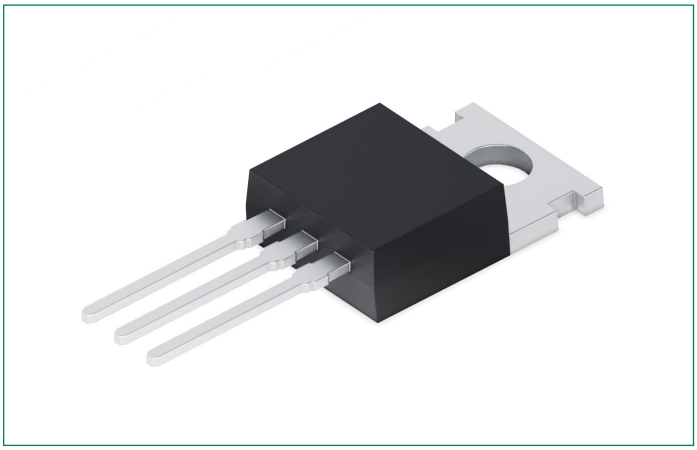
IXTP64N10L2

100 V, 32 mΩ, 64 A Linear L2™ Power MOSFET w/Extended FBSOA

N-Channel Enhancement Mode



Features & Benefits:

- Designed for Linear Operation
- International Standard Package
- Avalanche Rated
- Guaranteed FBSOA at T_C = 75 °C
- Easy to Mount
- Space Savings
- High Power Density

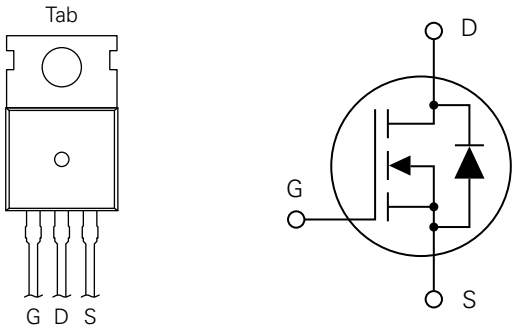
Applications:

- Solid State Circuit Breakers
- Soft Start Controls
- Linear Amplifiers
- Programmable Loads
- Current Regulators

Product Summary

Characteristic	Value	Unit
V_{DSS}	100	V
I_{D25}	64	A
$R_{DS(on)}$	≤ 32	mΩ

Pinout Diagram TO-220 (IXTP)



G: Gate; **D:** Drain; **S:** Source; **Tab:** Drain

Revised: XZ 10/09/2023

Maximum Ratings

Symbol	Characteristic	Conditions	Value	Unit
V_{DSS}	Drain-Source Voltage	T_J = 25 °C to 150 °C	100	V
V_{DGR}	Drain-Gate Voltage	T_J = 25 °C to 150 °C, R_{GS} = 1 MΩ	100	V
V_{GSS}	Gate-Source Voltage	Continuous	±20	V
V_{GSM}		Transient	±30	
I_{D25}	Drain Current	T_C = 25 °C	64	A
I_{DM}		T_C = 25 °C, Pulse Width Limited by T_{JM}	140	
I_A	Avalanche Current	T_C = 25 °C	32	A
E_{AS}	Avalanche Energy	T_C = 25 °C	2	J
P_D	Power Dissipation	T_C = 25 °C	357	W
T_J	Operating Junction Temperature	–	−55 to +150	°C
T_{JM}	Maximum Junction Temperature	–	150	
T_{stg}	Storage Temperature	–	−55 to +150	
T_L	Maximum Lead Temperature for Soldering	1.6 mm (0.062 in.) from Case for 10 s	300	°C
M_d	Mounting Torque	–	1.13 / 10	Nm/lb.in
W	Weight	–	3	g

Thermal Characteristics

Symbol	Characteristic	Value			Unit
		Min.	Typ.	Max.	
$R_{th, JC}$	Thermal Resistance, Junction-to-Case	–	–	0.35	°C/W
$R_{th, CS}$	Thermal Resistance, Case-to-Heatsink	–	0.50	–	°C/W

Electrical Characteristics – Static (T_J = 25 °C unless otherwise specified)

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
BV_{DSS}	Drain-Source Breakdown Voltage	I_D = 250 µA, V_{GS} = 0 V	100	–	–	V
$V_{GS(th)}$	Gate Threshold Voltage	I_D = 250 µA, V_{GS} = V_{DS}	2.5	–	4.5	V
I_{GSS}	Gate-Source Leakage Current	V_{DS} = 0 V, V_{GS} = ±20 V	–	–	±100	nA
I_{DSS}	Drain-Source Leakage Current	V_{DS} = V_{DSS}, V_{GS} = 0 V	–	–	5	µA
		V_{DS} = V_{DSS}, V_{GS} = 0 V, T_J = 125 °C	–	–	25	µA
$R_{DS(on)}$	Drain-Source On-Resistance[1]	V_{GS} = 10 V, I_D = 0.5 x I_{D25}	–	–	32	mΩ

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

Electrical Characteristics – Dynamic (T_J = 25 °C unless otherwise specified)

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
g_{fs}	Transconductance[1]	V_{DS} = 10 V, I_D = 0.5 x I_{D25}	21	27	33	S
R_{Gi}	Gate Input Resistance	–	–	1.2	–	Ω
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	–	3620	–	pF
C_{oss}	Output Capacitance		–	720	–	
C_{rss}	Reverse Transfer Capacitance		–	235	–	
$Q_{g(on)}$	Total Gate Charge	V_{GS} = 10 V, V_{DS} = 0.5 x V_{DSS}, I_D = 0.5 x I_{D25}	–	100	–	nC
Q_{gs}	Gate-Source Charge		–	16	–	
Q_{gd}	Gate-Drain Charge		–	45	–	
$t_{d(on)}$	Turn-on Delay Time	**Resistive Switching** V_{GS} = 10 V, V_{DS} = 0.5 x V_{DSS}, I_D = 0.5 x I_{D25}, $R_{G(ext)}$ = 0 Ω	–	14	–	ns
t_r	Rise Time		–	27	–	
$t_{d(off)}$	Turn-off Delay Time		–	38	–	
t_f	Fall Time		–	11	–	

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

Safe Operating Area Specification

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
SOA	V_{DS} = 100 V, I_D = 2.15 A, T_C = 75 °C, T_p = 5 s	215	–	–	W

Source-Drain Diode Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
I_S	Continuous Diode Forward Current	V_{GS} = 0 V	–	–	64	A
I_{SM}	Diode Pulse Current	Repetitive, Pusle Width Limited by T_{JM}	–	–	256	A
V_{SD}	Diode Forward Voltage[1]	I_F = I_S, V_{GS} = 0 V	–	–	1.4	V
t_{rr}	Reverse Recovery Time	I_F = 32 A, –di/dt = 100 A/µs, V_R = 50 V, V_{GS} = 0 V	–	180	–	ns
I_{RM}	Reverse Recovery Current		–	16.2	–	A
Q_{RM}	Reverse Recovery Charge		–	1.46	–	µC

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

Characteristic Curves

Fig. 1. Output Characteristics @ T_J = 25 ºC

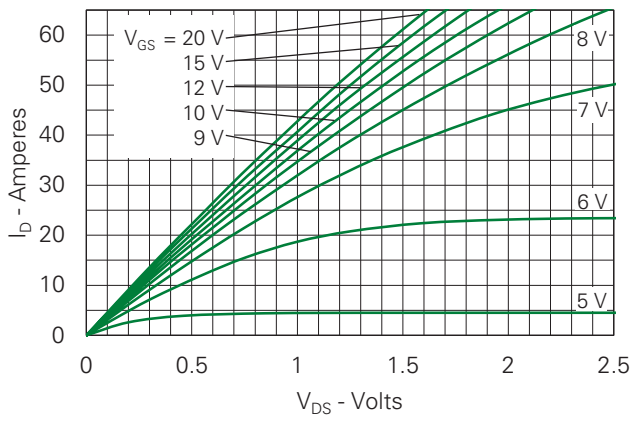


Fig. 2. Extended Output Characteristics @ T_J = 25 ºC

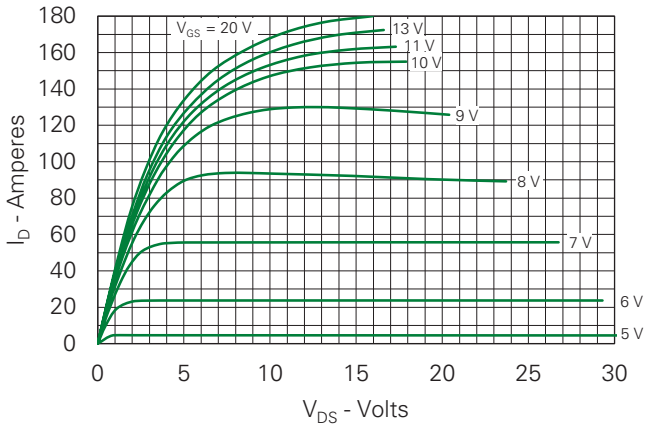


Fig. 3. Output Characteristics @ T_J = 125 ºC

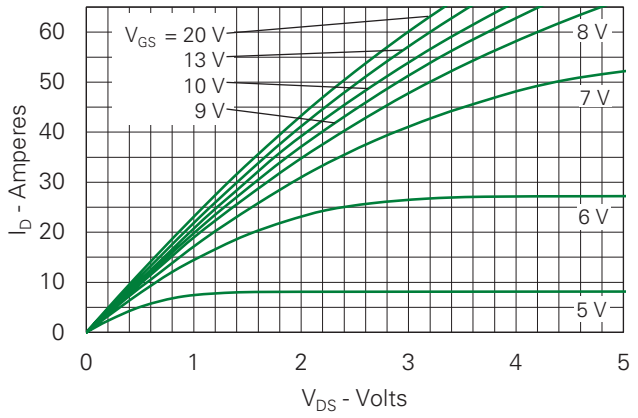


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 32 A Value vs. Junction Temperature

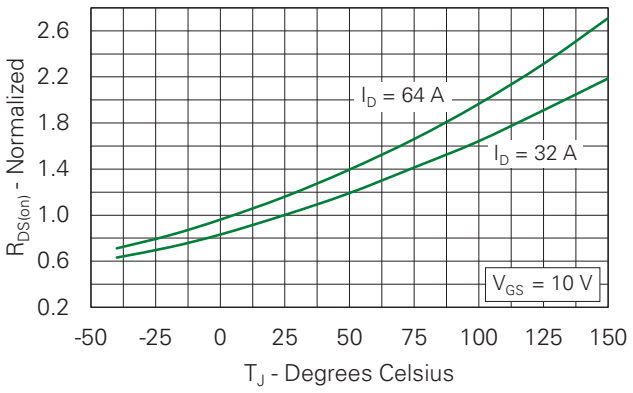


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 32 A Value vs. Drain Current

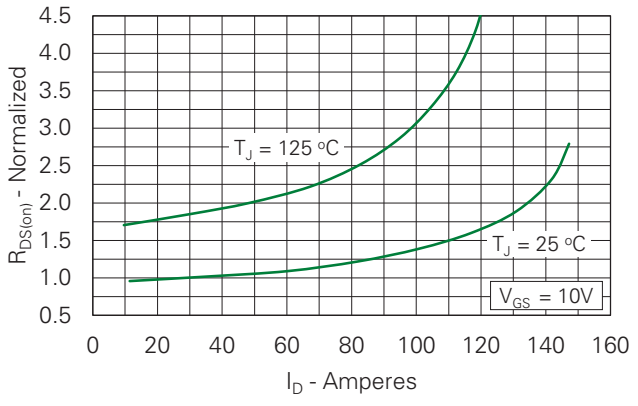


Fig. 6. Maximum Drain Current vs. Case Temperature

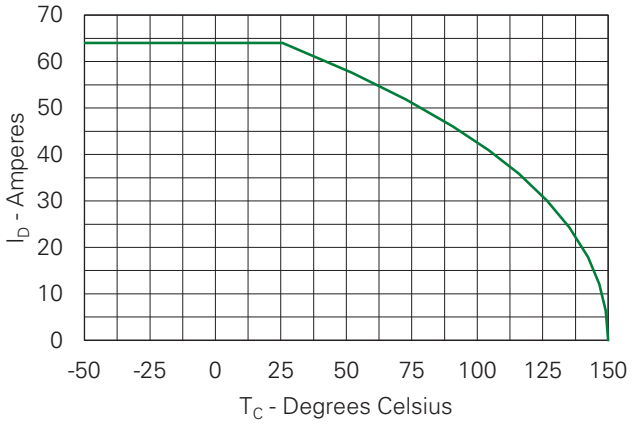


Fig. 7. Input Admittance

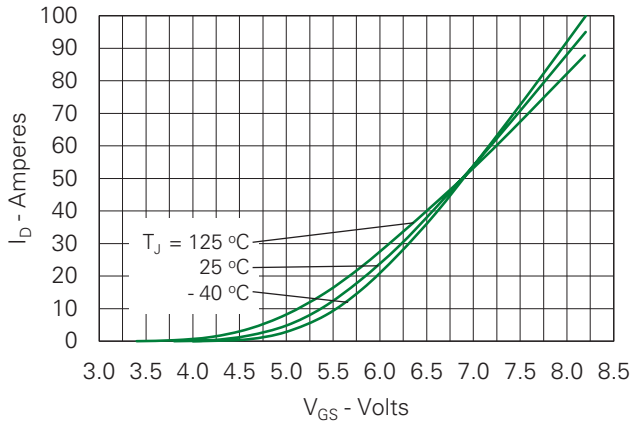


Fig. 8. Transconductance

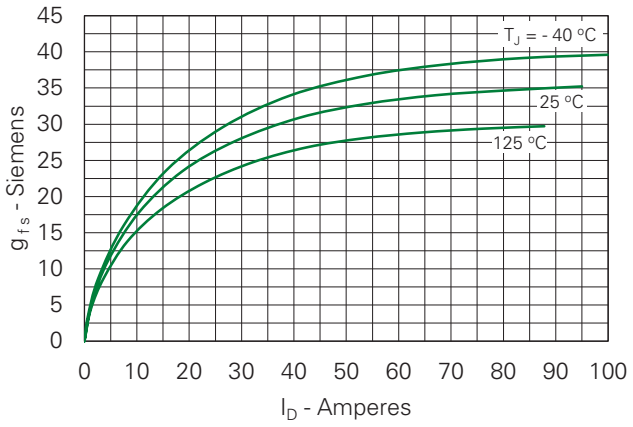


Fig. 9. Forward Voltage Drop of Intrinsic Diode

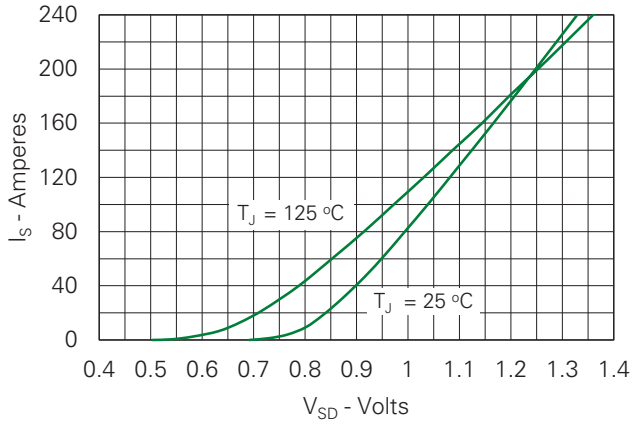


Fig. 10. Gate Charge

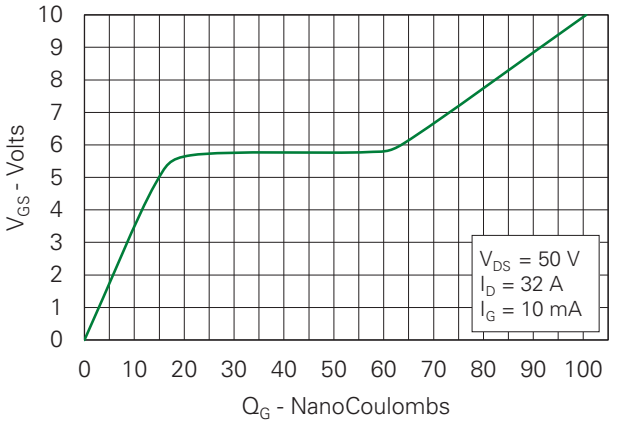


Fig. 11. Capacitance

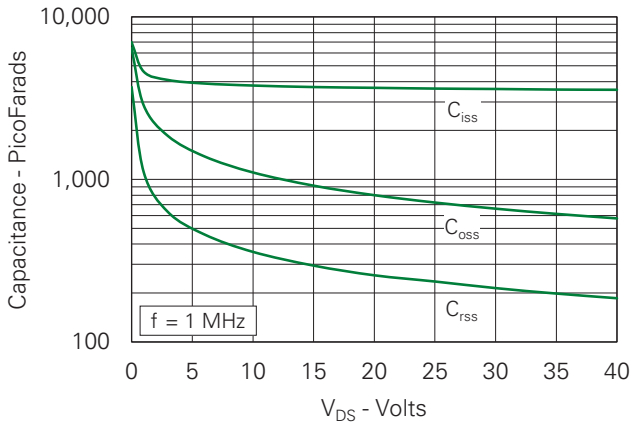


Fig. 12. Maximum Transient Thermal Impedance

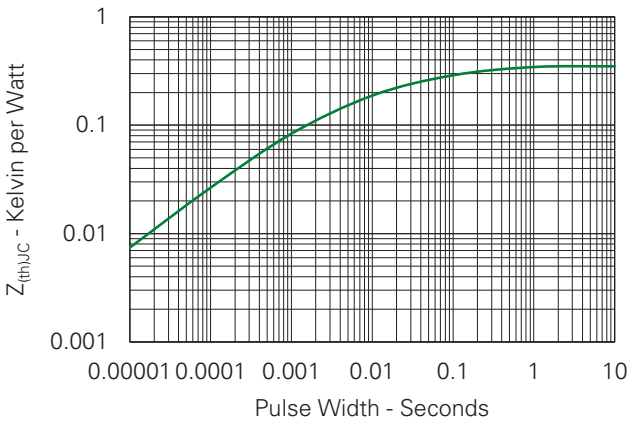


Fig. 13. Forward-Bias Safe Operating Area @ T_C = 25 °C

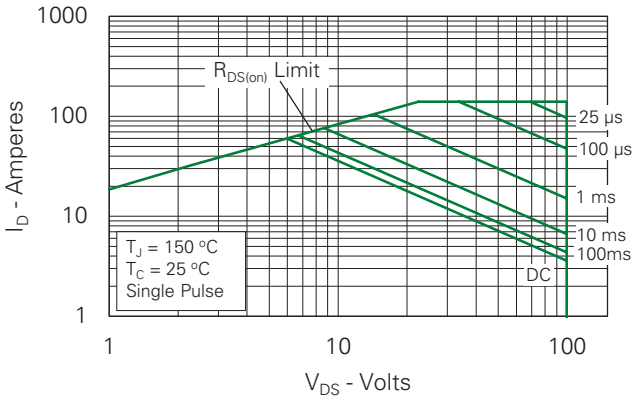
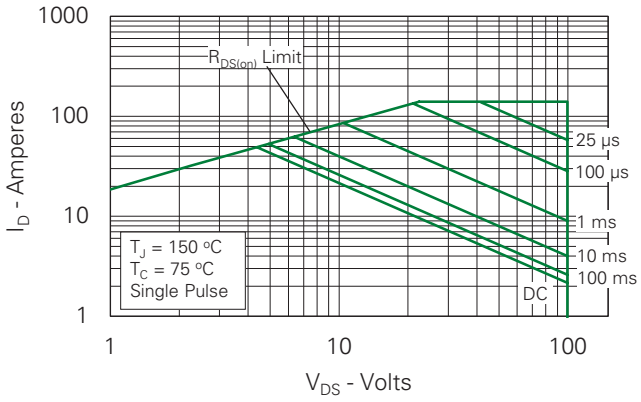
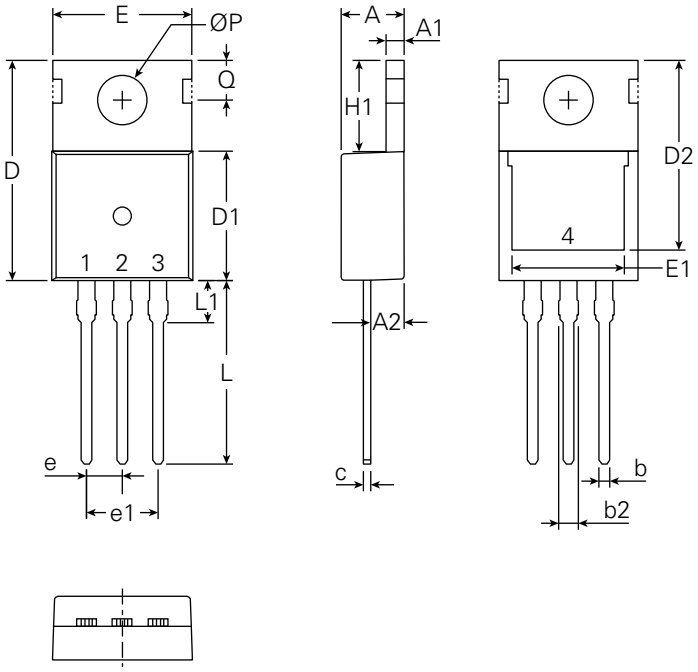


Fig. 14. Forward-Bias Safe Operating Area @ T_C = 75 °C



Part Outline Drawing TO-220 (IXTP)



1 - Gate
2,4 - Drain
3 - Source

Symbol	Inches			Millimeters		
	Min.	Typical	Max.	Min.	Typical	Max
A	0.169	–	0.185	4.30	–	4.70
A1	0.047	–	0.055	1.20	–	1.40
A2	0.079	–	0.106	2.00	–	2.70
b	0.024	–	0.039	0.60	–	1.00
b2	0.045	–	0.057	1.15	–	1.45
c	0.014	–	0.026	0.35	–	0.65
D	0.587	–	0.626	14.90	–	15.90
D1	0.335	–	0.370	8.50	–	9.40
(D2)	0.500	–	0.531	12.70	–	13.50
E	0.382	–	0.406	9.70	–	10.30
(E1)	0.283	–	0.323	7.20	–	8.20
e	0.100 BSC			2.45 BSC		
e1	0.200 BSC			5.08 BSC		
H1	0.244	–	0.268	6.20	–	6.80
L	0.492	–	0.547	12.50	–	13.90
L1	0.110	–	0.154	2.80	–	3.90
ØP	0.134	–	0.150	3.40	–	3.80
Q	0.106	–	0.126	2.70	–	3.20