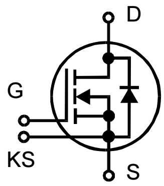
IXYS

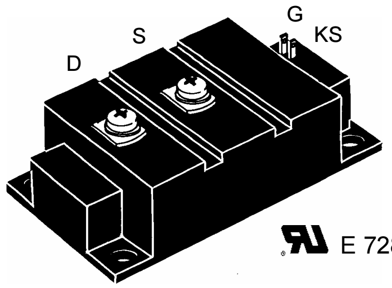
MegaMOS™FET Module

VMO 450-02F

V_{DSS} = 200 V
I_{D25} = 450 A
$R_{DS(on)\ typ}$ = 3.8 mΩ

N-Channel Enhancement Mode





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D = Drain
S = Source
KS = Kelvin Source
G = Gate

Symbol	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} = 10 kΩ		200	V
V_{GS}	Continuous		±20	V
V_{GSM}	Transient		±30	V
I_{D25}	T_C = 25°C		450	A
I_{D80}	T_C = 80°C		340	A
I_{DM}	T_C = 25°C, t_P = 10 µs ✶		1800	A
P_D	T_C = 25°C		2000	W
T_J			-40 ...+150	°C
T_{JM}			150	°C
T_{stg}			-40 ... +125	°C
V_{ISOL}	50/60 Hz	t = 1 min	3000	V~
	I_{ISOL} ≤ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque (M6)		2.25-2.75/20-25	Nm/lb.in.
	Terminal connection torque (M5)		2.5-3.7/22-33	Nm/lb.in.
Weight	typical including screws		250	g

Symbol	Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_{DSS}	V_{GS} = 0 V, I_D = 12 mA	200			V
$V_{GS(th)}$	V_{DS} = 20 V, I_D = 40 mA	2		4	V
I_{GSS}	V_{GS} = ±20 V DC, V_{DS} = 0			±500	nA
I_{DSS}	V_{DS} = 0.8 • V_{DSS}, V_{GS} = 0 V, T_J = 25°C			2.2	mA
	T_J = 125°C			11	mA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 • I_{D25}; Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %		3.8	4.6	mΩ

✶ Additional current limitation by external leads

Features

- International standard package
- **D**irect **C**opper **B**onded Al_2O_3 ceramic base plate
- Low $R_{DS(on)}$ HDMOS™ process
- Low package inductance for high speed switching
- Kelvin Source contact for easy drive

Applications

- AC motor speed control for electric vehicles
- DC servo and robot drives
- Switched-mode and resonant-mode power supplies
- DC choppers

Advantages

- Easy to mount
- Space and weight savings
- High power density
- Low losses

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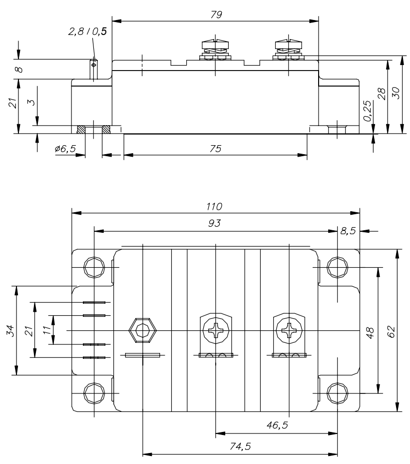
IXYS reserves the right to change limits, test conditions and dimensions.

Symbol	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} pulsed		400		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		52		nF
C_{oss}			10		nF
C_{rss}			3.5		nF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}; R_G = 1 Ω		210		ns
t_r			500		ns
$t_{d(off)}$			900		ns
t_f			350		ns
Q_g	V_{GS} = 10 V, V_{DS} = 100 V, I_D = 200 A		2300		nC
Q_{gs}			420		nC
Q_{gd}			1100		nC
R_{thJC}				0.063	K/W
R_{thJK}	with 30 µm heat transfer paste		0.093		K/W

Dimensions in mm (1 mm = 0.0394")



Source-Drain Diode

Symbol	Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
I_S	V_{GS} = 0, T_C = 25°C, T_J = T_{JM}			450	A
I_{SM}	Repetitive; pulse width limited by T_{JM} ✷			1800	A
V_{SD}	I_F = 450 A; V_{GS} = 0 V, Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %		1	1.25	V
t_{rr}	I_F = I_S, -di/dt = 1200 A/µs, V_{DS} = 100 V		600		ns

✷ Additional current limitation by external leads

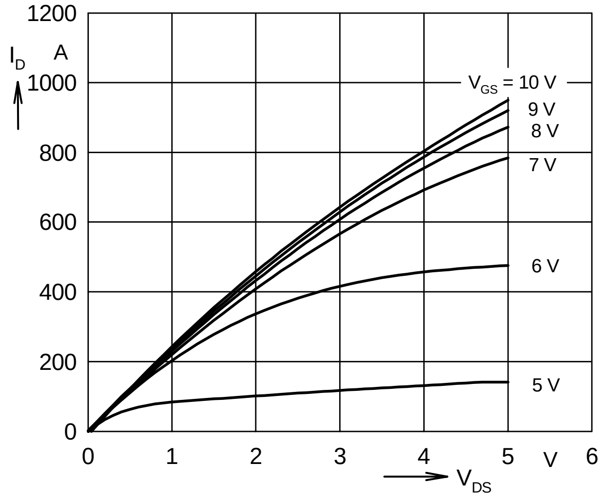


Fig. 1 Typical output characteristics $I_D = f(V_{DS})$

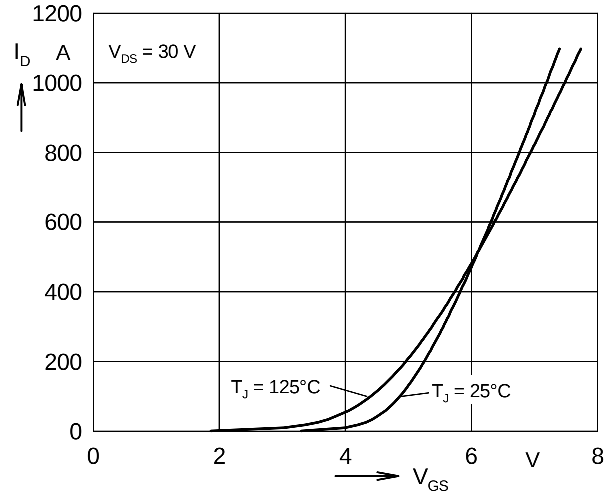


Fig. 2 Typical transfer characteristics $I_D = f(V_{GS})$

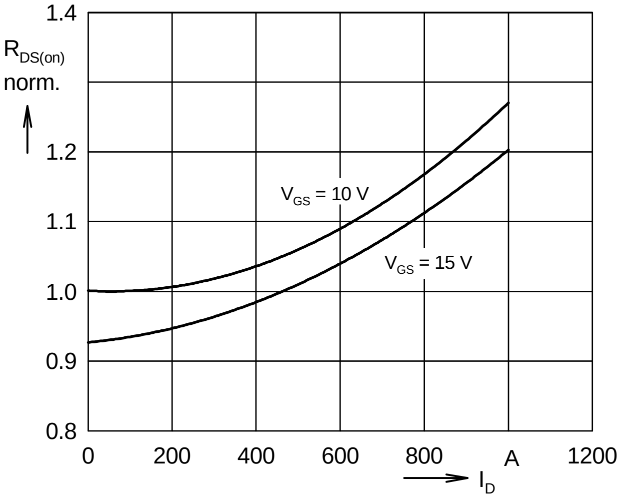


Fig. 3 Typical $R_{DS(on)} = f(I_D)$, normalized

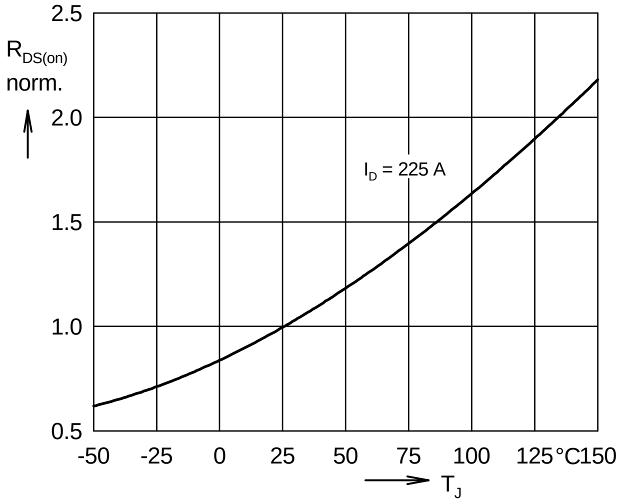


Fig. 4 $R_{DS(on)} = f(T_J)$, normalized

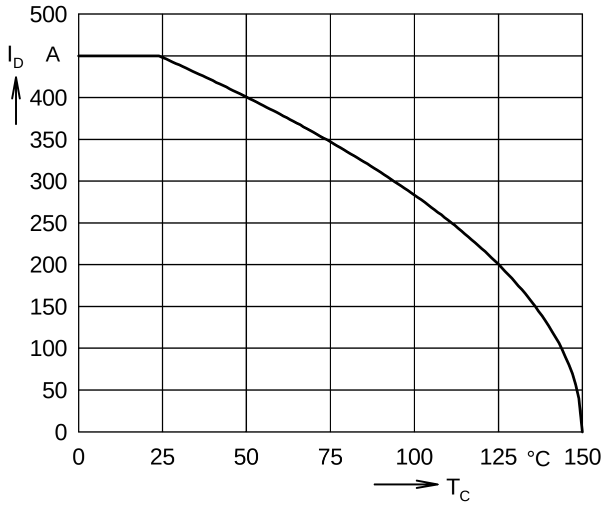


Fig. 5 Continuous drain current $I_D = f(T_C)$

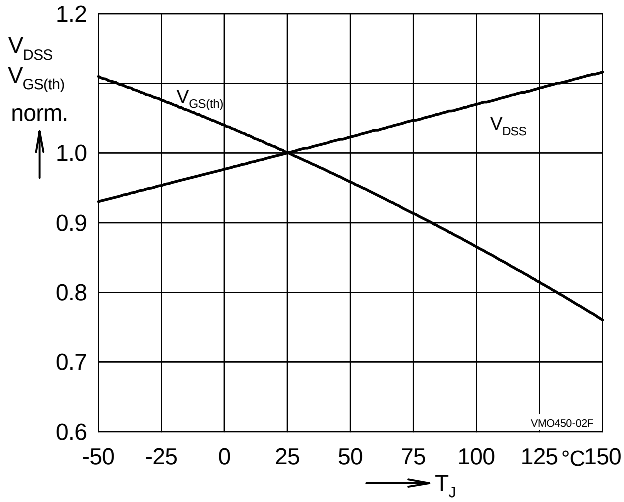


Fig. 6 $V_{DSS} = f(T_J)$, $V_{GS(th)} = f(T_J)$, normalized

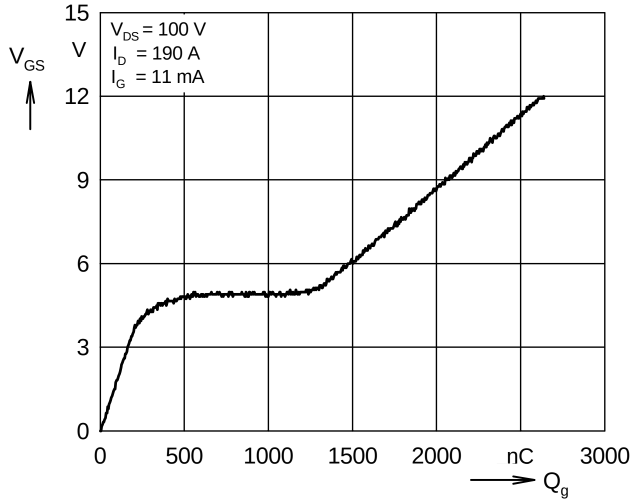


Fig. 7 Typical turn-on gate charge characteristics

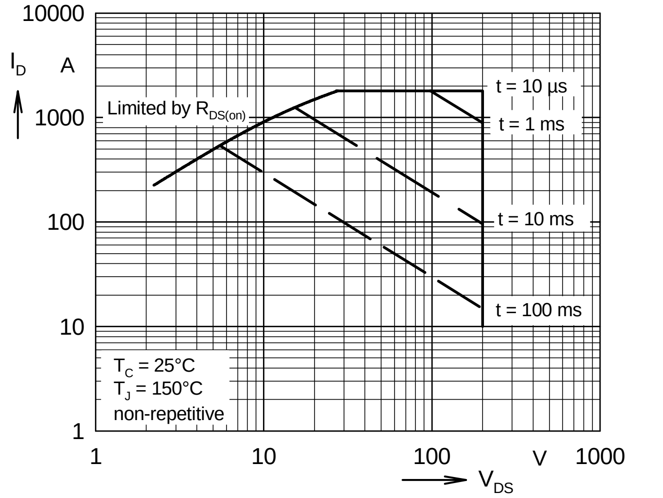


Fig. 8 Forward Bias Safe Operating Area, $I_D = f(V_{DS})$

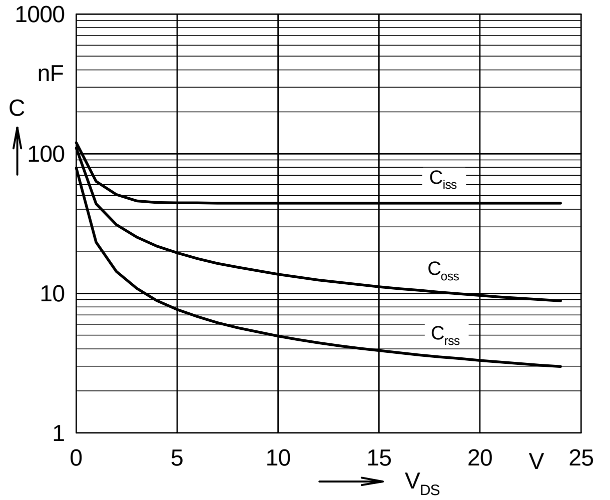


Fig. 9 Typical capacitances $C = f(V_{DS})$, f = 1 MHz

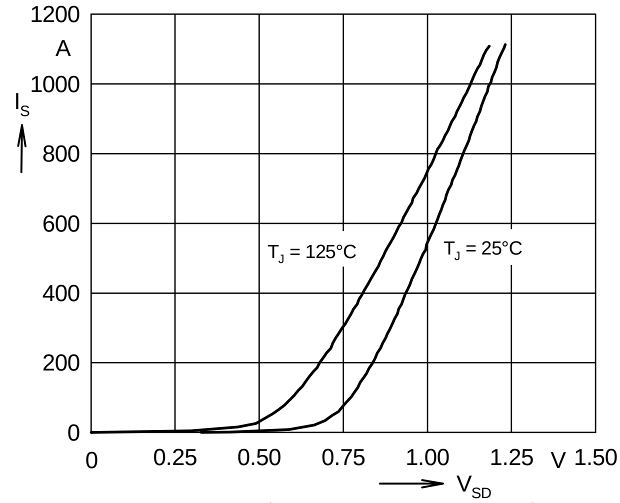


Fig. 10 Typical forward characteristics of reverse diode, $I_S = f(V_{SD})$

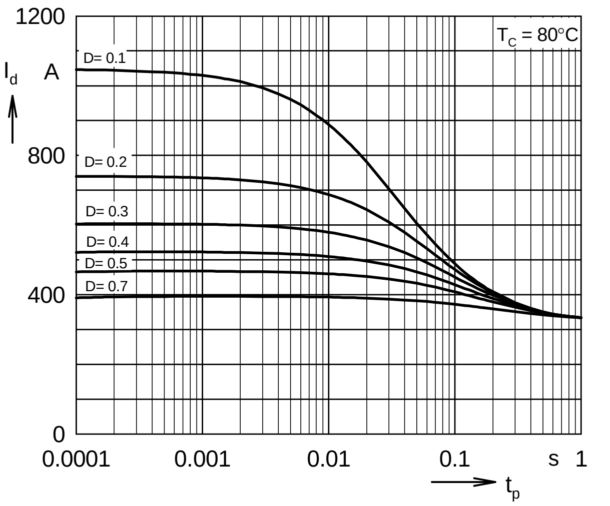


Fig. 11 Drain current versus pulse width and duty cycle

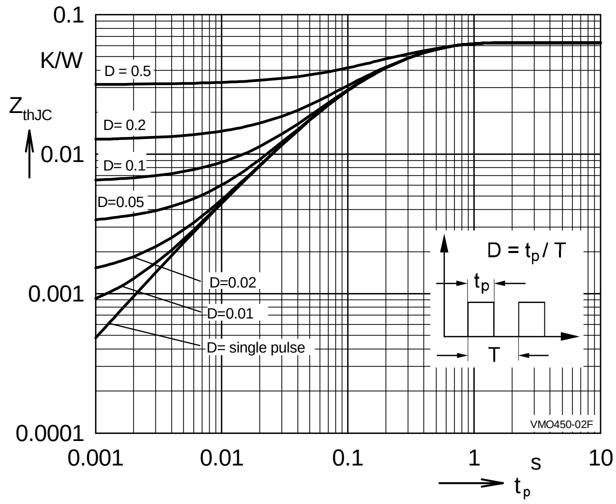


Fig. 12 Transient thermal resistance $Z_{thJK} = f(t_p)$