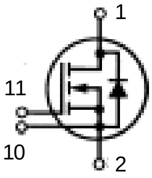
MegaMOS™FET Module

VMO 400-02F

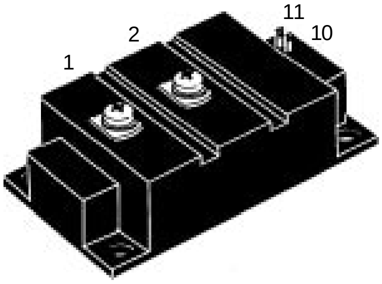
V_{DSS} = 200 V
I_{D25} = 418 A
$R_{DS(on)}$ = 4.2 mΩ

N-Channel Enhancement Mode



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} = 10 kΩ	200	V
V_{GS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_K = 25°C	418	A
I_{DM}	T_K = 25°C, t_P = 10 µs	1672	A
P_D	T_C = 25°C T_K = 25°C	2450 1640	W W
T_J		-40 ...+150	°C
T_{JM}		150	°C
T_{stg}		-40 ... +125	°C
V_{ISOL}	50/60 Hz t = 1 min I_{ISOL} ≤ 1 mA t = 1 s	3000 3600	V~ V~
M_d	Mounting torque (M6) Terminal connection torque (M5)	2.25-2.75/20-25 2.5-3.7/22-33	Nm/lb.in. Nm/lb.in.
Weight	typical including screws	250	g

Symbol	Test 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 = 120 mA	3		6	V
I_{GSS}	V_{GS} = ±20 V DC, V_{DS} = 0			±500	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0 V T_J = 25°C V_{DS} = 0.8 • V_{DSS}, V_{GS} = 0 V T_J = 125°C			2.5 12	mA mA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 • I_{D25} Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %			4.2	mΩ



1 = Drain 2 = Source
10 = Kelvin Source 11 = Gate

Features

- International standard package
- **D**irect **C**opper **B**onded Al_2O_3 ceramic base plate
- Isolation voltage 3600 V~
- 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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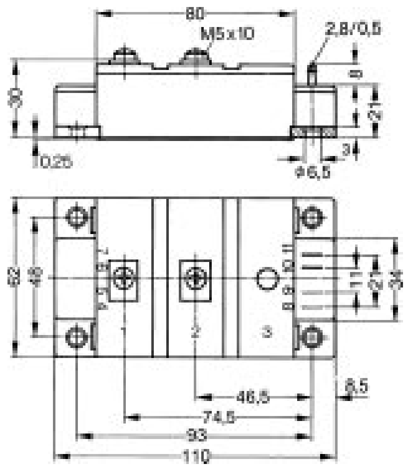
Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	V_{DS} = 10 V; I_D = 0.5 • I_{D25} pulsed		380		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		53		nF
C_{oss}			9.6		nF
C_{rss}			3.4		nF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25} R_G = 1 Ω (External)		210		ns
t_r			500		ns
$t_{d(off)}$			900		ns
t_f			350		ns
Q_g	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		2300		nC
Q_{gs}			420		nC
Q_{gd}			1150		nC
R_{thJC}				0.051	K/W
R_{thJK}	with 30 µm heat transfer paste			0.076	K/W

Dimensions in mm (1 mm = 0.0394")



Source-Drain Diode

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
I_S	V_{GS} = 0 V			418	A
I_{SM}	Repetitive; pulse width limited by T_{JM}			1672	A
V_{SD}	I_F = I_S; V_{GS} = 0 V, Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %		0.9	1.2	V
t_{rr}	I_F = I_S, -di/dt = 1200 A/µs, V_{DS} = 100 V		600		ns

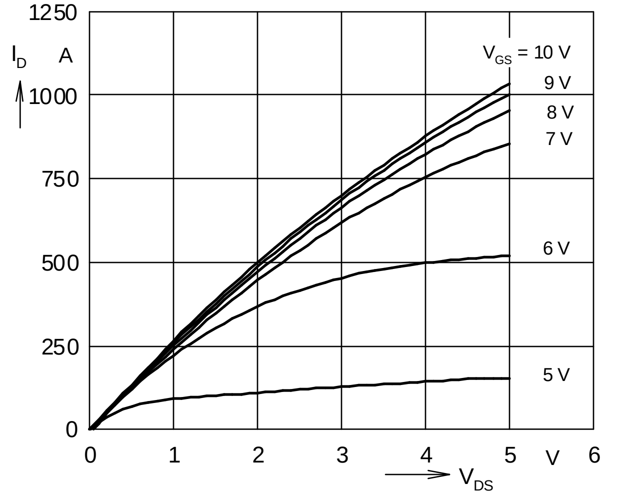


Fig. 1 Typical output characteristics $I_D = f(V_{DS})$

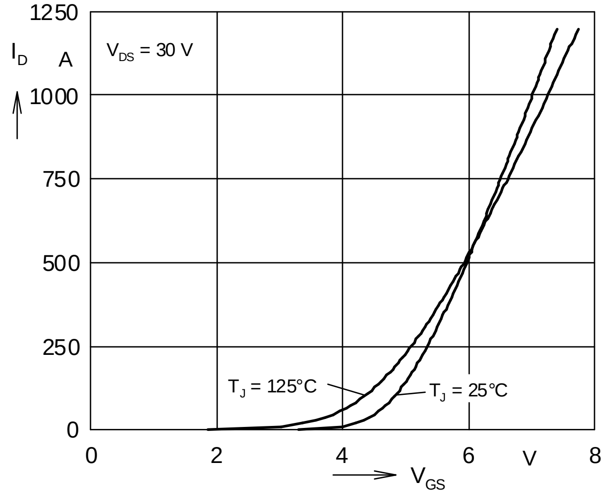


Fig. 2 Typical transfer characteristics $I_D = f(V_{GS})$

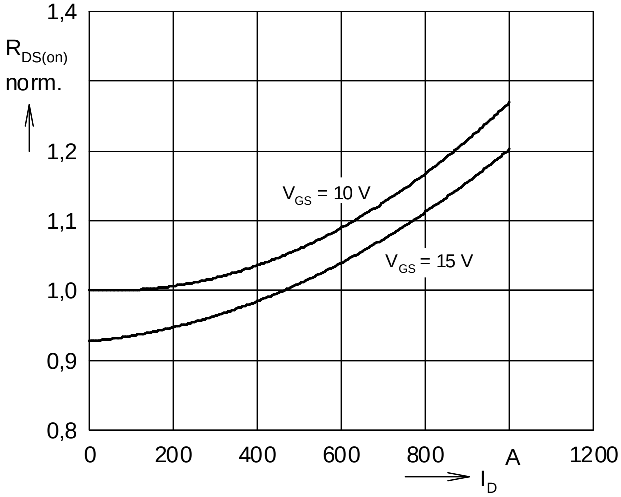


Fig. 3 Typical $R_{DS(on)} = f(I_D)$, normalized

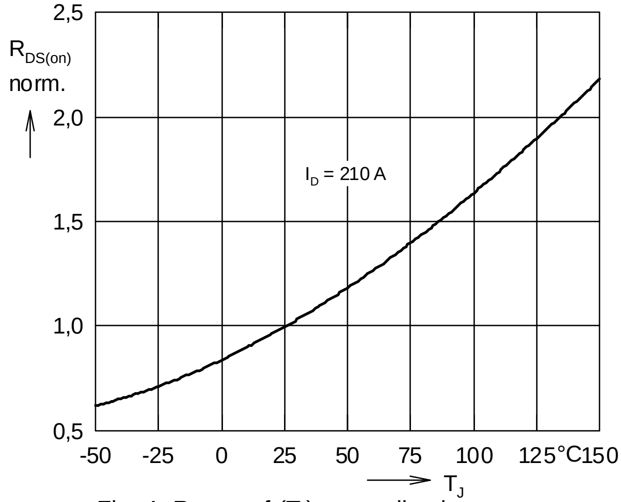


Fig. 4 $R_{DS(on)} = f(T_J)$, normalized

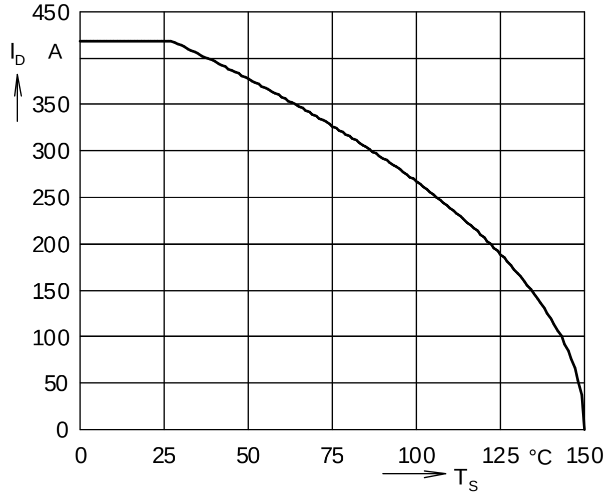


Fig. 5 Continuous drain current $I_D = f(T_K)$

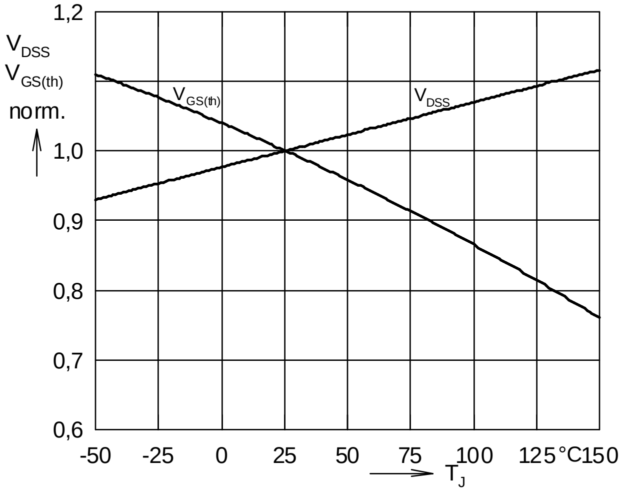


Fig. 6 $V_{DSS} = f(T_J)$, $V_{GS(th)} = f(T_J)$, normalized

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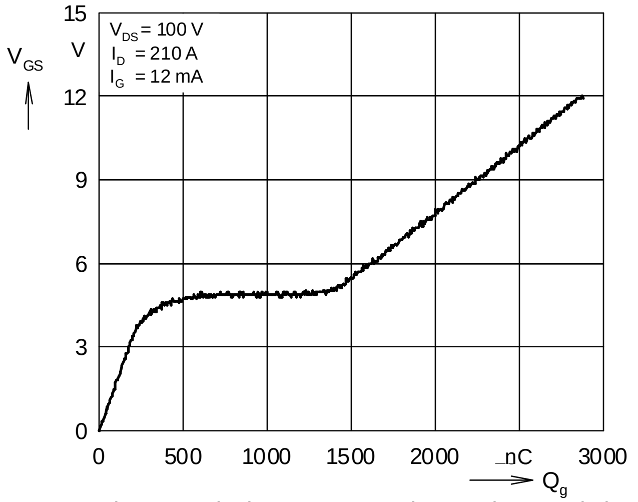

Fig. 7 Typical turn-on gate charge characteristics

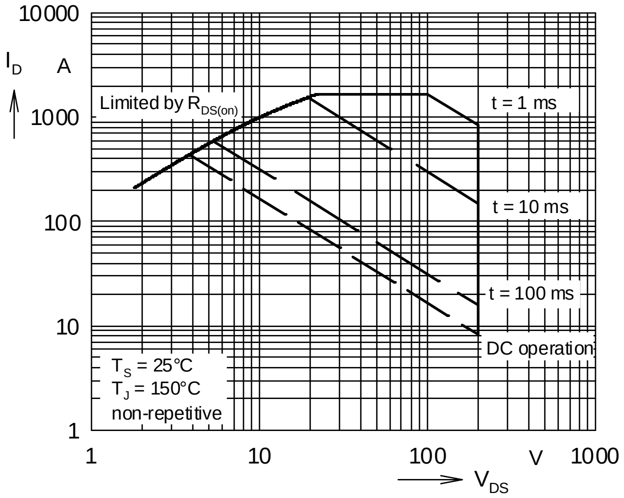

Fig. 8 Forward Bias Safe Operating Area, $I_D = f(V_{DS})$

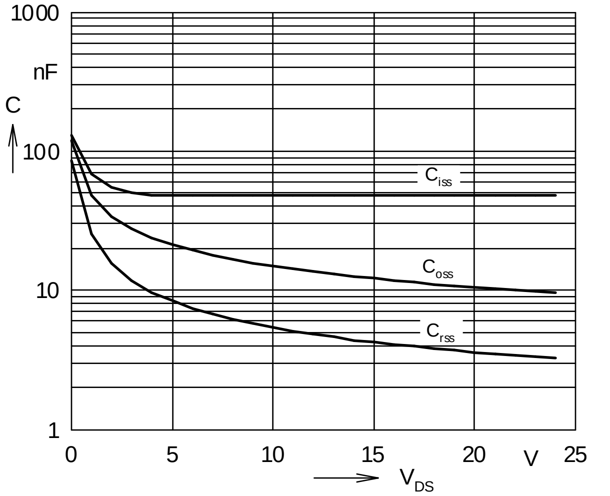

Fig. 9 Typical capacitances $C = f(V_{DS})$, f = 1 MHz

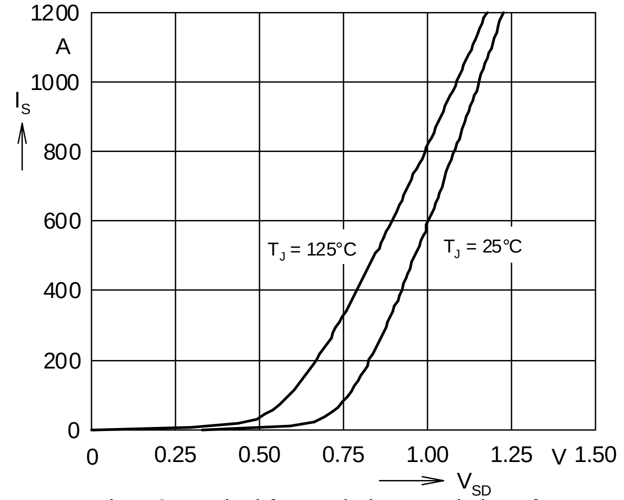

Fig. 10 Typical forward characteristics of reverse diode, $I_S = f(V_{SD})$

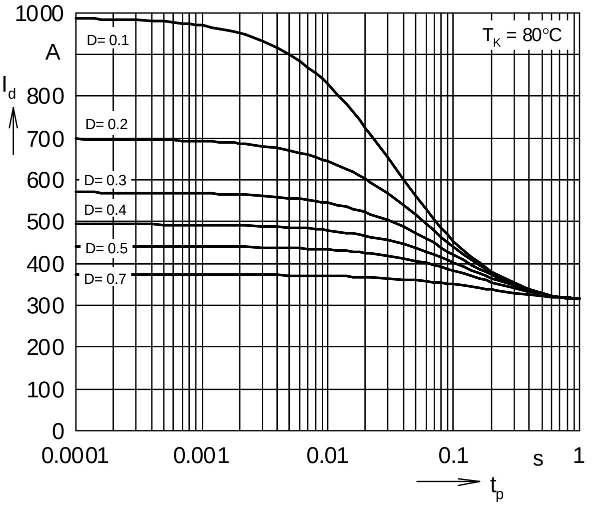

Fig. 11 Drain current versus pulse width and duty cycle

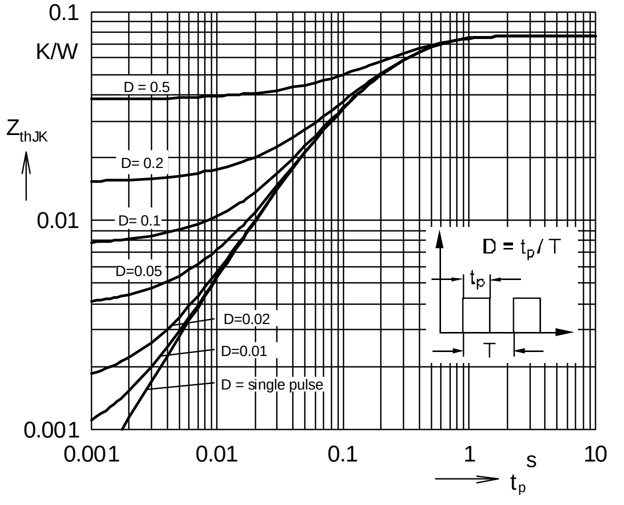

Fig. 12 Transient thermal resistance $Z_{thJK} = f(t_p)$

IXYS MOSFETS and IGBTs are covered by one or more of the following U.S. patents:

4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715

4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025