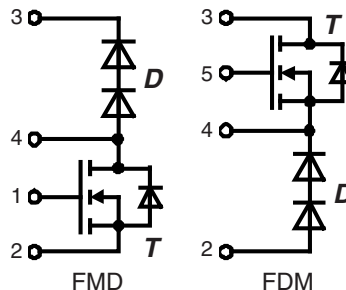


CoolMOS™¹⁾ Power MOSFET with HiPerDyn™ FRED

Buck and Boost Topologies

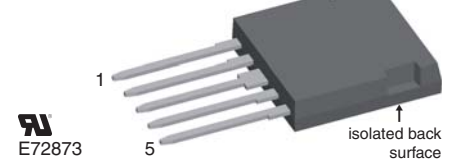
Electrically isolated back surface
2500 V electrical isolation
N-Channel Enhancement Mode
Low $R_{DS(on)}$, high V_{DSS} MOSFET
Ultra low gate charge



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

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

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

ISOPLUS i4™

Features

- Silicon chip on Direct-Copper-Bond substrate
 - high power dissipation
 - isolated mounting surface
 - 2500 V electrical isolation
 - low drain to tab capacitance (< 40 pF)
- Fast CoolMOS™¹⁾ power MOSFET 4th 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

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		Maximum Ratings	
Symbol	Conditions		
V_{DSS}	$T_{VJ} = 25^\circ\text{C}$	600	V
V_{GS}		± 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

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}; I_D = 44 \text{ A}$		40	45	m Ω
$V_{GS(th)}$	$V_{DS} = V_{GS}; I_D = 3 \text{ mA}$	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	
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

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		μC
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	μA
		$T_{VJ} = 150^{\circ}\text{C}$		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

