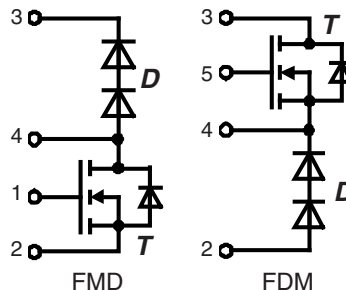


CoolMOS™¹⁾ Power MOSFET with HiPerDyn™ FRED

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

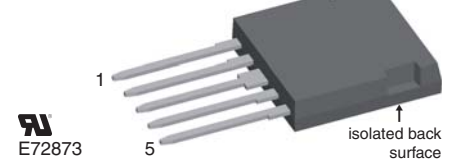


$$I_{D25} = 15 \text{ A}$$

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

$$R_{DS(on) \text{ max}} = 0.165 \Omega$$

ISOPLUS i4™



| MOSFET T | | | |
|----------------------|--|-----------------|----------|
| Symbol | Conditions | Maximum Ratings | |
| V_{DSS} | $T_{VJ} = 25^\circ\text{C}$ | 600 | V |
| V_{GS} | | ± 20 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 15 | A |
| I_{D90} | $T_C = 90^\circ\text{C}$ | 11 | A |
| E_{AS} E_{AR} | single pulse repetitive } $I_D = 7.9 \text{ A}; T_C = 25^\circ\text{C}$ | 522 0.79 | mJ 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 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

| Symbol | Conditions | Characteristic Values | | | | |
|---|---|---|------|------|--------------------------------|----|
| | | $(T_{VJ} = 25^\circ\text{C}, \text{ unless otherwise specified})$ | | | | |
| | | min. | typ. | max. | | |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}; I_D = 12 \text{ A}$ | | 150 | 165 | m Ω | |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}; I_D = 0.79 \text{ mA}$ | 2.5 | 3 | 3.5 | V | |
| I_{DSS} | $V_{DS} = 600 \text{ V}; V_{GS} = 0 \text{ V}$ | | | | | |
| | | | | 10 | μA μA | |
| I_{GSS} | $V_{GS} = \pm 20 \text{ V}; V_{DS} = 0 \text{ V}$ | | | 100 | nA | |
| C_{iss} C_{oss} | } $V_{GS} = 0 \text{ V}; V_{DS} = 100 \text{ V}$ $f = 1 \text{ MHz}$ | | 2000 | | pF | |
| | | | | 100 | | pF |
| Q_g Q_{gs} Q_{gd} | } $V_{GS} = 0 \text{ to } 10 \text{ V}; V_{DS} = 400 \text{ V}; I_D = 12 \text{ A}$ | | 40 | 52 | nC | |
| | | | | 9 | | nC |
| | | | | 13 | | nC |
| $t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off} $E_{rec off}$ | } $V_{GS} = 10 \text{ V}; V_{DS} = 400 \text{ V}$ $I_D = 12 \text{ A}; R_G = 3.3 \Omega$ | | 12 | | ns | |
| | | | | 5 | | ns |
| | | | | 50 | | ns |
| | | | | 5 | | ns |
| | | | | tbd | | mJ |
| | | | | tbd | | mJ |
| | | | | tbd | | mJ |
| R_{thJC} R_{thCH} | with heat transfer paste | | 0.35 | 1.1 | K/W K/W | |

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 | $V_{GS} = 0\text{ V}$ | | | 12 | A |
| V_{SD} | $I_F = 12\text{ A}; V_{GS} = 0\text{ V}$ | | 0.9 | 1.2 | V |
| t_{rr} | $I_F = 12\text{ A}; -di_F/dt = 100\text{ A}/\mu\text{s}; V_R = 400\text{ V}$ | | 390 | | ns |
| Q_{RM} | | | 7.5 | | μC |
| I_{RM} | | | 38 | | 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} | $T_C = 25^{\circ}\text{C}$ | 15 | A |
| I_{F90} | $T_C = 90^{\circ}\text{C}$ | 8 | A |

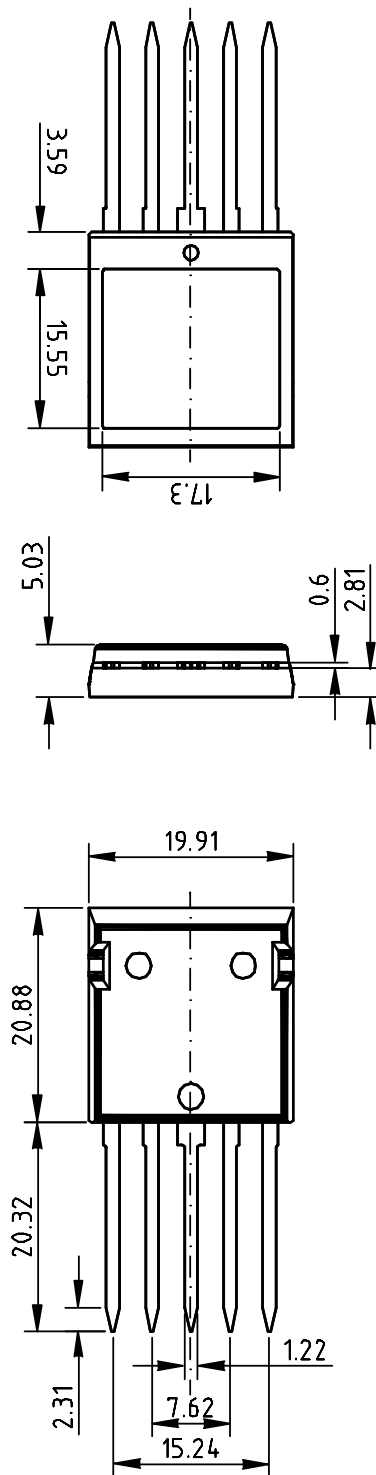
| Symbol | Conditions | Characteristic Values | | | |
|------------|---|--------------------------------|------|------|---------------|
| | | min. | typ. | max. | |
| V_F | $I_F = 15\text{ A}$ | $T_{VJ} = 25^{\circ}\text{C}$ | | 2.50 | V |
| | | | | 3.00 | V |
| | $I_F = 30\text{ A}$ | $T_{VJ} = 150^{\circ}\text{C}$ | | 2.00 | A |
| | | | | 2.55 | A |
| I_R | $V_R = V_{RRM}$ | $T_{VJ} = 25^{\circ}\text{C}$ | | 1 | μA |
| | | $T_{VJ} = 150^{\circ}\text{C}$ | | 0.08 | mA |
| I_{FSM} | $t = 10\text{ ms (50 Hz), sine};$ | $T_{VJ} = 45^{\circ}\text{C}$ | | 150 | A |
| I_{RM} | $I_F = 20\text{ A}; V_R = 100\text{ V};$ $-di_F/dt = 200\text{ A}/\mu\text{s}$ | $T_{VJ} = 25^{\circ}\text{C}$ | | 3 | A |
| t_{rr} | | | | 35 | ns |
| R_{thJC} | with heat transfer paste | | | 2.4 | K/W |
| R_{thJH} | | 0.8 | | | 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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