100\text{V}$ , $I_D = 50\text{mA}$ $R_G = 30\Omega$ (External)		9	ns
$t_r$			4	ns
$t_{d(off)}$			28	ns
$t_f$			45	ns
$R_{thJC}$	TO-220			5.0 $^\circ\text{C/W}$
$R_{thCS}$		0.50		$^\circ\text{C/W}$

**Source-Drain Diode**

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$V_{SD}$	$I_F = 200\text{mA}$ , $V_{GS} = -10\text{V}$ , Note 1		0.7	1.5 V
$t_{rr}$	$I_F = 750\text{mA}$ , $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 25\text{V}$ , $V_{GS} = -10\text{V}$			1.0 $\mu\text{s}$

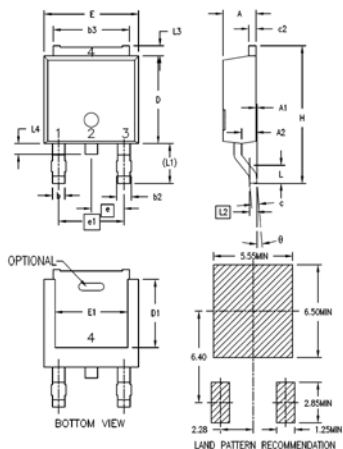
Note 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
4,860,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2	7,071,537	

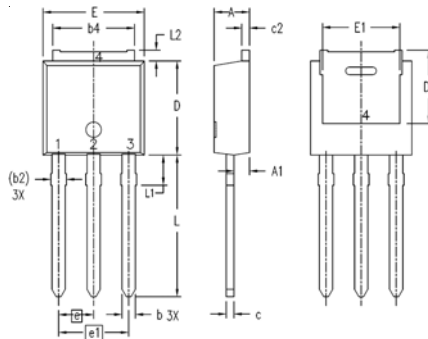
### TO-252 AA (IXTY) Outline



1. Gate; 2,4. Drain; 3. Source

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.086	.094	2.19	2.38
A1	0	.005	0	0.12
A2	.038	.046	0.97	1.17
b	.025	.035	0.64	0.89
b2	.030	.045	0.76	1.14
b3	.200	.215	5.08	5.46
c	.018	.024	0.46	0.61
c2	.018	.023	0.46	0.58
D	.235	.245	5.97	6.22
D1	.180	.205	4.57	5.21
E	.250	.265	6.35	6.73
E1	.170	.205	4.32	5.21
e	.090 BSC		2.28 BSC	
e1	.180 BSC		4.57 BSC	
H	.370	.410	9.40	10.42
L	.055	.070	1.40	1.78
L1	.100	.115	2.54	2.92
L2	.020 BSC		0.50 BSC	
L3	.025	.040	0.64	1.02
L4	.025	.040	0.64	1.02
θ	0°	10°	0°	10°

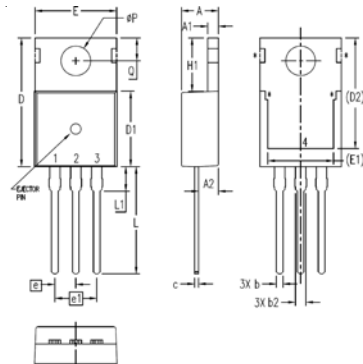
### TO-251 AA (IXTU) Outline



1. Gate; 2,4. Drain; 3. Source

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.087	.094	2.20	2.40
A1	.032	.048	0.82	1.22
b	.026	.034	0.66	0.86
(b2)	.030	.038	0.76	0.96
b4	.198	.222	5.04	5.64
c	.018	.024	0.45	0.60
c2	.016	.024	0.40	0.60
D	.232	.248	5.90	6.30
(D1)	.179	.195	4.55	4.95
E	.252	.268	6.40	6.80
(E1)	.191	.207	4.85	5.25
e	.090 BSC		2.28 BSC	
e1	.180 BSC		4.57 BSC	
L	.358	.374	9.10	9.50
L1	.063	.079	1.60	2.00
L2	.020	.035	0.50	0.90

### TO-220 (IXTP) Outline



1. Gate; 2,4. Drain; 3. Source

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.169	.185	4.30	4.70
A1	.047	.055	1.20	1.40
A2	.079	.106	2.00	2.70
b	.024	.039	0.60	1.00
b2	.045	.057	1.15	1.45
c	.014	.026	0.35	0.65
D	.587	.626	14.90	15.90
D1	.335	.370	8.50	9.40
(D2)	.500	.531	12.70	13.50
E	.382	.406	9.70	10.30
(E1)	.283	.323	7.20	8.20
e	.100 BSC		2.54 BSC	
e1	.200 BSC		5.08 BSC	
H1	.244	.268	6.20	6.80
L	.492	.547	12.50	13.90
L1	.110	.154	2.80	3.90
∅P	.134	.150	3.40	3.80
Q	.106	.126	2.70	3.20



---

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).