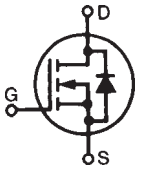
IXYS

LinearL2™ Power MOSFET w/Extended FBSOA

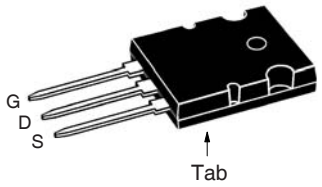
IXTK60N50L2
IXTX60N50L2

V_{DSS} = 500V
I_{D25} = 60A
$R_{DS(on)}$ ≤ 100mΩ

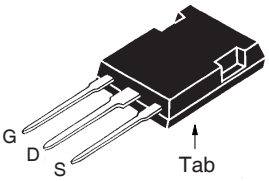
N-Channel Enhancement Mode
Avalanche Rated



TO-264 (IXTK)



PLUS247 (IXTX)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	500	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	500	V
V_{GSS}	Continuous	±30	V
V_{GSM}	Transient	±40	V
I_{D25}	T_C = 25°C	60	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	150	A
I_A	T_C = 25°C	60	A
E_{AS}	T_C = 25°C	3	J
P_D	T_C = 25°C	960	W
T_J		-55...+150	°C
T_{JM}		150	°C
T_{stg}		-55...+150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	°C
M_d	Mounting torque (IXTK)	1.13/10	Nm/lb.in
F_C	Mounting Force (IXTX)	20..120 / 4.5..27	N/lb
Weight	TO-264	10	g
	PLUS247	6	g

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 1mA	500			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250μA	2.5		4.5	V
I_{GSS}	V_{GS} = ±30V, V_{DS} = 0V			±200	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			50	μA
	T_J = 125°C			5	mA
$R_{DS(on)}$	V_{GS} = 10V, $I_D = 0.5 \bullet I_{D25}$, Note 1			100	mΩ

Features

- Designed for linear operation
- International standard packages
- Avalanche rated
- Guaranteed FBSOA at 75°C

Advantages

- Easy to mount
- Space savings
- High power density

Applications

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

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS}= 10V, I_D = 0.5 • I_{D25}, Note 1	18	25	32	S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		24		nF
C_{oss}			1325		pF
C_{rss}			172		pF
$t_{d(on)}$	**Resistive Switching Times**		40		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		40		ns
$t_{d(off)}$	R_G = 0.5Ω (External)		165		ns
t_f			38		ns
$Q_{g(on)}$	V_{GS}= 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		610		nC
Q_{gs}			130		nC
Q_{gd}			365		nC
R_{thJC}				0.13	°C/W
R_{thCS}			0.15		°C/W

Safe Operating Area Specification

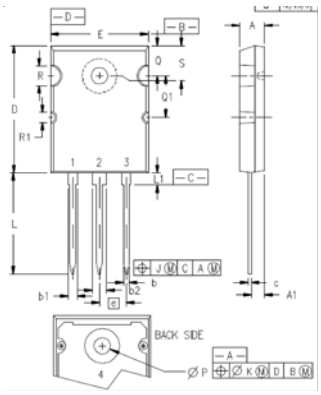
Symbol	Test Conditions	Characteristic Values Min.	Typ.	Max.	
SOA	V_{DS} = 400V, I_D = 1.1A, T_C = 75°C, tp = 3s	440			W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			60	A
I_{SM}	Repetitive, pulse width limited by T_{JM}			240	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 60A, -di/dt = 100A/µs,		980		ns
I_{RM}	V_R = 100V, V_{GS} = 0V		73		A
Q_{RM}			35.8		µC

Notes: 1. Pulse test, t ≤ 300µs, duty cycle, d ≤ 2%.

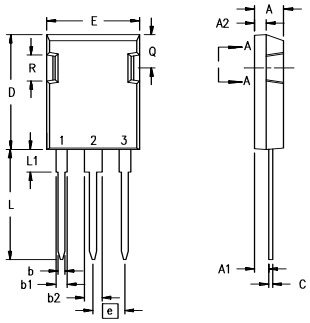
TO-264 (IXTK) Outline



Terminals: 1 - Gate
2,4 - Drain
3 - Source

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.185	.209	4.70	5.31
A1	.102	.118	2.59	3.00
b	.037	.055	0.94	1.40
b1	.087	.102	2.21	2.59
b2	.110	.126	2.79	3.20
c	.017	.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	.760	.799	19.30	20.29
e	.215BSC		5.46 BSC	
J	.000	.010	0.00	0.25
K	.000	.010	0.00	0.25
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
ØP	.122	.138	3.10	3.51
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
ØR	.155	.187	3.94	4.75
ØR1	.085	.093	2.16	2.36
S	.243	.253	6.17	6.43

PLUS 247™ (IXTX) Outline



Terminals: 1 - Gate
2 - Drain
3 - Source

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.83	5.21	.190	.205
A_1	2.29	2.54	.090	.100
A_2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b_1	1.91	2.13	.075	.084
b_2	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	0.244
R	4.32	4.83	.170	.190

Fig. 1. Output Characteristics @ T_J = 25ºC

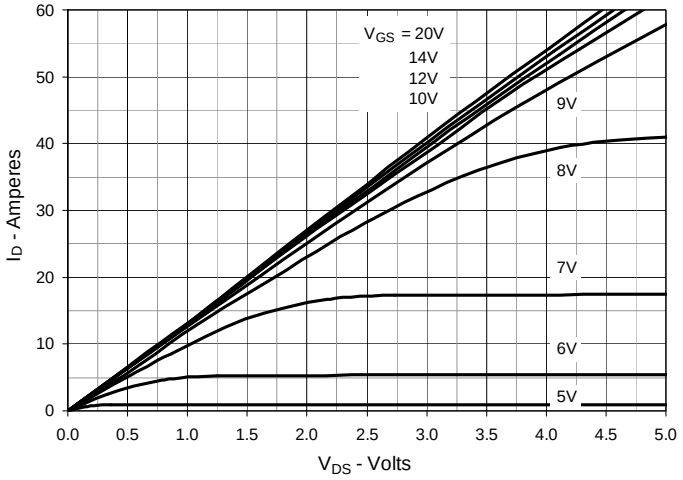


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

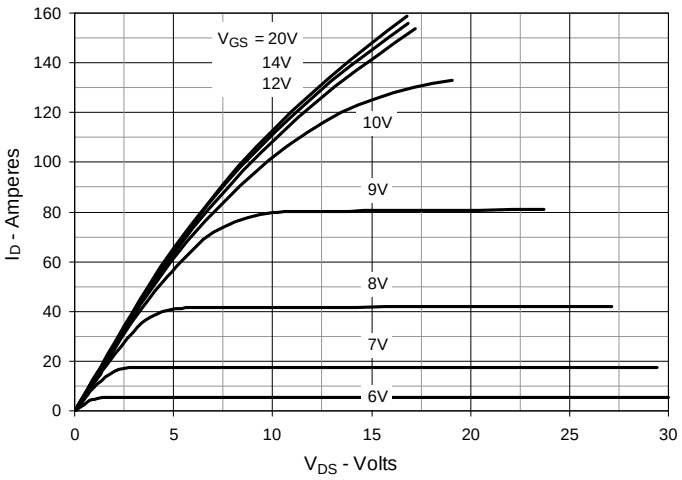


Fig. 3. Output Characteristics @ T_J = 125ºC

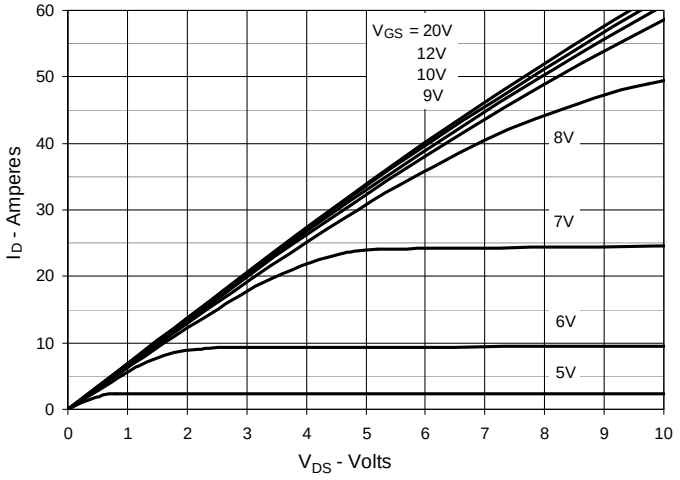


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 30A Value vs. Junction Temperature

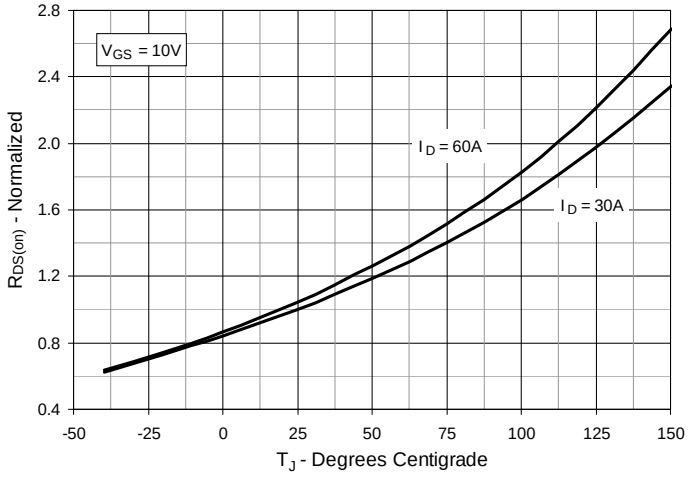


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 30A Value vs. Drain Current

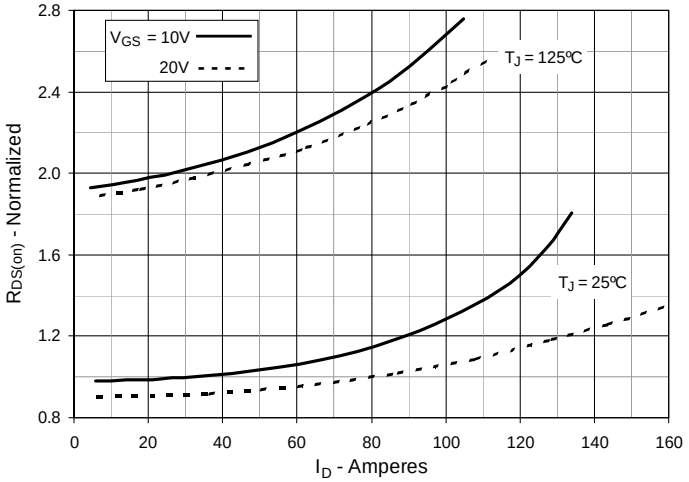


Fig. 6. Maximum Drain Current vs. Case Temperature

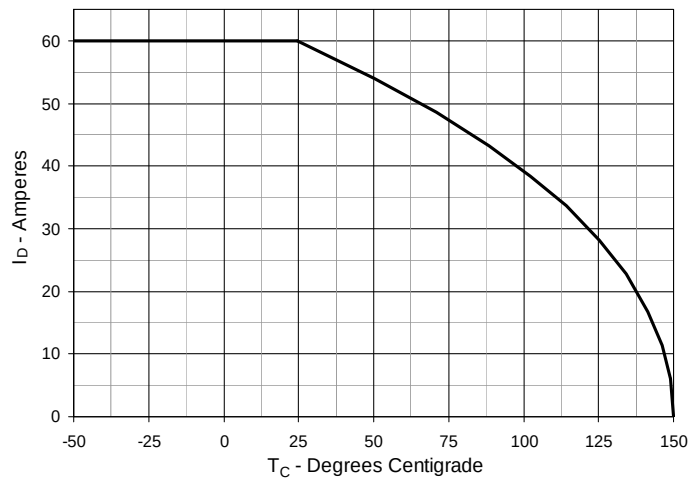


Fig. 7. Input Admittance

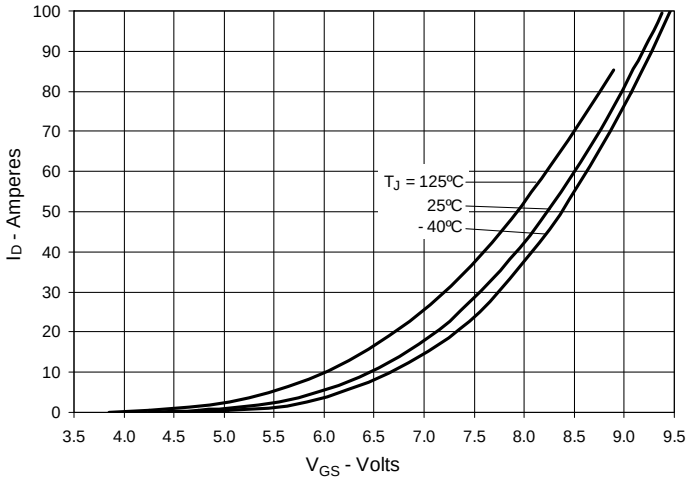


Fig. 8. Transconductance

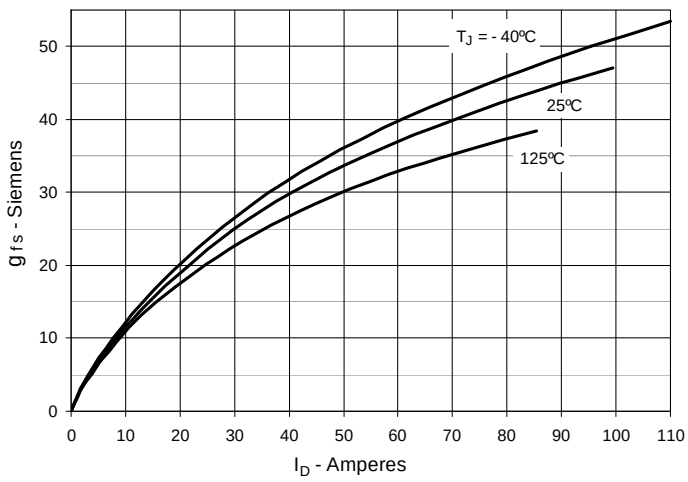


Fig. 9. Forward Voltage Drop of Intrinsic Diode

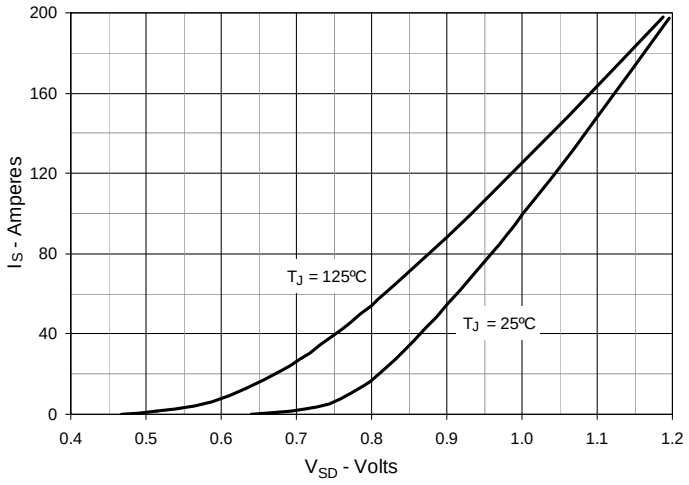


Fig. 10. Gate Charge

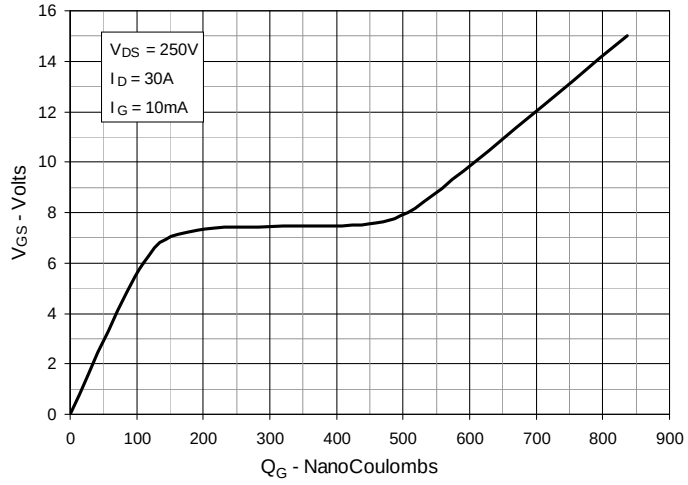


Fig. 11. Capacitance

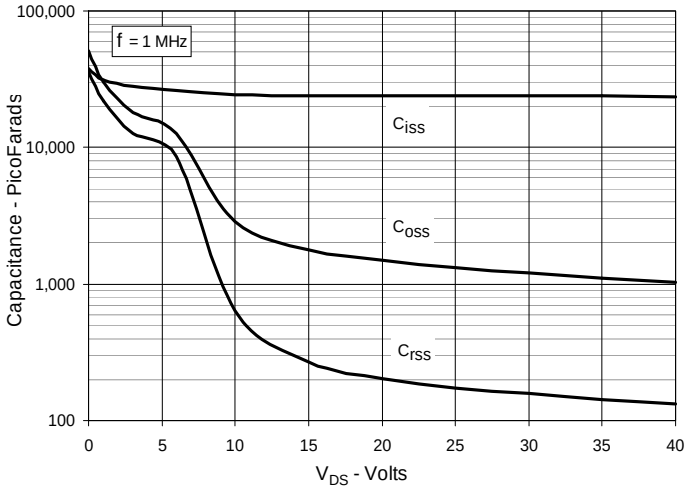


Fig. 12. Maximum Transient Thermal Impedance

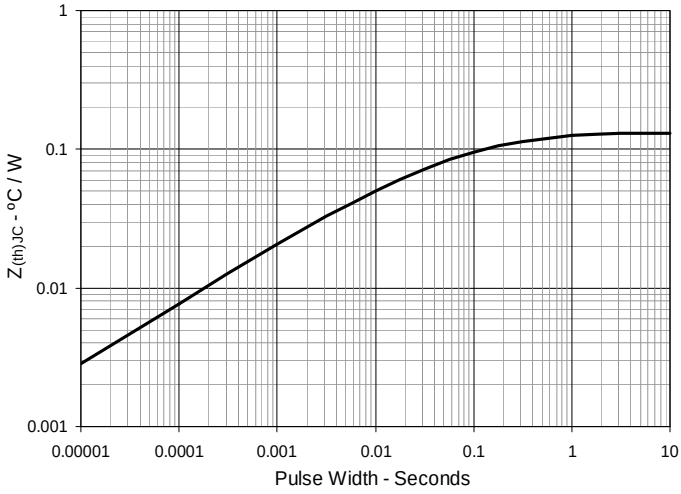


Fig. 13. Forward-Bias Safe Operating Area @ T_C = 25ºC

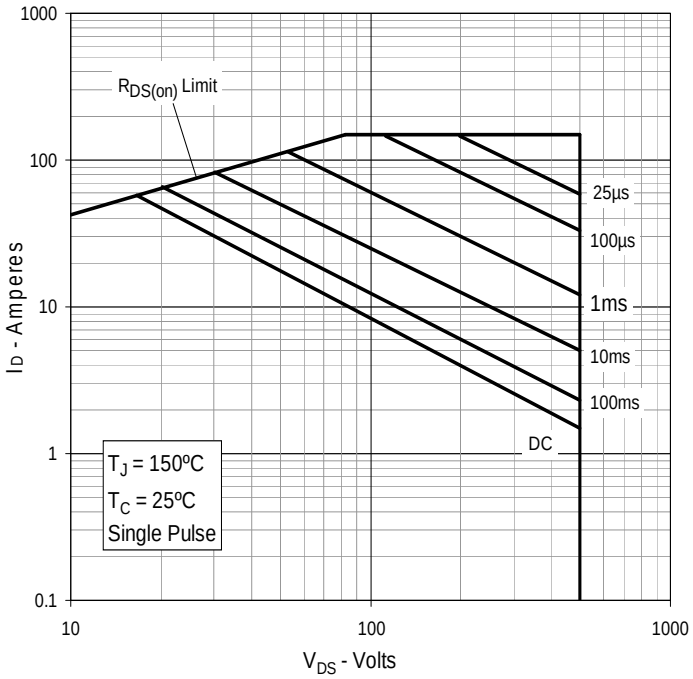


Fig. 14. Forward-Bias Safe Operating Area @ T_C = 75ºC