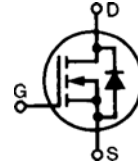


# HiPerFET™ Power MOSFETs IXFR 58N20Q

## ISOPLUS247™ Q-Class

(Electrically Isolated Back Surface)

N-Channel Enhancement Mode  
 Avalanche Rated, High dV/dt  
 Low Gate Charge and Capacitances  
 Preliminary Data Sheet



$$V_{DSS} = 200 \text{ V}$$

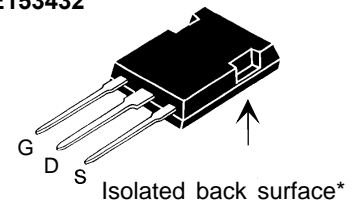
$$I_{D25} = 50 \text{ A}$$

$$R_{DS(on)} = 40 \text{ m}\Omega$$

$$t_{rr} \leq 200 \text{ ns}$$

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	200	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$	200	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	50	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , Note 1	232	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	58	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	30	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$	1.0	J
dv/dt	$I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$	5	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	300	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
$T_L$	1.6 mm (0.062 in.) from case for 10 s	250	$^\circ\text{C}$
$V_{ISOL}$	50/60 Hz, RMS $t = 1 \text{ min}$	2500	V~
Weight		5	g

ISOPLUS247™  
 E153432



G = Gate      D = Drain  
 S = Source

\* Patent pending

### Features

- Silicon chip on Direct-Copper-Bond substrate
  - High power dissipation
  - Isolated mounting surface
  - 2500V electrical isolation
- Low drain to tab capacitance (<50pF)
- IXYS advanced low  $Q_g$  process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Fast intrinsic diode

### Applications

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

### Advantages

- Easy assembly
- Space savings
- High power density

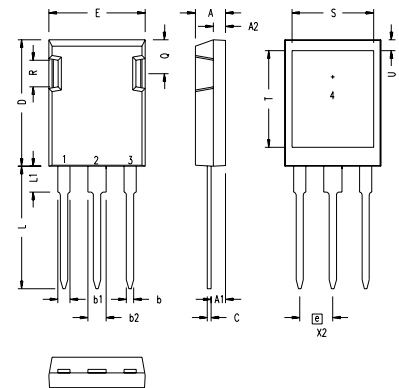
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	200		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4 \text{ mA}$	2.0		4.0 V
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0$			$\pm 100 \text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0 \text{ V}$		$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	25 $\mu\text{A}$ 1 mA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 29 \text{ A}$ Note 2			40 m $\Omega$

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	Characteristic Values			
			min.	typ.	max.	
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 29\text{ A}$	Note 2	24	34	S	
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$			3600	pF	
$C_{oss}$				870	pF	
$C_{rss}$				280	pF	
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 29\text{ A}$ $R_G = 1.5\ \Omega$ (External),			20	ns	
$t_r$				40	ns	
$t_{d(off)}$				40	ns	
$t_f$				13	ns	
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 29\text{ A}$			98	140	nC
$Q_{gs}$				25	35	nC
$Q_{gd}$				45	70	nC
$R_{thJC}$				0.5	K/W	
$R_{thCK}$	(TO-247)		0.15		K/W	

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	Characteristic Values		
			min.	typ.	max.
$I_S$	$V_{GS} = 0\text{ V}$			58	A
$I_{SM}$	Repetitive, Note 1			232	A
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{ V}$ , Note 2			1.5	V
$t_{rr}$	$I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$			200	ns
$Q_{RM}$				0.7	$\mu\text{C}$
$I_{RM}$				7	A

Note: 1. Pulse width limited by  $T_{JM}$   
2. Pulse test,  $t \leq 300\ \mu\text{s}$ , duty cycle  $d \leq 2\%$

### ISOPLUS 247 OUTLINE



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - NO CONNECTION

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.



---

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).