IXYS

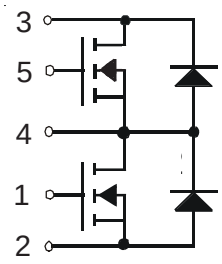
Advance Technical Information

Trench Gate HiperFET N-Channel Power MOSFET

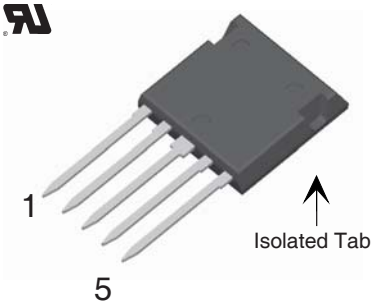
FMM60-02TF

V_{DSS} = 200V
I_{D25} = 33A
$R_{DS(on)}$ ≤ 40mΩ
$t_{rr(typ)}$ = 82ns

Phase Leg Topology



ISOPLUS i4-Pak™



Symbol	Test Conditions	Maximum Ratings	
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
V_{ISOLD}	50/60H_Z, RMS, t = 1min, leads-to-tab	2500	~V
T_L	1.6mm (0.062 in.) from case for 10s	300	°C
T_{SOLD}	Plastic body for 10s	260	°C
F_C	Mounting force	20..120 / 4.5..27	N/lb.

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	200	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	200	V
V_{GSM}	Transient	± 30	V
I_{D25}	T_C = 25°C	33	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	150	A
I_A	T_C = 25°C	5	A
E_{AS}	T_C = 25°C	1	J
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$	10	V/ns
P_D	T_C = 25°C	125	W

Symbol	Test Conditions	Characteristic Values Min.	Typ.	Max.	
C_P	Coupling capacitance between shorted pins and mounting tab in the case		40		pF
d_S, d_A	pin - pin	1.7			mm
d_S, d_A	pin - backside metal	5.5			mm
Weight			9		g

Features

- Silicon chip on Direct-Copper Bond (DCB) substrate
  - UL recognized package
  - Isolated mounting surface
  - 2500V electrical isolation
- Avalanche rated
- Low Q_G
- Low Drain-to-Tab capacitance
- Low package inductance

Advantages

- Low gate drive requirement
- High power density
- Fast intrinsic rectifier
- Low drain to ground capacitance
- Fast switching

Applications

- DC and AC motor drives
- UPS, solar and wind power inverters
- Synchronous rectifiers
- Multi-phase DC to DC converters
- Industrial battery chargers
- Switching power supplies

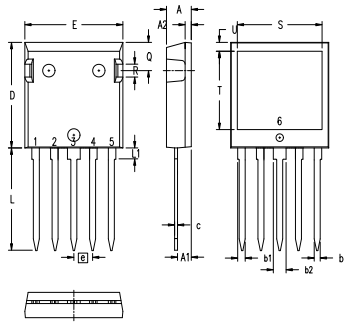
Symbol	Test Conditions[2] (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250µA	200			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250µA	2.5		4.5	V
I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0V			± 200	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			5	µA
	T_J = 125°C			250	µA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 30A, Note 1		32	40	mΩ
g_{fs}	V_{DS} = 10V, I_D = 60A, Note 1	40	62		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25 V, f = 1 MHz		3700		pF
C_{oss}			520		pF
C_{rss}			37		pF
$t_{d(on)}$	**Resistive Switching Times**		39		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 30A		46		ns
$t_{d(off)}$	R_G = 5Ω (External)		75		ns
t_f			42		ns
$Q_{g(on)}$	V_{GS}= 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 30A		90		nC
Q_{gs}			33		nC
Q_{gd}			21		nC
R_{thJC}				1.0	°C/W
R_{thCS}			0.15		°C/W

Source-Drain Diode

Symbol	Test Conditions[3] (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			33	A
I_{SM}	Repetitive, pulse width limited by T_{JM}			150	A
V_{SD}	I_F = 60A, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 25A, -di/dt = 100A/µs		82		ns
I_{RM}	V_R = 100V, V_{GS} = 0V		15.3		A
Q_{RM}			0.63		µC

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

ISOPLUS i4-Pak™ Outline



NOTE: Bottom heatsink meets 3000 Volts AC 1 sec isolation to the other pins.

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.190	.205	4.83	5.21
A1	.102	.118	2.59	3.00
A2	.046	.085	1.17	2.16
b	.045	.055	1.14	1.40
b1	.058	.068	1.47	1.73
b2	.100	.110	2.54	2.79
C	.020	.029	0.51	0.74
D	.819	.840	20.80	21.34
E	.770	.799	19.56	20.29
e	.150 BSC		3.81 BSC	
L	.780	.840	19.81	21.34
L1	.083	.102	2.11	2.59
Q	.210	.244	5.33	6.20
R	.100	.180	2.54	4.57
S	.660	.690	16.76	17.53
T	.590	.620	14.99	15.75
U	.065	.080	1.65	2.03

Ref: IXYS CO 0077 R0

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated objective result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.