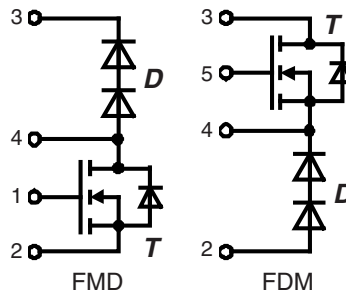


# CoolMOS™ 1) Power MOSFET

## with HiPerDyn™ FRED

### Buck and Boost Topologies

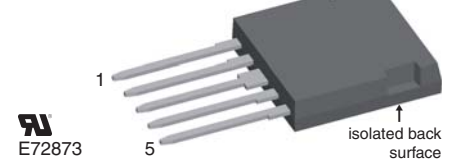
Electrically isolated back surface  
 2500 V electrical isolation  
 N-Channel Enhancement Mode  
 Low  $R_{DS(on)}$ , high  $V_{DSS}$  MOSFET  
 Ultra low gate charge



$$I_{D25} = 47 \text{ A}$$

$$V_{DSS} = 600 \text{ V}$$

$$R_{DS(on) \text{ max}} = 0.045 \Omega$$

**ISOPLUS i4™**


MOSFET T		Maximum Ratings	
Symbol	Conditions		
$V_{DSS}$	$T_{VJ} = 25^\circ\text{C}$	600	V
$V_{GS}$		$\pm 20$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	47	A
$I_{D90}$	$T_C = 90^\circ\text{C}$	32	A
$E_{AS}$	single pulse } $I_D = 11 \text{ A}; T_C = 25^\circ\text{C}$ repetitive	1950	mJ
$E_{AR}$		3	mJ
$dV/dt$	MOSFET $dV/dt$ ruggedness $V_{DS} = 0 \dots 480 \text{ V}$	50	V/ns

**Features**

- Silicon chip on Direct-Copper-Bond substrate
  - high power dissipation
  - isolated mounting surface
  - 2500 V electrical isolation
  - low drain to tab capacitance ( $< 40 \text{ pF}$ )
- Fast CoolMOS™ 1) power MOSFET 4<sup>th</sup> generation
  - high blocking capability
  - lowest resistance
  - avalanche rated for unclamped inductive switching (UIS)
  - low thermal resistance due to reduced chip thickness
- Enhanced total power density
- HiPerDyn™ FRED
  - consisting of series connected diodes
  - enhanced dynamic behaviour for high frequency operation

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}; I_D = 44 \text{ A}$		40	45	mΩ
$V_{GS(th)}$	$V_{DS} = V_{GS}; I_D = 3 \text{ mA}$	2.5	3	3.5	V
$I_{DSS}$	$V_{DS} = V_{DSS}; V_{GS} = 0 \text{ V}$			10	μA
				50	μA
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}; V_{DS} = 0 \text{ V}$			100	nA
$C_{iss}$	$V_{GS} = 0 \text{ V}; V_{DS} = 100 \text{ V}$ $f = 1 \text{ MHz}$		6800		pF
$C_{oss}$			320		pF
$Q_g$	$V_{GS} = 0 \text{ to } 10 \text{ V}; V_{DS} = 400 \text{ V}; I_D = 44 \text{ A}$		150	190	nC
$Q_{gs}$			35		nC
$Q_{gd}$			50		nC
$t_{d(on)}$	$V_{GS} = 10 \text{ V}; V_{DS} = 400 \text{ V}$ $I_D = 44 \text{ A}; R_G = 3.3 \Omega$		30		ns
$t_r$			20		ns
$t_{d(off)}$			100		ns
$t_f$			10		ns
$E_{on}$			tbd		mJ
$E_{off}$			tbd		mJ
$E_{rec off}$			tbd		mJ
$R_{thJC}$				0.45	K/W
$R_{thCH}$	with heat transfer paste	0.25			K/W

**Applications**

- Switched mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)
- Power factor correction (PFC)

**Advantages**

- Easy assembly: no screws or isolation foils required
- Space savings
- High power density
- High reliability

1) CoolMOS™ is a trademark of Infineon Technologies AG.

**MOSFET T Source-Drain Diode**

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
( $T_{VJ} = 25^{\circ}\text{C}$ , unless otherwise specified)					
$I_S$	$V_{GS} = 0\text{ V}$			44	A
$V_{SD}$	$I_F = 44\text{ A}; V_{GS} = 0\text{ V}$		0.9	1.2	V
$t_{rr}$	$I_F = 44\text{ A}; -di_F/dt = 100\text{ A}/\mu\text{s}; V_R = 400\text{ V}$		600		ns
$Q_{RM}$			17		$\mu\text{C}$
$I_{RM}$			60		A

**Diode D (data for series connection)**

Symbol	Conditions	Maximum Ratings	
$V_{RRM}$	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	600	V
$I_{F25}$	$T_C = 25^{\circ}\text{C}$	95	A
$I_{F90}$	$T_C = 90^{\circ}\text{C}$	56	A

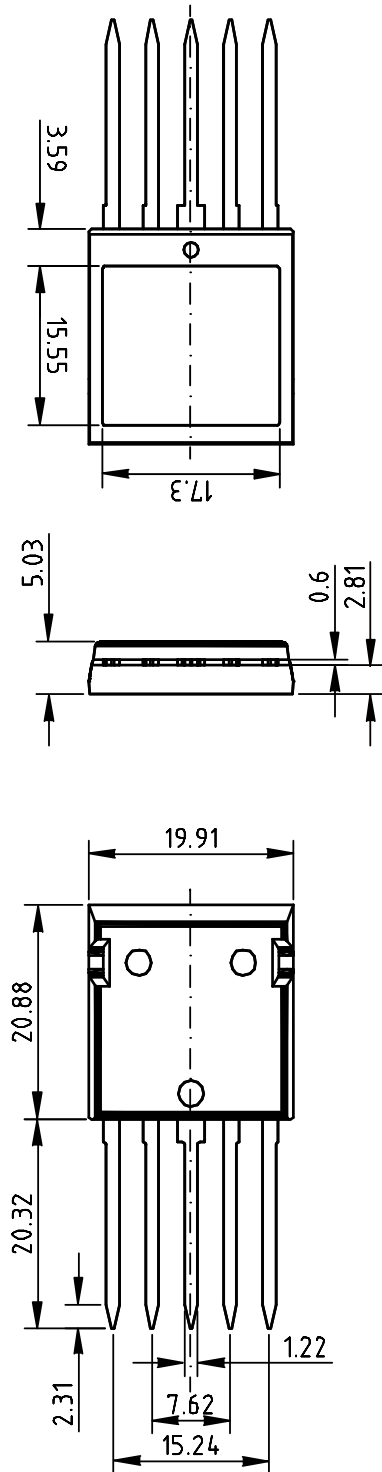
Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$V_F$	$I_F = 30\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$		2.48	V
				3.02	V
	$I_F = 60\text{ A}$	$T_{VJ} = 150^{\circ}\text{C}$		1.89	A
				2.45	A
$I_R$	$V_R = V_{RRM}$	$T_{VJ} = 25^{\circ}\text{C}$		1	$\mu\text{A}$
		$T_{VJ} = 150^{\circ}\text{C}$		0.2	mA
$I_{FSM}$	$t = 10\text{ ms (50 Hz), sine};$	$T_{VJ} = 45^{\circ}\text{C}$		450	A
$I_{RM}$	$I_F = 30\text{ A}; V_R = 100\text{ V};$ $-di_F/dt = 200\text{ A}/\mu\text{s}$	$T_{VJ} = 25^{\circ}\text{C}$		2	A
$t_{rr}$				30	ns
$R_{thJC}$	with heat transfer paste		0.25	0.55	K/W
$R_{thCH}$					K/W

**Component**

Symbol	Conditions	Maximum Ratings	
$T_{VJ}$	operating	-55...+150	$^{\circ}\text{C}$
$T_{stg}$	storage	-55...+125	$^{\circ}\text{C}$
$V_{ISOL}$	$I_{ISOL} < 1\text{ mA}; 50/60\text{ Hz}$	2500	V~
$F_C$	mounting force with clip	20...120	N

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$C_P$	coupling capacity 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

ISOPLUS i4™ Outline





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