

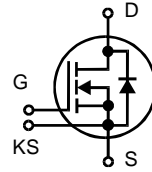
# HiPerFET™ MOSFET Module

## VMO 650-01F

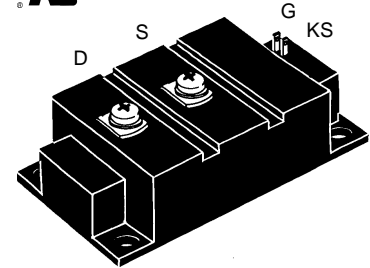
$V_{DSS} = 100 \text{ V}$   
 $I_{D25} = 690 \text{ A}$   
 $R_{DS(on)} = 1.8 \text{ m}\Omega$

N-Channel Enhancement Mode

Preliminary Data



E 72873



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

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	100	V
$V_{DGR}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GS} = 10 \text{ k}\Omega$	100	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_S = 25^\circ\text{C}$	690	A
$I_{D80}$	$T_S = 80^\circ\text{C}$	520	A
$I_{DM}$	$T_S = 25^\circ\text{C}$ pulse width limited by $T_{JM}$	2780	A
$P_D$	$T_C = 25^\circ\text{C}$	2500	W
	$T_S = 25^\circ\text{C}$	1740	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	$t = 1 \text{ min}$	3000
	$I_{ISOL} \leq 1 \text{ mA}$	$t = 1 \text{ s}$	3600
$M_d$	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

### Features

- International standard package
- Direct Copper Bonded  $\text{Al}_2\text{O}_3$  ceramic base plate
- Isolation voltage 3600 V~
- Low  $R_{DS(on)}$  HDMOST™ 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.
$V_{DSS}$	$V_{GS} = 0 \text{ V}, I_D = 7 \text{ mA}$	100		V
$V_{GS(th)}$	$V_{DS} = 20 \text{ V}, I_D = 130 \text{ mA}$	3		V
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V DC}, V_{DS} = 0$			$\pm 500 \text{ nA}$
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ $V_{GS} = 0 \text{ V}$	$T_J = 25^\circ\text{C}$		3.5 mA
		$T_J = 125^\circ\text{C}$		14 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 $d \leq 2\%$			1.8 m $\Omega$

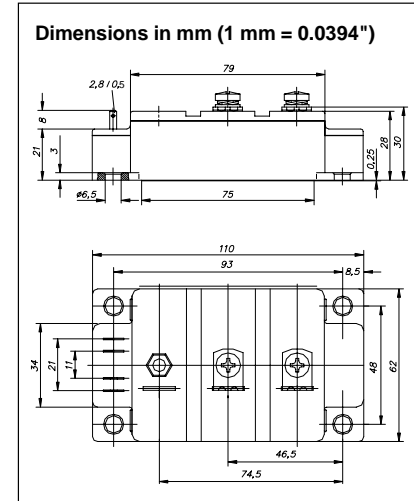
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Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ pulsed		390	S
$C_{iss}$	} $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		59	nF
$C_{oss}$			20.8	nF
$C_{rss}$			10.4	nF
$t_{d(on)}$	} $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 2\ \Omega$ (external)		250	ns
$t_r$			500	ns
$t_{d(off)}$			800	ns
$t_f$			200	ns
$Q_g$	} $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		2300	nC
$Q_{gs}$			455	nC
$Q_{gd}$			1110	nC
$R_{thJC}$				0.048 K/W
$R_{thJS}$	with 30 $\mu\text{m}$ heat transfer paste			0.072 K/W



Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$I_S$	$V_{GS} = 0\text{ V}$			690 A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$			2760 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
$t_{rr}$	$I_F = I_S, -di/dt = 1000\text{ A}/\mu\text{s}, V_{DS} = 0.5 \cdot V_{DSS}$		300	ns