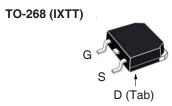


# LinearL2<sup>™</sup> Power MOSFET w/Extended FBSOA

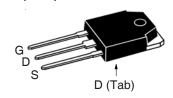
IXTT40N50L2 IXTQ40N50L2 IXTH40N50L2  $V_{DSS} = 500V$   $I_{D25} = 40A$   $R_{DS(as)} \le 170m\Omega$ 

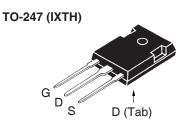
N-Channel Enhancement Mode Avalanche rated





TO-3P (IXTQ)





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

Symbol	Test Conditions	Maximum Ratings		
V <sub>DSS</sub>	T <sub>J</sub> = 25°C to 150°C	500	V	
V <sub>DGR</sub>	$T_J = 25^{\circ}C$ to 150°C, $R_{GS} = 1M\Omega$	500	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	40	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	40	A	
E <sub>as</sub>	$T_{C} = 25^{\circ}C$	2	J	
$P_{D}$	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>	Maximum Lead Temperature for Soldering	300	°C	
T <sub>SOLD</sub>	1.6 mm (0.062in.) from Case for 10s	260	°C	
M <sub>d</sub>	Mounting Torque (TO-247&TO-3P)	1.13/10	Nm/lb.in	
Weight	TO-268	4.0	g	
	TO-3P TO-247	5.5 6.0	g g	

#### **Symbol Test Conditions Characteristic Values** (T<sub>1</sub> = 25°C, Unless Otherwise Specified) Min. Тур. Max. $V_{GS} = 0V, I_D = 1mA$ $\mathbf{BV}_{\mathrm{DSS}}$ 500 V<sub>GS(th)</sub> $V_{DS} = V_{GS}, I_{D} = 250 \mu A$ 2.5 4.5 $V_{GS} = \pm 20V, V_{DS} = 0V$ ±100 l<sub>gss</sub> nΑ $V_{DS} = V_{DSS}, V_{GS} = 0V$ 50 μΑ I<sub>DSS</sub> $T_J = 125^{\circ}C$ 300 μΑ $V_{GS} = 10V, I_{D} = 0.5 \cdot I_{D25}, \text{ Note 1}$ $\boldsymbol{R}_{\text{DS}(\underline{on})}$ 170 $m\Omega$

# **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



Symbol $(T_J = 25)$		Test Conditions Inless Otherwise Specified)	Charac Min.	teristic \ Typ.	Values Max.	
g <sub>fs</sub>		$V_{DS} = 10V, I_{D} = 0.5 \cdot I_{D25}, \text{ Note 1}$	11	15	19	S
C <sub>iss</sub>	)			10.4		nF
C <sub>oss</sub>	}	$V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$		655		pF
$\mathbf{C}_{rss}$	J			155		рF
t <sub>d(on)</sub>	)	Resistive Switching Times		50		ns
t <sub>r</sub>		$V_{\rm GS} = 10V$ , $V_{\rm DS} = 0.5 \cdot V_{\rm DSS}$ , $I_{\rm D} = 0.5 \cdot I_{\rm D25}$ $R_{\rm G} = 2\Omega$ (External)		133		ns
$\mathbf{t}_{d(off)}$				127		ns
t <sub>f</sub>	J			44		ns
Q <sub>g(on)</sub>	)			320		nC
Qgs	}	$V_{GS} = 10V$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_{D} = 0.5 \cdot I_{D25}$		64		nC
$\mathbf{Q}_{gd}$	J			198		nC
R <sub>thJC</sub>					0.23 °C	C/W
$\mathbf{R}_{ ext{thCS}}$		(TO-247&TO-3P)		0.25	°(	C/W

## **Safe Operating Area Specification**

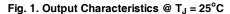
Symbol	Test Conditions	Min.	Тур.	Max.
SOA	$V_{DS} = 400V$ , $I_{D} = 0.8A$ , $T_{C} = 75^{\circ}C$ , $tp = 3s$	320		W

### Source-Drain Diode

Symbol	Test Conditions	Characteristic Values			
$(T_J = 25^{\circ}C,$	Unless Otherwise Specified)	Min.	Тур.	Max.	
I <sub>s</sub>	$V_{GS} = 0V$			40	A
I <sub>SM</sub>	Repetitive, Pulse Width Limited by $T_{_{JM}}$			160	Α
V <sub>SD</sub>	$I_F = I_S$ , $V_{GS} = 0V$ , Note 1			1.5	V
t <sub>rr</sub>	$I_{\rm F} = I_{\rm S}$ , -di/dt = 100A/ $\mu$ s, $V_{\rm R} = 100$ V		500		ns

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





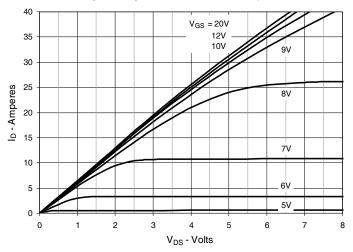


Fig. 2. Extended Output Characteristics @ T<sub>J</sub> = 25°C

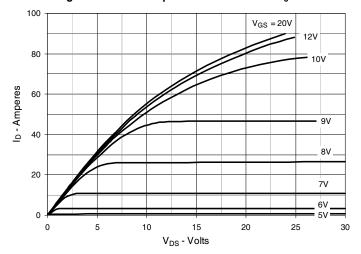


Fig. 3. Output Characteristics @ T<sub>J</sub> = 125°C

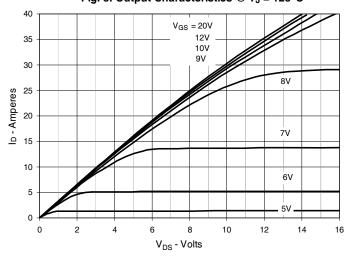


Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D$  = 20A Value vs. Junction Temperature

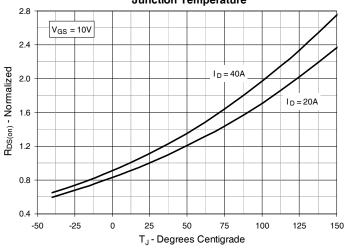


Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D$  = 20A Value vs. Drain Current

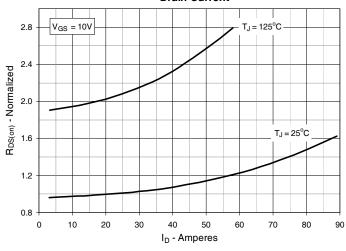
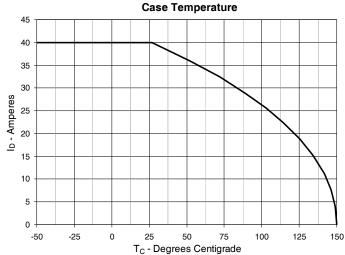
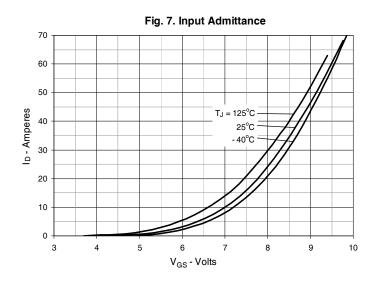


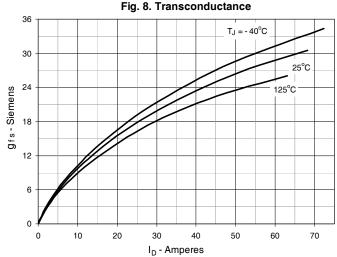
Fig. 6. Maximum Drain Current vs.

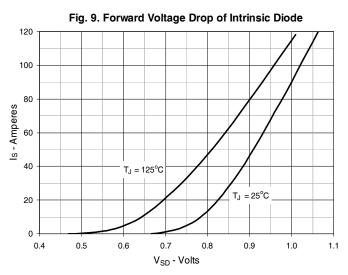
Case Temperature

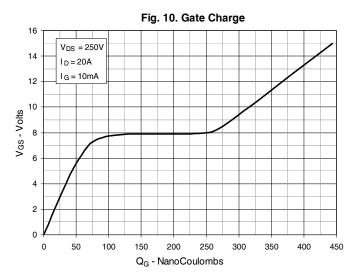


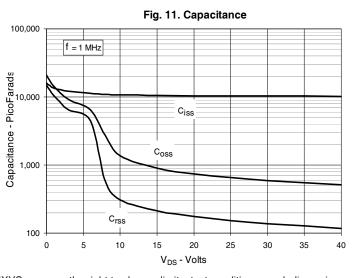


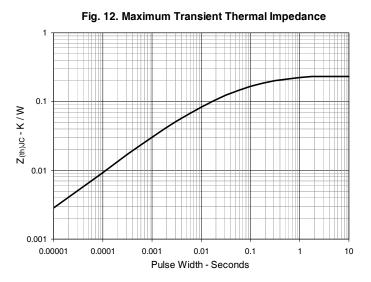












 $\ensuremath{\mathsf{IXYS}}$  reserves the right to change limits, test conditions,  $% \mathsf{IXYS}$  and  $\mathsf{JXYS}$  dimensions.



# Fig. 13. Forward-Bias Safe Operating Area

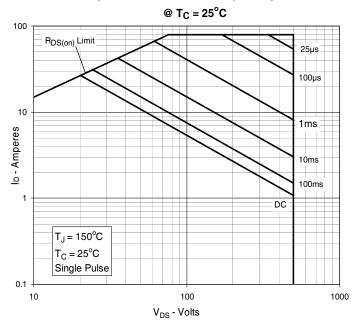


Fig. 14. Forward-Bias Safe Operating Area

