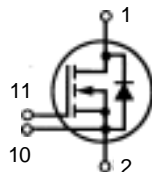


MegaMOS™FET Module

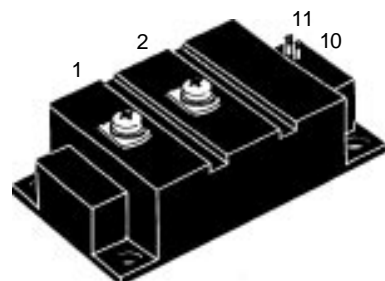
VMO 400-02F

$V_{DSS} = 200 \text{ V}$
 $I_{D25} = 418 \text{ A}$
 $R_{DS(on)} = 4.2 \text{ m}\Omega$

N-Channel Enhancement Mode



Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	200	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 10 \text{ k}\Omega$	200	V
V_{GS}	Continuous	± 20	V
V_{GSM}	Transient	± 30	V
I_{D25}	$T_K = 25^\circ\text{C}$	418	A
I_{DM}	$T_K = 25^\circ\text{C}$, $t_p = 10 \mu\text{s}$	1672	A
P_D	$T_C = 25^\circ\text{C}$	2450	W
	$T_K = 25^\circ\text{C}$	1640	W
T_J		-40 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-40 ... +125	$^\circ\text{C}$
V_{ISOL}	50/60 Hz $I_{ISOL} \leq 1 \text{ mA}$	$t = 1 \text{ min}$ $t = 1 \text{ s}$	3000 V~ 3600 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



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

Features

- International standard package
- Direct Copper Bonded 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

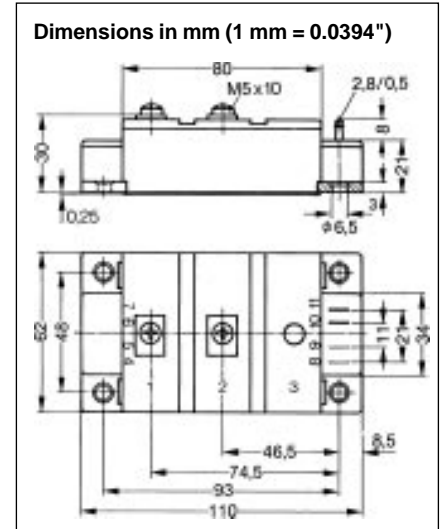
Advantages

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

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_{DSS}	$V_{GS} = 0 \text{ V}$, $I_D = 12 \text{ mA}$	200		V
$V_{GS(th)}$	$V_{DS} = 20 \text{ V}$, $I_D = 120 \text{ mA}$	3		6 V
I_{GSS}	$V_{GS} = \pm 20 \text{ V DC}$, $V_{DS} = 0$			$\pm 500 \text{ nA}$
I_{DSS}	$V_{DS} = V_{DSS}$, $V_{GS} = 0 \text{ V}$ $T_J = 25^\circ\text{C}$ $V_{DS} = 0.8 \cdot V_{DSS}$, $V_{GS} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$			2.5 mA 12 mA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$, $I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300 \mu\text{s}$, duty cycle $d \leq 2 \%$			4.2 m Ω

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

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
g_{fs}	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ pulsed		380	S
C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		53	nF
C_{oss}			9.6	nF
C_{rss}			3.4	nF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1\ \Omega$ (External)		210	ns
t_r			500	ns
$t_{d(off)}$			900	ns
t_f			350	ns
Q_g	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		2300	nC
Q_{gs}			420	nC
Q_{gd}			1150	nC
R_{thJC}	with 30 μm heat transfer paste			0.051 K/W
R_{thJK}				0.076 K/W



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

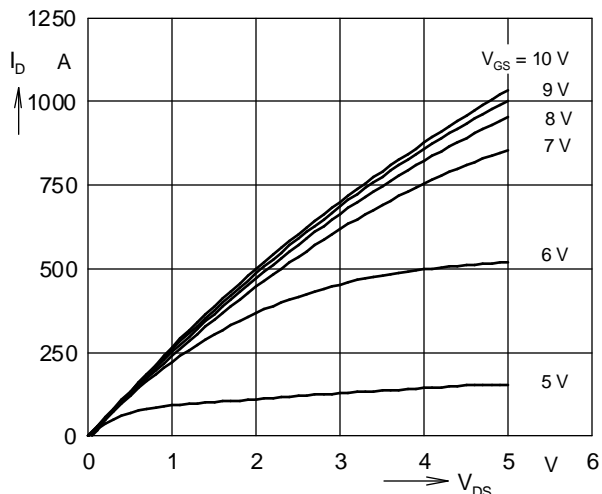


Fig. 1 Typical output characteristics $I_D = f(V_{DS})$

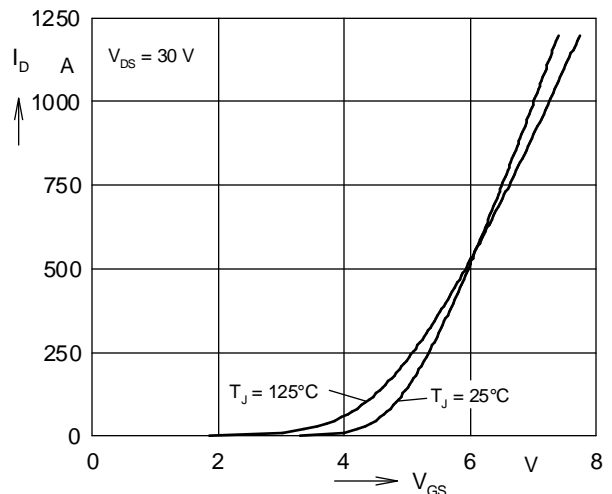


Fig. 2 Typical transfer characteristics $I_D = f(V_{GS})$

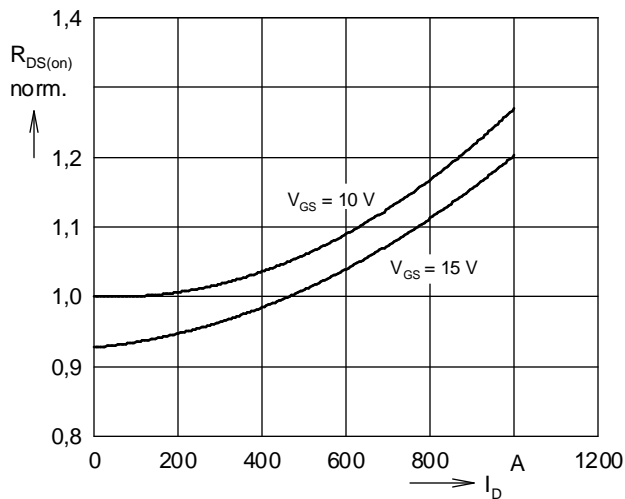


Fig. 3 Typical $R_{DS(on)} = f(I_D)$, normalized

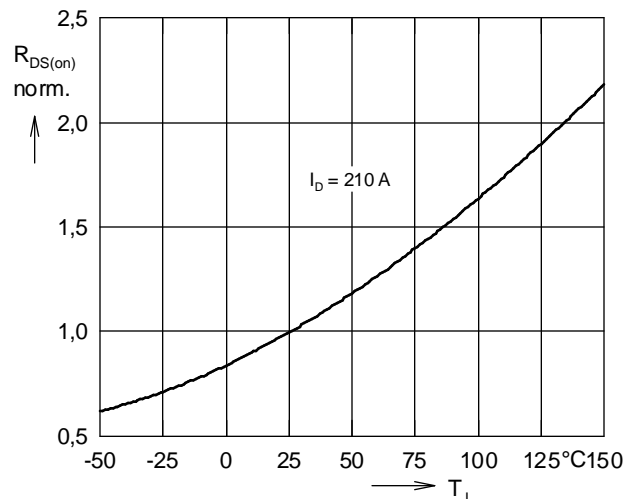


Fig. 4 $R_{DS(on)} = f(T_J)$, normalized

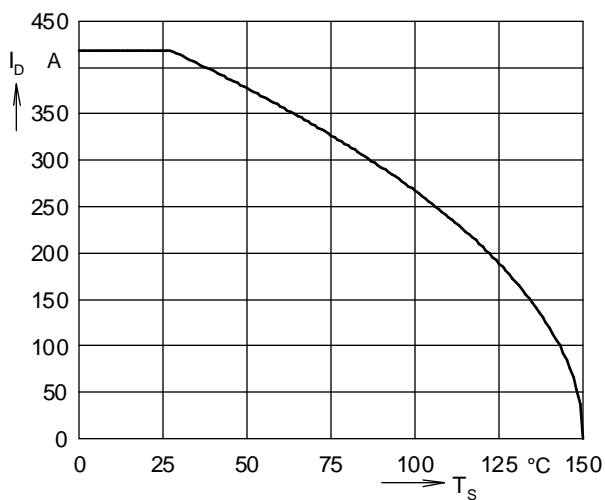


Fig. 5 Continuous drain current $I_D = f(T_K)$

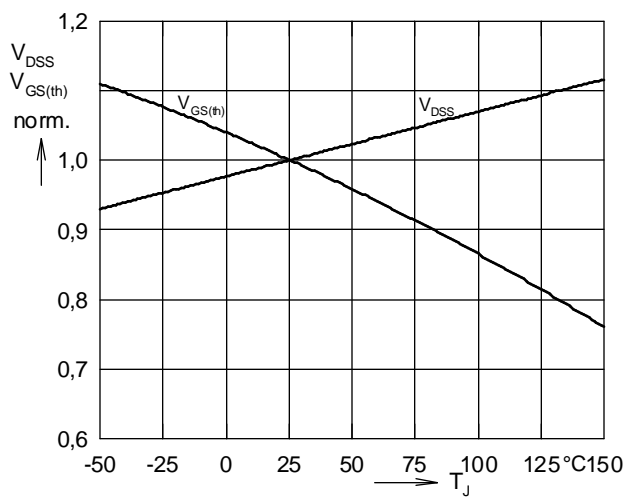


Fig. 6 $V_{DS} = f(T_J)$, $V_{GS(th)} = f(T_J)$, normalized

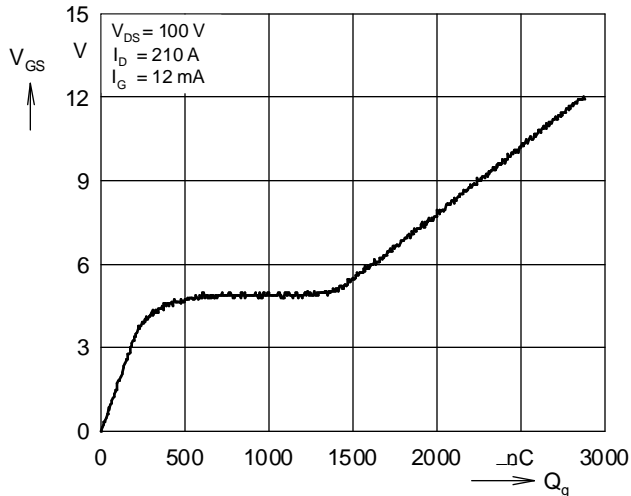


Fig. 7 Typical turn-on gate charge characteristics

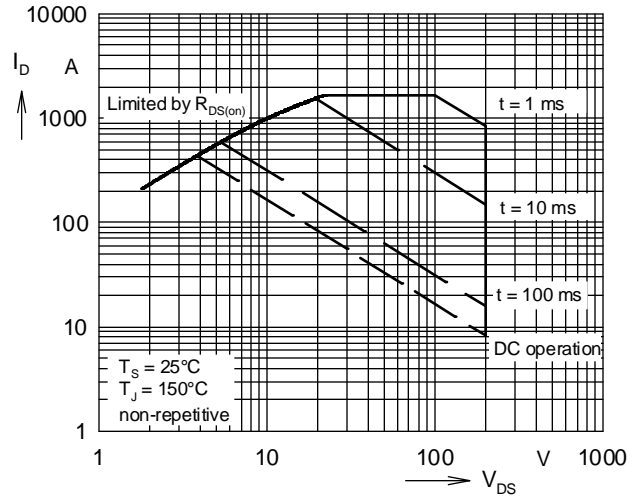


Fig. 8 Forward Bias Safe Operating Area, $I_D = f(V_{DS})$

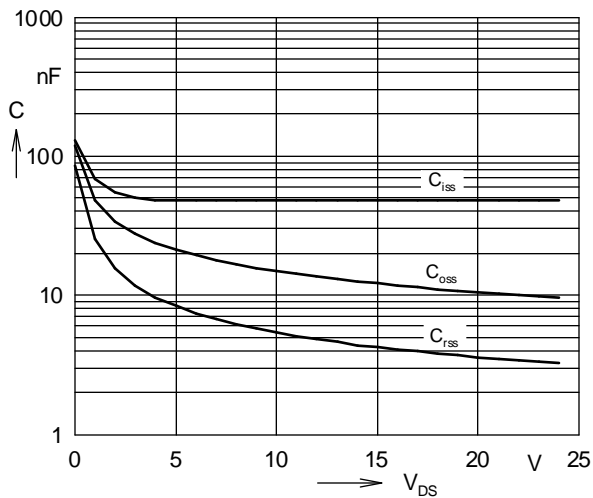


Fig. 9 Typical capacitances $C = f(V_{DS})$, $f = 1 \text{ MHz}$

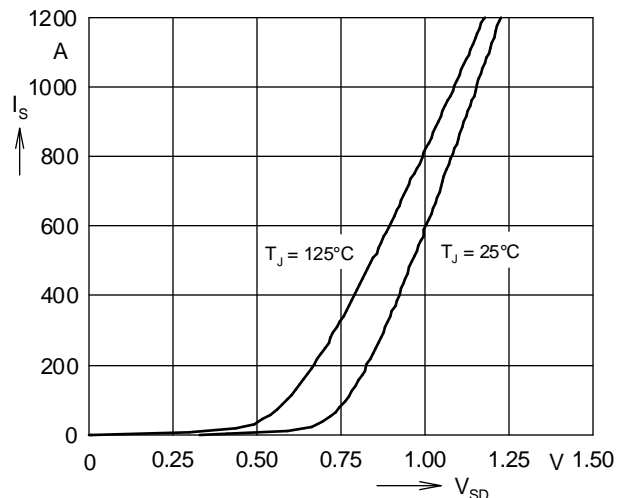


Fig. 10 Typical forward characteristics of reverse diode, $I_S = f(V_{SD})$

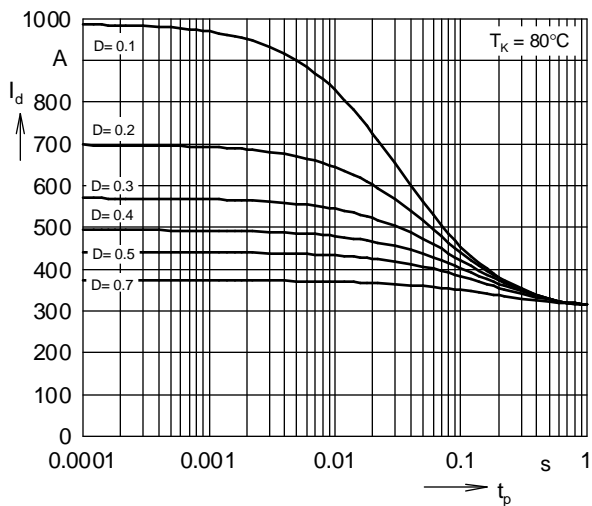


Fig. 11 Drain current versus pulse width and duty cycle

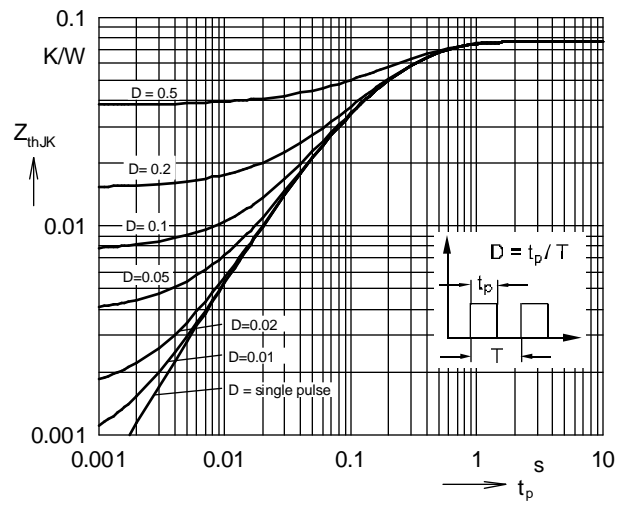


Fig. 12 Transient thermal resistance $Z_{thJK} = f(t_p)$