IXYS

Advanced Technical Information

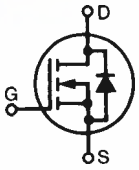
HiPerFET™ Power MOSFETs Q-CLASS

IXFX 90N20Q
IXFK 90N20Q

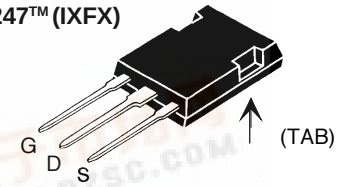
V_{DSS} = 200 V
I_{D25} = 90 A
$R_{DS(on)}$ = 22 mΩ
$t_{rr} \leq$ 200 µs

Single MOSFET Die

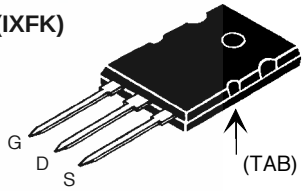
N-Channel Enhancement Mode
Avalanche Rated, Low Qg,
High dV/dt, Low t_{rr}



PLUS 247™ (IXFX)



TO-264 AA (IXFK)



G = Gate D = Drain
S = Source TAB = Drain

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	300	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ	300	V
V_{GS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	73	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	292	A
I_{AR}	T_C = 25°C	73	A
E_{AR}	T_C = 25°C	60	mJ
E_{AS}	T_C = 25°C	2.5	J
dv/dt	$I_S \leq I_{DM}$, di/dt ≤ 100 A/µs, $V_{DD} \leq V_{DSS}$ $T_J \leq$ 150°C, R_G = 2 Ω	5	V/ns
P_D	T_C = 25°C	500	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6 mm (0.063 in.) from case for 10 s	300	°C
M_d	Mounting torque TO-264	0.4/6	Nm/lb.in.
Weight	PLUS 247	6	g
	TO-264	10	g

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	min.	typ.	max.	
V_{DSS}	V_{GS} = 0 V, I_D = 4mA	300			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 4mA	2.0		4.0	V
I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0			±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$ V_{GS} = 0 V			100	µA
	T_J = 125°C			2	mA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 I_{D25} Note 1			22	mΩ

Features

- IXYS advanced low Q_g process
- Low gate charge and capacitances
  - easier to drive
  - faster switching
- International standard packages
- Low $R_{DS\ (on)}$
- Rated for unclamped Inductive load switching (UIS) rated
- Molding epoxies meet UL 94 V-0 flammability classification

Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control
- Temperature and lighting controls

Advantages

- PLUS 247™ package for clip or spring mounting
- Space savings
- High power density

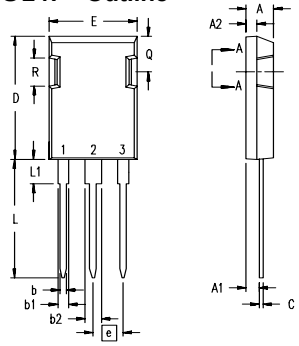
Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	V_{DS} = 10 V; I_D = 0.5 I_{D25} Note 1	40	50		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		6800		pF
C_{oss}			1620		pF
C_{rss}			480		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25} R_G = 1 Ω (External),		35		ns
t_r			31		ns
$t_{d(off)}$			82		ns
t_f			12		ns
$Q_{g(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}		190		nC
Q_{gs}			40		nC
Q_{gd}			90		nC
R_{thJC}				0.26	K/W
R_{thCK}			0.15		K/W

Source-Drain Diode

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
I_S	V_{GS} = 0 V			90	A
I_{SM}	Repetitive; pulse width limited by T_{JM}			360	A
V_{SD}	I_F = I_S, V_{GS} = 0 V, Note 1			1.3	V
t_{rr}	I_F = 45A,-di/dt = 100 A/µs, V_R = 100 V			200	ns
Q_{RM}			1.4		µC
I_{RM}			10		A

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

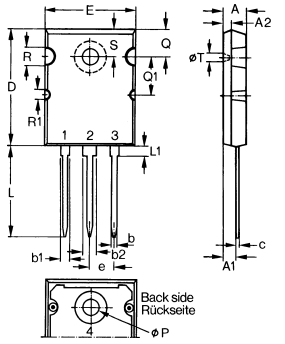
PLUS 247™ Outline



Terminals: 1 - Gate
2 - Drain (Collector)
3 - Source (Emitter)
4 - Drain (Collector)

Dim.	Millimeter Min.	Max.	Inches Min.	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

TO-264 AA Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072