

## Linear L2<sup>™</sup> Power MOSFET with extended FBSOA

### IXTH30N60L2 IXTQ30N60L2 IXTT30N60L2

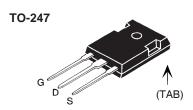
 $V_{DSS} = 600V$   $I_{D25} = 30A$   $R_{DS(an)} \le 240m\Omega$ 

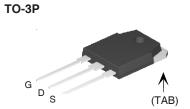
N-Channel Enhancement Mode Avalanche rated



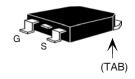
Symbol	Test Conditions	Maximum Ratings		
V <sub>DSS</sub>	$T_J = 25^{\circ}C$ to $150^{\circ}C$	600	V	
$V_{DGR}$	$T_J = 25^{\circ}C$ to 150°C, $R_{GS} = 1M\Omega$	600	V	
V <sub>GSS</sub>	Continuous	±20	V	
V <sub>GSM</sub>	Transient	±30	V	
I <sub>D25</sub>	T <sub>C</sub> = 25°C	30	A	
I <sub>DM</sub>	$T_{\rm C} = 25^{\circ}$ C, pulse width limited by $T_{\rm JM}$	80	Α	
I <sub>A</sub>	T <sub>C</sub> = 25°C	30	A	
E <sub>as</sub>	$T_{c} = 25^{\circ}C$	2	J	
$\overline{P_{D}}$	T <sub>C</sub> = 25°C	540	W	
T <sub>J</sub>		-55 to +150	°C	
$T_{JM}$		+150	°C	
T <sub>stg</sub>		-55 to +150	°C	
T <sub>L</sub>	1.6mm (0.063in) from case for 10s	300	°C	
T <sub>SOLD</sub>	Plastic body for 10s	260	°C	
$\overline{M_d}$	Mounting torque (TO-247&TO-3P)	1.13/10	Nm/lb.in.	
Weight	TO-247	6.0	g	
	TO-3P	5.5	g	
	TO-268	4.0	g	

			Charact Min.	haracteristic Values Min. <sub> </sub> Typ. <sub> </sub> Max.			
BV <sub>DSS</sub>	$V_{GS} = 0V, I_{D} = 1mA$		600			V	
V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$		2.5		4.5	V	
I <sub>GSS</sub>	$V_{GS} = \pm 20V, V_{DS} = 0V$				±100	nA	
I <sub>DSS</sub>	$V_{DS} = V_{DSS}$				50	μΑ	
	$V_{GS} = 0V$	$T_J = 125^{\circ}C$			300	μΑ	
R <sub>DS(on)</sub>	$V_{GS} = 10V, I_{D} = 0.5 \cdot I_{D25}, I_{D25}$	Note 1			240	$m\Omega$	





TO-268



G = Gate D = DrainS = Source TAB = Drain

#### **Features**

- Designed for linear operation
- International standard packages
- Avalanche rated
- Molding epoxies meet UL 94 V-0 flammability classification
- Guaranteed FBSOA at 75°C

#### **Applications**

- Solid state circuit breakers
- Soft start controls
- Linear amplifiers
- Programmable loads
- Current regulators



<b>Symbo</b> (T <sub>J</sub> = 25		Test Conditions nless otherwise specified)	Charac Min.	teristic \ Typ.	Values Max.	
g <sub>fs</sub>		V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.5 • I <sub>D25</sub> , Note 1	10	14	18	S
C <sub>iss</sub>	)			10.7		nF
C <sub>oss</sub>	}	$V_{GS} = 0V$ , $V_{DS} = 25V$ , $f = 1MHz$		600		pF
$\mathbf{C}_{rss}$	J			130		pF
t <sub>d(on)</sub>	<u> </u>	Resistive Switching Times		43		ns
t,		$V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_{D} = 0.5 \cdot I_{D25}$		65		ns
t <sub>d(off)</sub>		$R_{c} = 2\Omega$ (External)		123		ns
t <sub>f</sub>	J	G ( )		43		ns
Q <sub>g(on)</sub>	)			335		nC
Qgs	}	$V_{GS} = 10V$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_{D} = 0.5 \cdot I_{D25}$		58		nC
$\mathbf{Q}_{gd}$	J			212		nC
R <sub>thJC</sub>					0.23 °C	C/W
$R_{\text{thCS}}$		(TO-247&TO-3P)		0.25	°(	C/W

#### **Safe Operating Area Specification**

Symbol	Test Conditions	Min.	Тур.	Max.
SOA	$V_{DS} = 480V$ , $I_{D} = 0.6A$ , $T_{C} = 75$ °C, $t_{D} = 3s$	288		W

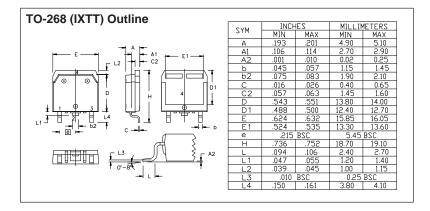
#### Source-Drain Diode

#### Characteristic Values

(T<sub>1</sub> = 25°C, unless otherwise specified)

	(1, - 20 0, arriodo otrior wido opconi						
Symbol	Test Conditions Min.	Тур.	Max				
I <sub>s</sub>	V <sub>GS</sub> = 0V		30	A			
I <sub>sm</sub>	Repetitive, pulse width limited by $T_{_{JM}}$		120	Α			
V <sub>SD</sub>	$I_F = I_S$ , $V_{GS} = 0V$ , Note 1		1.5	V			
t <sub>rr</sub>	$I_{F} = I_{S}$ , -di/dt = 100A/ $\mu$ s, $V_{R} = 100V$	710		ns			

Note 1: Pulse test,  $t \le 300\mu s$ ; duty cycle,  $d \le 2\%$ .



#### PRELIMINARY TECHNICAL INFORMATION

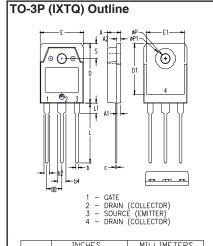
The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

#### IXYS reserves the right to change limits, test conditions, and dimensions.

# TO-247 (IXTH) Outline

Terminals: 1 - Gate 2 - Drain 3 - Source Tab - Drain

Dim.	Millimeter		Inc	hes
	Min.	Max.	Min.	Max.
Α	4.7	5.3	.185	.209
A,	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	2.87	3.12	.113	.123
С	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
е	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15	BSC	242	BSC



INCHE2		MILLIME LERS		
MIN	MAX	MIN	MAX	
.185	.193	4.70	4.90	
.051	.059	1.30	1.50	
.057	.065	1.45	1.65	
.035	.045	0.90	1.15	
.075	.087	1.90	2.20	
.114	.126	2.90	3.20	
.022	.031	0.55	0.80	
.780	.799	19.80	20.30	
.665	.677	16.90	17.20	
.610	.622	15.50	15.80	
.531	.539	13.50	13.70	
.215 BSC		5.45 BSC		
.779	.795	19.80	20.20	
.134	.142	3.40	3.60	
.126	.134	3.20	3.40	
.272	.280	6.90	7.10	
.193	.201	4.90	5.10	
	MIN .185 .051 .057 .035 .075 .114 .022 .780 .665 .610 .531 .215 .779 .134	MIN MAX .185 .193 .051 .059 .057 .065 .035 .045 .075 .087 .114 .126 .022 .031 .780 .799 .665 .677 .610 .622 .531 .539 .215 BSC .779 .795 .134 .142 .126 .134	MIN         MAX         MIN           .185         .193         4,70           .051         .059         1.30           .057         .065         1.45           .035         .045         0.90           .075         .087         1.90           .114         .126         2.90           .022         .031         0.55           .780         .799         19.80           .665         .677         16.90           .610         .622         15.50           .531         .539         13.50           .215 BSC         5.45           .779         .795         19.80           .134         .142         3.40           .126         .134         3.20           .272         .280         6.90	



Fig. 1. Output Characteristics @ 25°C

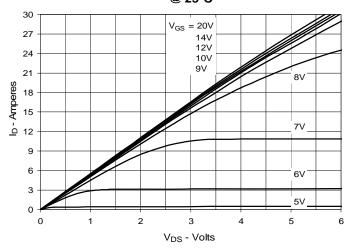


Fig. 2. Extended Output Characteristics
@ 25°C

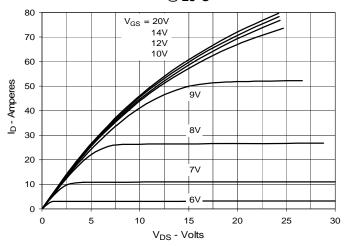


Fig. 3. Output Characteristics @ 125°C

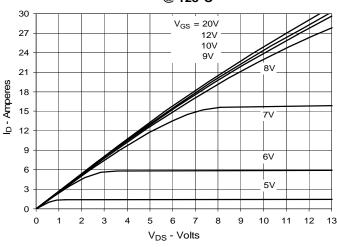


Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 15A$  Value vs. Junction Temperature

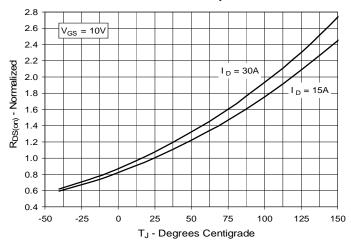


Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 15A$  Value vs. Drain Current

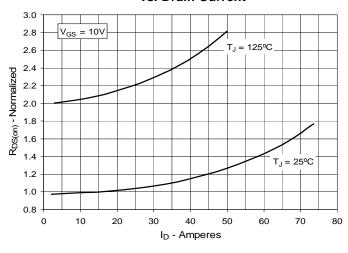
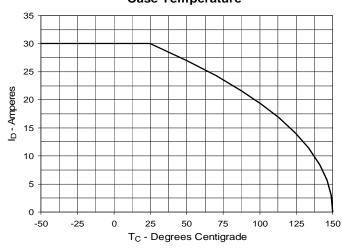
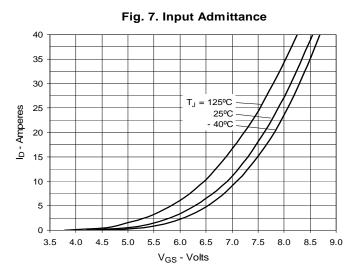


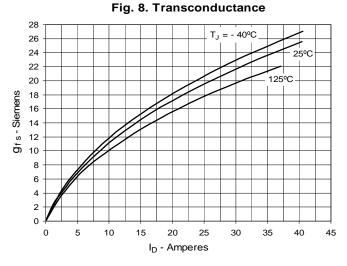
Fig. 6. Maximum Drain Current vs.

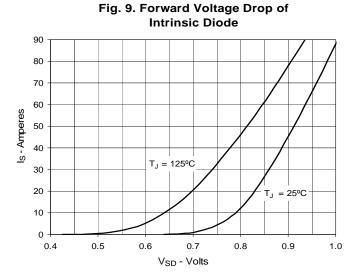
Case Temperature

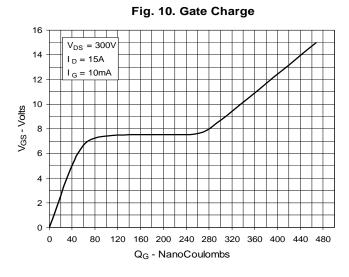


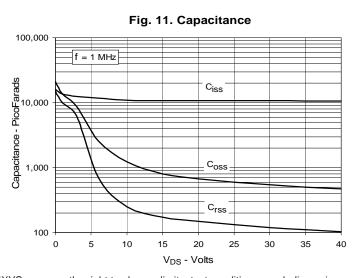












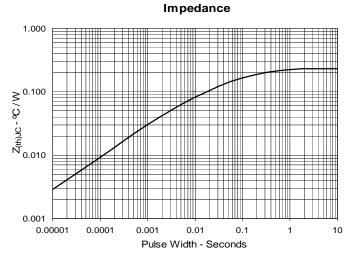


Fig. 12. Maximum Transient Thermal

 $\ensuremath{\mathsf{IXYS}}$  reserves the right to change limits, test conditions,  $% \ensuremath{\mathsf{IXYS}}$  and  $% \ensuremath{\mathsf{dimensions}}$  .



Fig. 13. Forward-Bias Safe Operating Area  $@T_C = 25^{\circ}C$ 

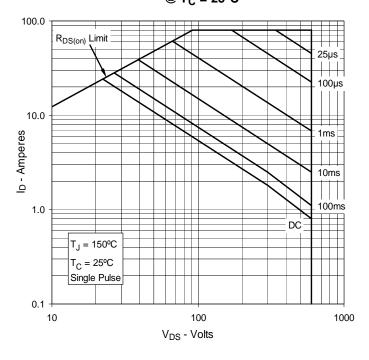


Fig. 14. Forward-Bias Safe Operating Area  $@T_C = 75^{\circ}C$ 

