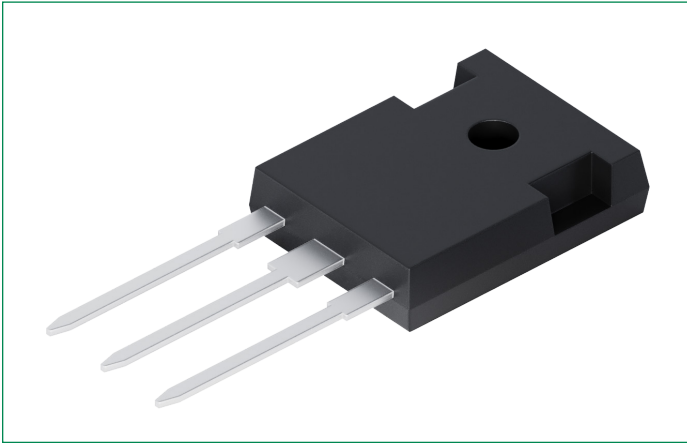


IXTJ3N150

1500 V, 8.0 mΩ, High Voltage Power MOSFET

N-Channel Enhancement Mode Avalanche Rated Fast Intrinsic Diode



Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500 V ~ Electrical Isolation
- Fast Intrinsic Diode
- Avalanche Rated
- Molding Epoxies meet UL 94 V-0
- Flammability Classification

Advantages

- Easy to Mount
- Space Savings
- High Power Density

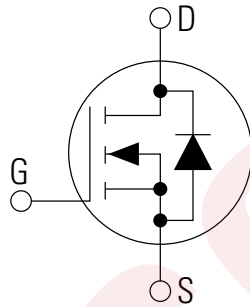
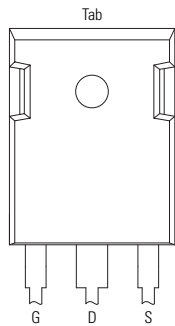
Applications

- High Voltage Power Supplies
- Capacitor Discharge Applications
- Pulse Circuits/Controls

Product Summary

Characteristic	Value	Unit
V_{DSS}	1500	V
I_{D25}	2.3	A
$R_{DS(on)}$	8.0	mΩ

Pinout Diagram (ISO TO-247™)



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

Maximum Ratings

Symbol	Characteristic	Conditions	Value	Unit
V_{DSS}	Drain-source voltage	$T_{vj} = 25\text{ °C to }150\text{ °C}$	1500	V
V_{DGR}	Drain-gate voltage	$T_{vj} = 25\text{ °C to }150\text{ °C}, R_{GS} = 1\text{ M}\Omega$	1500	V
V_{GSS}	Gate-source voltage	Continuous	± 30	V
V_{GSM}		Transient	± 40	
I_D	Drain current	$T_c = 25\text{ °C}$	2.3	A
I_{DM}	Pulse drain current	$T_c = 25\text{ °C}$, pulse width limited by $T_{vj(max)}$	9.0	
I_A	Avalanche current	$T_c = 25\text{ °C}$	3	A
E_{AS}	Non-repetitive single pulse avalanche energy	$T_c = 25\text{ °C}$	250	mJ
dv/dt	dv/dt capability	$I_S \leq I_{DM}, V_{DD} \leq V_{DSS}, T_{vj} \leq 150\text{ °C}$	5	V/ns
P_{tot}	Total power dissipation	$T_c = 25\text{ °C}$	110	W
T_{vj}	Virtual junction temperature range	–	–55 to +150	°C
$T_{vj(max)}$	Maximum virtual junction temperature	–	150	
T_{stg}	Storage temperature range	–	–55 to +150	
T_L	Maximum lead temperature for soldering purposes	1.6mm (0.062 in.) from Case for 10 s	300	°C
F	Mounting force	–	1.13 / 10	Nm/lb.in
V_{ISOL}	Isolation withstand voltage	50/60 Hz, RM, t = 1 min	2500	V
G	Weight	–	5	g

Electrical Characteristics – Static ($T_{vj} = 25\text{ °C}$ unless otherwise specified)

Symbol	Characteristic	Conditions	Value			Unit	
			Min.	Typ.	Max.		
$V_{(BR)DSS}$	Drain-source breakdown voltage	$I_D = 250\text{ }\mu\text{A}, V_{GS} = 0\text{ V}$	1500	–	–	V	
$V_{GS(th)}$	Gate-source threshold voltage	$I_D = 250\text{ }\mu\text{A}, V_{GS} = V_{DS}$	2.5	–	5.0	V	
I_{GSS}	Gate leakage current	$V_{DS} = 0\text{ V}, V_{GS} = \pm 30\text{ V}$	–	–	± 100	nA	
I_{DSS}	Drain-source leakage current	$V_{DS} = V_{DSS}, V_{GS} = 0\text{ V}$	$T_{vj} = 25\text{ °C}$	–	–	10	μA
			$T_{vj} = 125\text{ °C}$	–	–	100	μA
$R_{DS(on)}$	Drain-source on-state resistance ¹	$V_{GS} = 10\text{ V}, I_D = 1.5\text{ A}$	–	–	8.0	Ω	

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

Electrical Characteristics – Dynamic $(T_{vj} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
g_{fs}	Transconductance ¹	$V_{DS} = 20\text{ V}, I_D = 1.5\text{ A}$	2.2	3.6	–	S
C_{iss}	Input capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	–	1375	–	pF
C_{oss}	Output capacitance		–	90	–	
C_{rss}	Reverse transfer capacitance		–	30	–	
$t_{d(on)}$	Turn-on delay time	Resistive Switching Times $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \times V_{DSS},$ $I_D = 1.5\text{ A}, R_{G(ext)} = 5\text{ }\Omega$	–	19	–	ns
t_r	Rise time		–	21	–	
$t_{d(off)}$	Turn-off delay time		–	42	–	
t_f	Fall time		–	25	–	
Q_G	Total gate charge	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \times V_{DSS},$ $I_D = 0.5\text{ A}$	–	38.6	–	nC
Q_{GS}	Gate-source charge		–	6.5	–	
Q_{GD}	Gate-drain charge		–	19.0	–	
R_{GI}	Gate Input Resistance	–	–	3.0	–	Ω

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

Thermal Specifications

Symbol	Characteristics	Value	Unit
$R_{th(j-c)}$	Thermal Resistance, Junction to Case	1.13	K/W
$R_{th(j-a)}$	Thermal Resistance, Junction to Ambient	0.15	K/W

Source - Drain Diode Characteristics $(T_{vj} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
I_S	Continuous diode forward current ¹	$V_{GS} = 0\text{ V}$	–	–	3	A
I_{SM}	Diode pulse current	Repetitive, pulse width limited by $T_{vj(max)}$	–	–	12	A
V_{SD}	Diode Forward Voltage ¹	$I_F = I_S, V_{GS} = 0\text{ V}$	–	–	1.3	V
t_{rr}	Reverse recovery time	$I_F = 1.5\text{ A},$ $-di/dt = 100\text{ A}/\mu\text{s},$ $V_R = 100\text{ V}$	–	0.9	–	μs
Q_{rr}	Reverse recovery charge		–	6.7	–	μC
I_{rrm}	Peak reverse recovery current		–	15.0	–	A

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

Characteristic Curves

Fig. 1. Output Characteristics @ $T_{vj} = 25^\circ\text{C}$

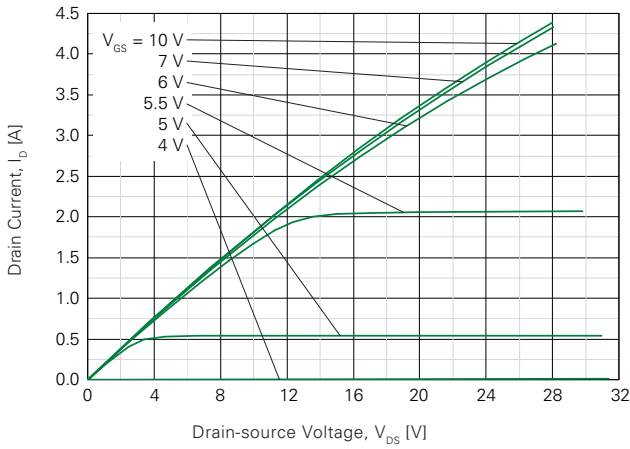


Fig. 2. Output Characteristics @ $T_{vj} = 125^\circ\text{C}$

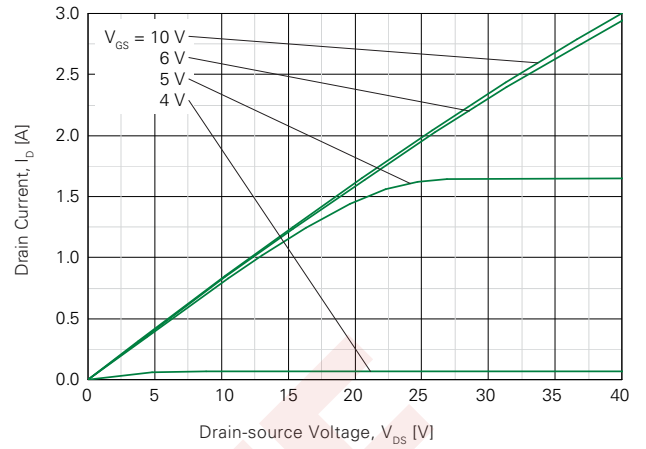


Fig. 3. $R_{DS(on)}$ Normalized to $I_D = 1.5\text{ A}$ Value vs. Junction Temperature

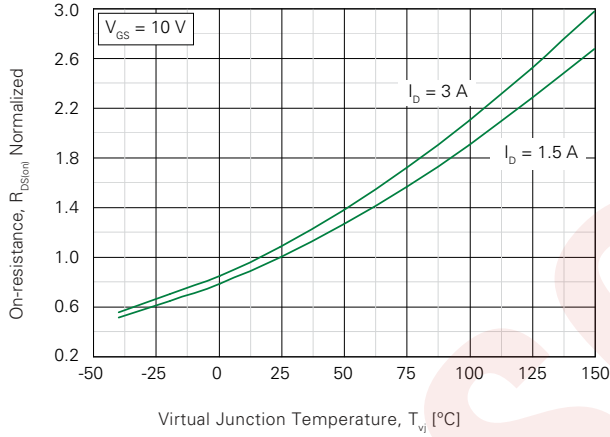


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 1.5\text{ A}$ Value vs. Drain Current

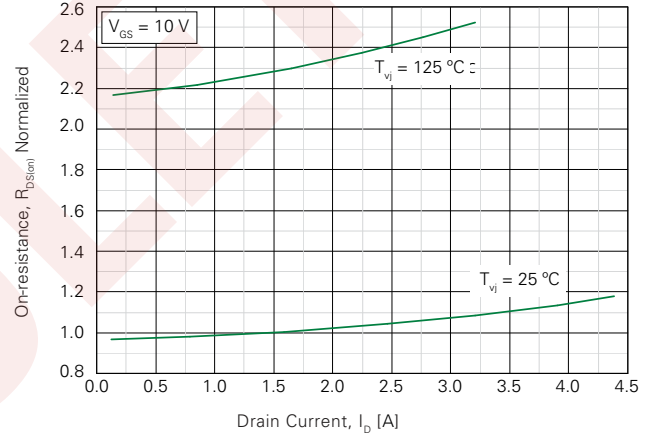


Fig. 5. Maximum Drain Current vs. Case Temperature

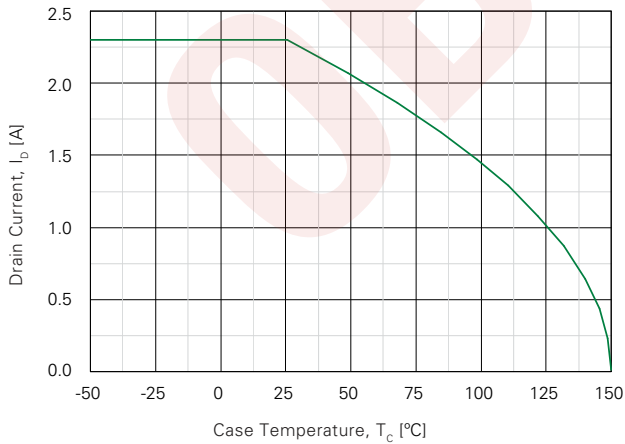


Fig. 6. Input Admittance

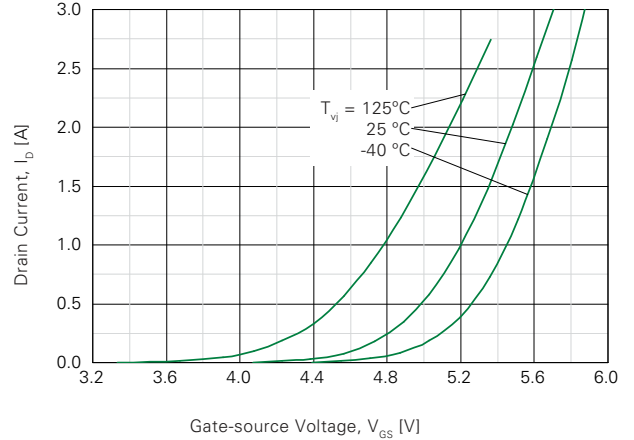


Fig. 7. Input Admittance

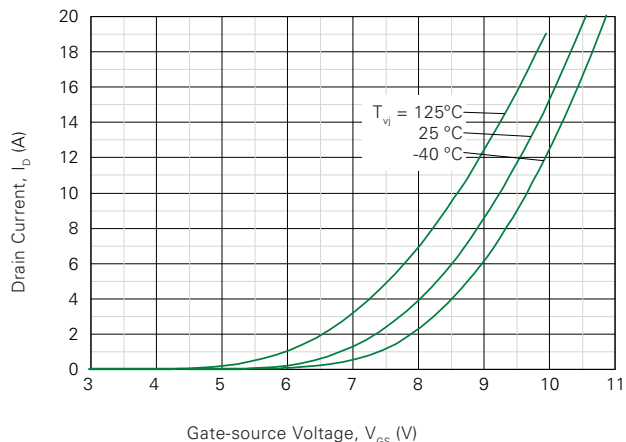


Fig. 8. Forward Voltage Drop of Intrinsic Diode

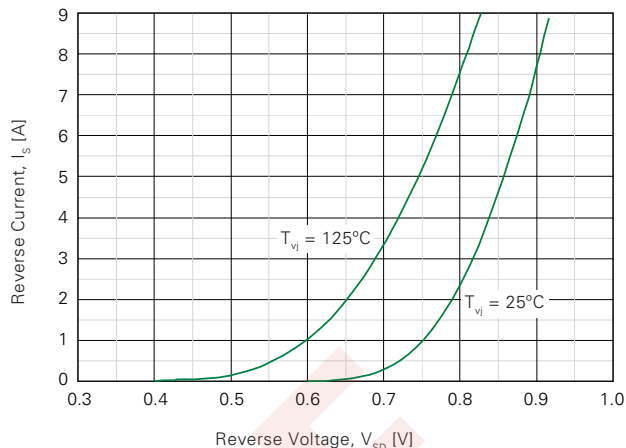


Fig. 9. Gate Charge

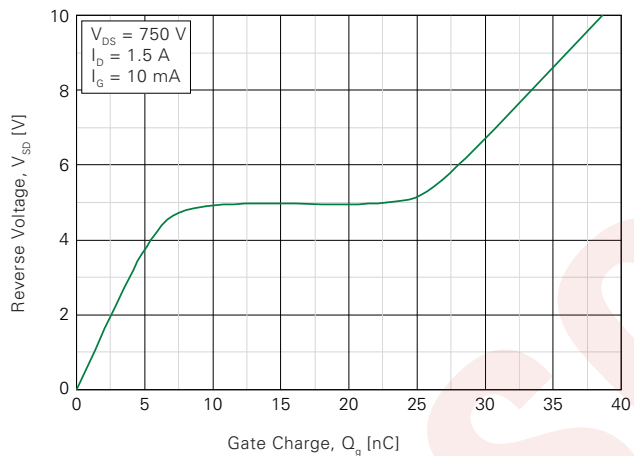


Fig. 10. Capacitance

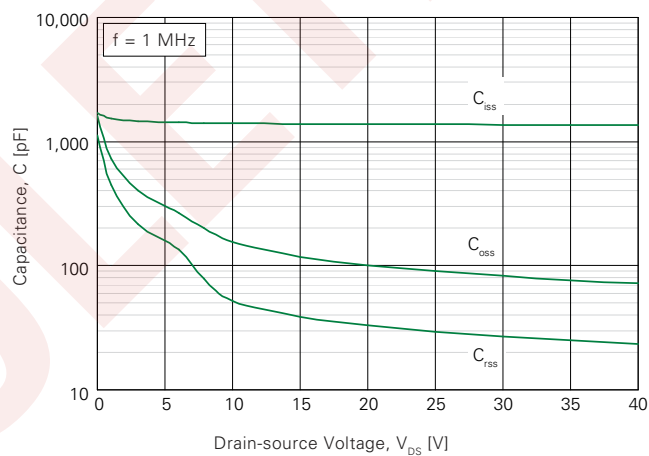


Fig. 11. Forward-Bias Safe Operating Area

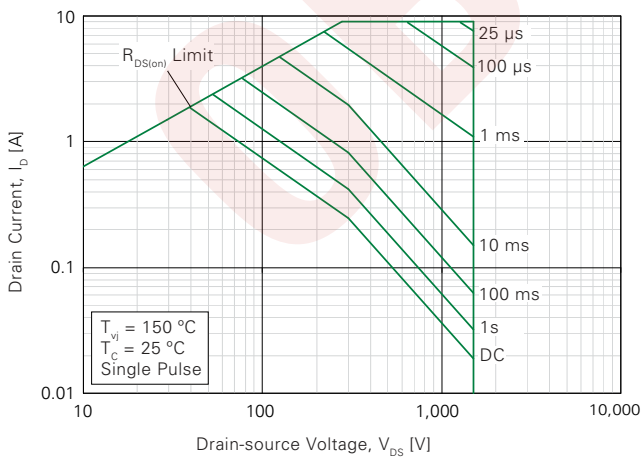
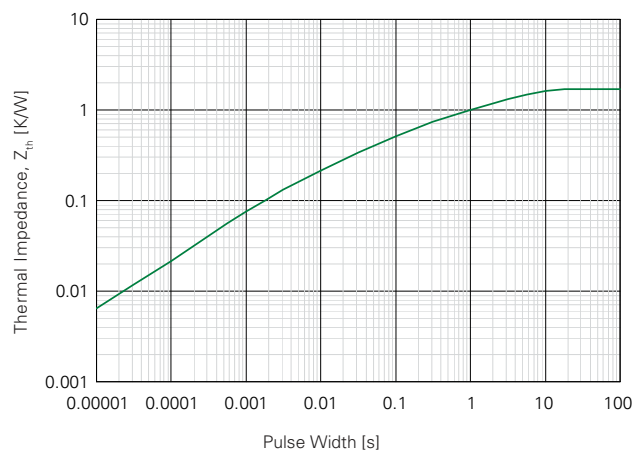
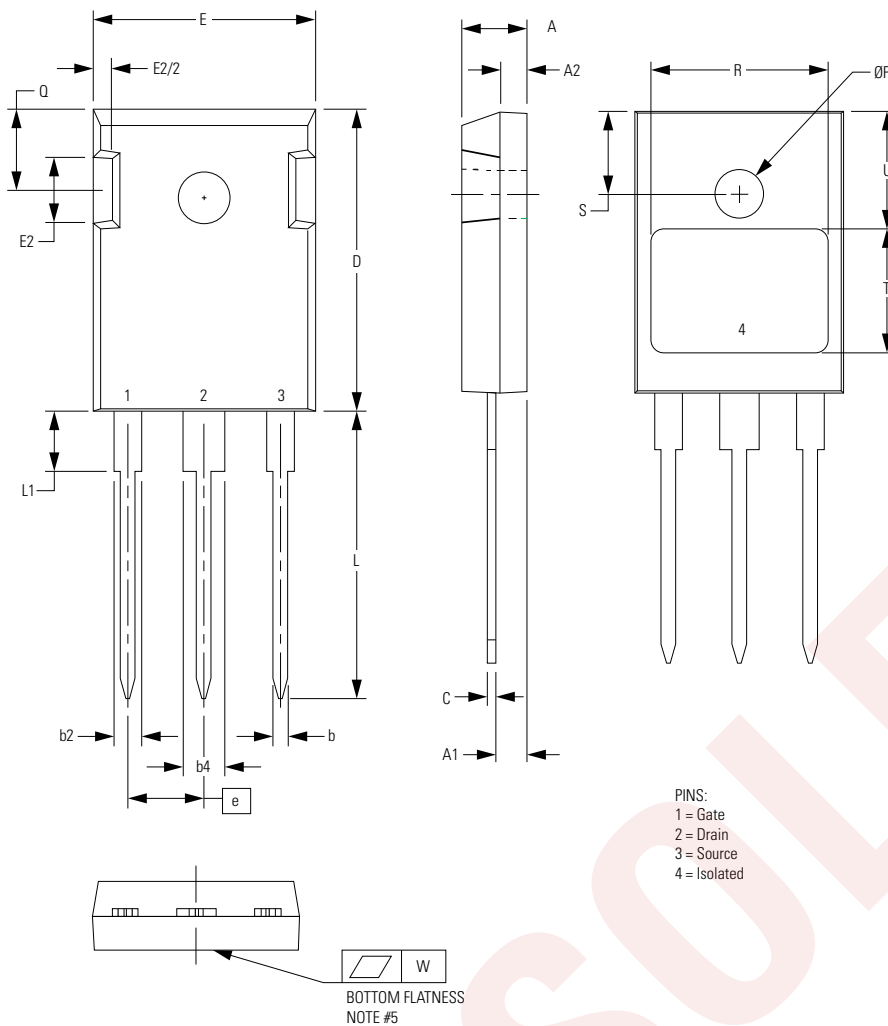


Fig. 12. Maximum Transient Thermal Impedance



Part Outline Drawing (ISO TO-247 (IXTJ))



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	0.190	0.205
A1	2.21	2.54	0.087	0.100
A2	1.91	2.16	0.075	0.085
b	1.14	1.40	0.045	0.055
b2	1.91	2.16	0.075	0.085
b4	2.92	3.20	0.115	0.126
c	0.58	0.84	0.023	0.033
D	20.83	21.34	0.820	0.840
E	15.75	16.13	0.620	0.635
E2	4.44	4.95	0.175	0.195
e	5.45 BSC		0.215 BSC	
L	19.81	20.57	0.780	0.810
L1	4.06	4.50	0.160	0.177
Q	5.59	6.10	0.220	0.240
R	13.21	13.72	0.520	0.540
S	6.15 BSC		0.242 BSC	
T	9.02	9.53	0.355	0.375
U	8.76	9.40	0.345	0.370
ØP	3.55	3.66	0.140	0.144
W	0.000	0.10	0.000	0.004

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