IXYS

Preliminary Technical Information

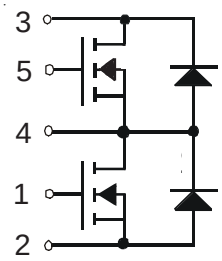
Trench Gate HiperFET Power MOSFET

FMM50-025TF

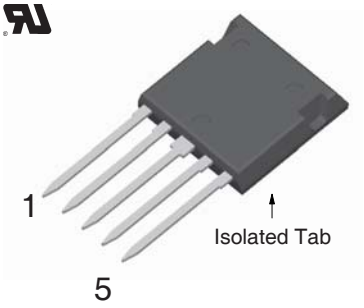
V_{DSS} = 250V
I_{D25} = 30A
$R_{DS(on)}$ ≤ 60mΩ
$t_{rr(typ)}$ = 84ns

Phase Leg Topology

N-Channel



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	250	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	250	V
V_{GSM}	Transient	± 30	V
I_{D25}	T_C = 25°C	30	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	130	A
I_A	T_C = 25°C	25	A
E_{AS}	T_C = 25°C	400	mJ
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$	15	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

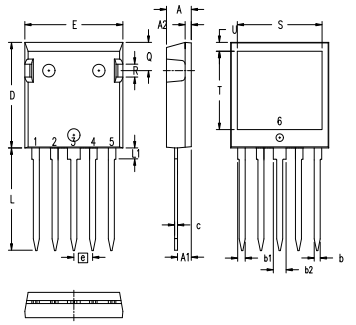
- Low Gate Drive RRequirement
- High power density
- Fast Intrinsic Rectifier
- Low Drain to Ground Capacitance
- Fast Switching

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 (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 1mA	250			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			± 100	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			1	µA
	T_J = 125°C			150	µA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 25A, Note 1			60	mΩ
g_{fs}	V_{DS} = 10V, I_D = 25A, Note 1	35	58		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25 V, f = 1 MHz		4000		pF
C_{oss}			410		pF
C_{rss}			60		pF
$t_{d(on)}$	**Resistive Switching Times**		14		ns
t_r	V_{GS} = 15V, V_{DS} = 0.5 • V_{DSS}, I_D = 25A		25		ns
$t_{d(off)}$	R_G = 5Ω (External)		47		ns
t_f			25		ns
$Q_{g(on)}$	V_{GS}= 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 25A		78		nC
Q_{gs}			19		nC
Q_{gd}			22		nC
R_{thJC}				1.0	°C/W
R_{thCS}			0.15		°C/W

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

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			30	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			200	A
V_{SD}	I_F = 50A, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 25A, -di/dt = 250A/µs		84		ns
I_{RM}	V_R = 100V, V_{GS} = 0V		15.4		A
Q_{RM}			650		nC

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

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.