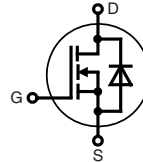


# CoolMOS™ 1) Power MOSFET

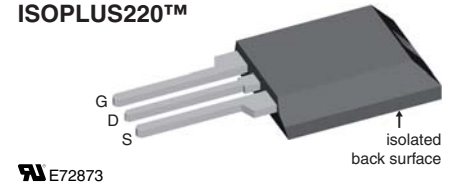
## ISOPLUS™ Package

N-Channel Enhancement Mode  
Low  $R_{DS(on)}$ , high  $V_{DSS}$  MOSFET  
Electrically Isolated Back Surface



$$\begin{aligned} I_{D25} &= 13 \text{ A} \\ V_{DSS} &= 800 \text{ V} \\ R_{DS(on) \text{ max}} &= 290 \text{ m}\Omega \end{aligned}$$

ISOPLUS220™



| MOSFET    |                                                                                                                   |                 |      |
|-----------|-------------------------------------------------------------------------------------------------------------------|-----------------|------|
| Symbol    | Conditions                                                                                                        | Maximum Ratings |      |
| $V_{DSS}$ | $T_{VJ} = 25^\circ\text{C}$                                                                                       | 800             | V    |
| $V_{GS}$  |                                                                                                                   | $\pm 20$        | V    |
| $I_{D25}$ | $T_C = 25^\circ\text{C}$                                                                                          | 13              | A    |
| $I_{D90}$ | $T_C = 90^\circ\text{C}$                                                                                          | 9               | A    |
| $E_{AS}$  | $T_{J \text{ start}} = 25^\circ\text{C}$ ; single pulse; $I_D = 3.4 \text{ A}$                                    | 670             | mJ   |
| $E_{AR}$  | $T_{J \text{ start}} = 25^\circ\text{C}$ ; repetitive; $I_D = 17 \text{ A}$                                       | 0.5             | mJ   |
| $dV/dt$   | $V_{DS} < V_{DSS}$ ; $I_F = 17 \text{ A}$ ; $T_{VJ} = 150^\circ\text{C}$<br>$dI_R/dt = 100 \text{ A}/\mu\text{s}$ | 6               | V/ns |

### Features

- Silicon chip on Direct-Copper-Bond substrate
  - high power dissipation
  - isolated mounting surface
  - 2500 V electrical isolation
- 3<sup>rd</sup> generation CoolMOS™ 1) power MOSFET
  - high blocking capability
  - lowest resistance
  - avalanche rated for unclamped inductive switching (UIS)
- Low thermal resistance due to reduced chip thickness
- Low drain to tab capacitance (<30 pF)

### Applications

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

### Advantages

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

<sup>1)</sup> CoolMOS™ is a trademark of Infineon Technologies AG.

| Symbol                                        | Conditions                                                                                                 | Characteristic Values                                |                      |           |                      |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------|-----------|----------------------|
|                                               |                                                                                                            | (T <sub>VJ</sub> = 25°C, unless otherwise specified) |                      |           |                      |
|                                               |                                                                                                            | min.                                                 | typ.                 | max.      |                      |
| $R_{DS(on)}$                                  | $V_{GS} = 10 \text{ V}$ ; $I_D = I_{D90}$                                                                  |                                                      | 250                  | 290       | mΩ                   |
| $V_{GS(th)}$                                  | $V_{DS} = V_{GS}$ ; $I_D = 1 \text{ mA}$                                                                   | 2                                                    |                      | 4         | V                    |
| $I_{DSS}$                                     | $V_{DS} = V_{DSS}$ ; $V_{GS} = 0 \text{ V}$<br>$T_{VJ} = 25^\circ\text{C}$<br>$T_{VJ} = 125^\circ\text{C}$ |                                                      | 125                  | 25        | μA<br>μA             |
| $I_{GSS}$                                     | $V_{GS} = \pm 20 \text{ V}$ ; $V_{DS} = 0 \text{ V}$                                                       |                                                      |                      | $\pm 100$ | nA                   |
| $C_{iss}$<br>$C_{oss}$<br>$C_{rss}$           | $V_{GS} = 0 \text{ V}$ ; $V_{DS} = 25 \text{ V}$ ; $f = 1 \text{ MHz}$                                     |                                                      | 2300<br>1250<br>60   |           | pF<br>pF<br>pF       |
| $Q_g$<br>$Q_{gs}$<br>$Q_{gd}$                 |                                                                                                            |                                                      | 90<br>10<br>40       |           | nC<br>nC<br>nC       |
| $t_{d(on)}$<br>$t_r$<br>$t_{d(off)}$<br>$t_f$ |                                                                                                            |                                                      | 25<br>25<br>75<br>10 |           | ns<br>ns<br>ns<br>ns |
| $R_{thJC}$                                    |                                                                                                            |                                                      |                      | 1.0       | K/W                  |

### Source-Drain Diode

| Symbol   | Conditions                                                                   | Characteristic Values |      |               |
|----------|------------------------------------------------------------------------------|-----------------------|------|---------------|
|          |                                                                              | min.                  | typ. | max.          |
| $I_S$    | $V_{GS} = 0\text{ V}$                                                        |                       |      | 17 A          |
| $V_{SD}$ | $I_F = 17\text{ A}; V_{GS} = 0\text{ V}$                                     |                       | 1.0  | 1.2 V         |
| $t_{rr}$ | $I_F = 17\text{ A}; -di_F/dt = 100\text{ A}/\mu\text{s}; V_R = 400\text{ V}$ |                       | 550  | ns            |
| $Q_{RM}$ |                                                                              |                       | 15   | $\mu\text{C}$ |
| $I_{RM}$ |                                                                              |                       | 50   | A             |

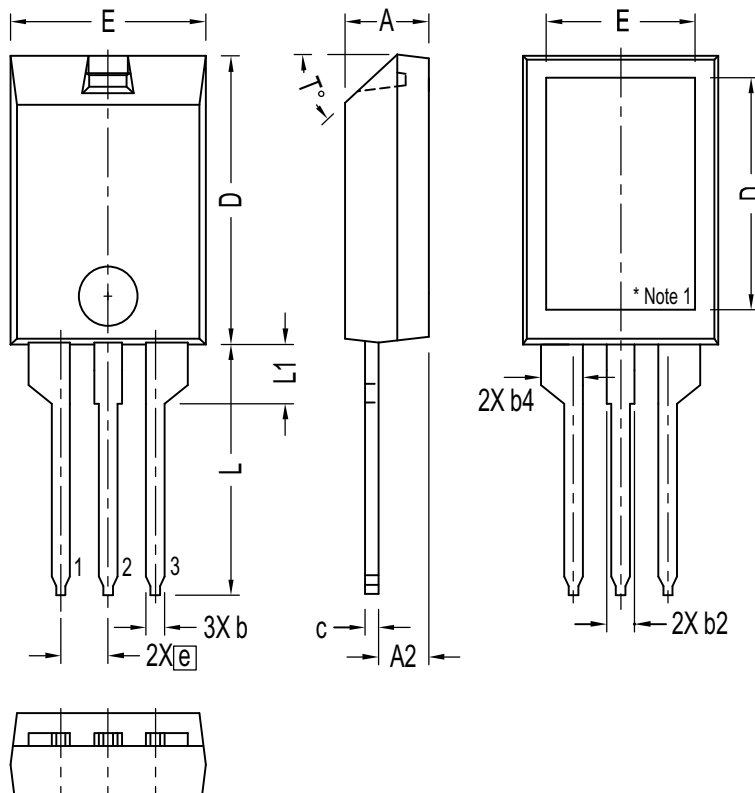
( $T_{VJ} = 25^\circ\text{C}$ , unless otherwise specified)

### Component

| Symbol     | Conditions                                        | Maximum Ratings |                  |
|------------|---------------------------------------------------|-----------------|------------------|
| $T_{VJ}$   | operating                                         | -55...+150      | $^\circ\text{C}$ |
| $T_{stg}$  |                                                   | -55...+150      | $^\circ\text{C}$ |
| $V_{ISOL}$ | RMS, lead-to-tab, 50/60 Hz, $f = 1\text{ minute}$ | 2500            | V~               |
| $F_C$      | mounting force                                    | 11-65/2.4-11    | N/lb.            |

| Symbol     | Conditions             | Characteristic Values |      |      |
|------------|------------------------|-----------------------|------|------|
|            |                        | min.                  | typ. | max. |
| $R_{thCH}$ | with heatsink compound |                       | 0.3  | K/W  |
| Weight     |                        |                       | 2.7  | g    |

### ISOPLUS220™ Outline



| SYM | INCHES     |      | MILLIMETERS |       |
|-----|------------|------|-------------|-------|
|     | MIN        | MAX  | MIN         | MAX   |
| A   | .157       | .197 | 4.00        | 5.00  |
| A2  | .098       | .118 | 2.50        | 3.00  |
| b   | .035       | .051 | 0.90        | 1.30  |
| b2  | .049       | .065 | 1.25        | 1.65  |
| b4  | .093       | .100 | 2.35        | 2.55  |
| c   | .028       | .039 | 0.70        | 1.00  |
| D   | .591       | .630 | 15.00       | 16.00 |
| D1  | .472       | .512 | 12.00       | 13.00 |
| E   | .394       | .433 | 10.00       | 11.00 |
| E1  | .295       | .335 | 7.50        | 8.50  |
| e   | .100 BASIC |      | 2.55 BASIC  |       |
| L   | .512       | .571 | 13.00       | 14.50 |
| L1  | .118       | .138 | 3.00        | 3.50  |
| T°  |            |      | 42.5°       | 47.5° |

#### NOTE:

1. Bottom heatsink is electrically isolated from Pin 1, 2, or 3.
2. This drawing will meet dimensional requirement of JEDEC SS Product Outline TO-273 except D and D1 dimension.

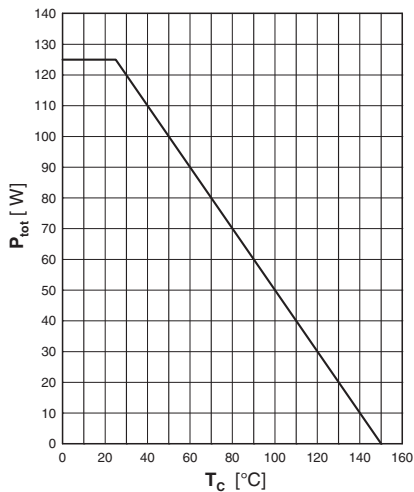


Fig. 1 Power Dissipation

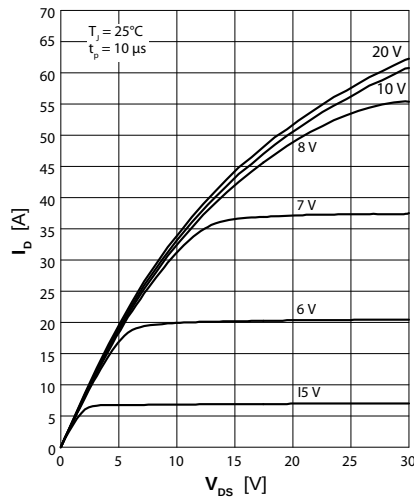


Fig. 2 Typ. Output Characteristics

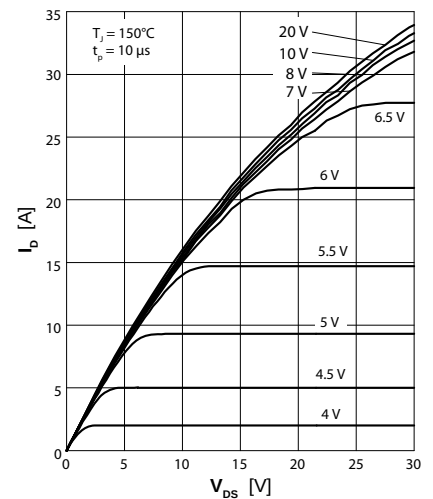


Fig. 3 Typ. Output Characteristics

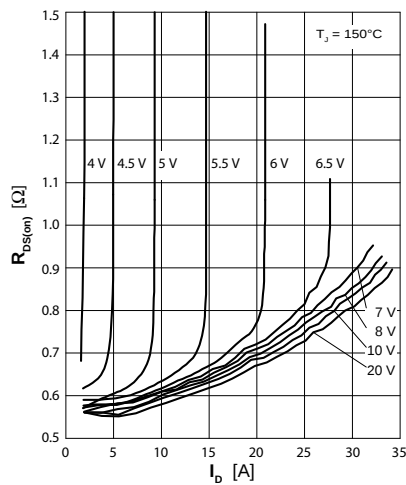


Fig. 4 Typ. Drain-Source on Resistance

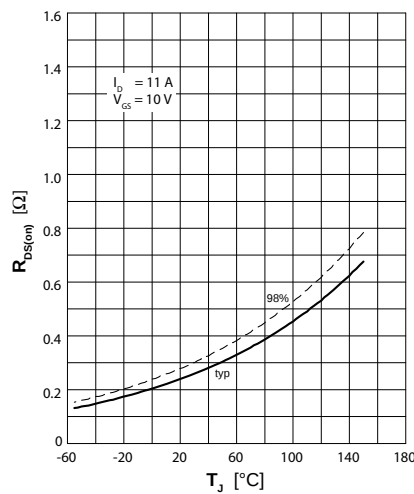


Fig. 5 Drain-Source On-State Resistance

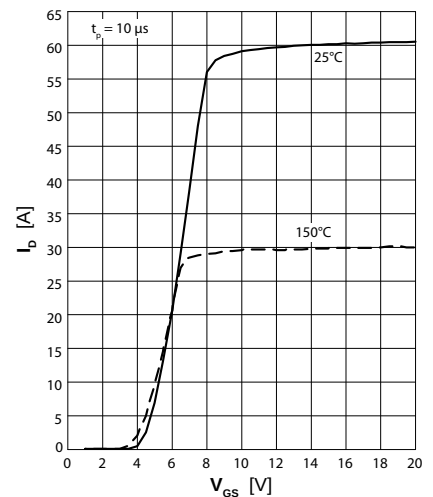


Fig. 6 Typ. Transfer Characteristics

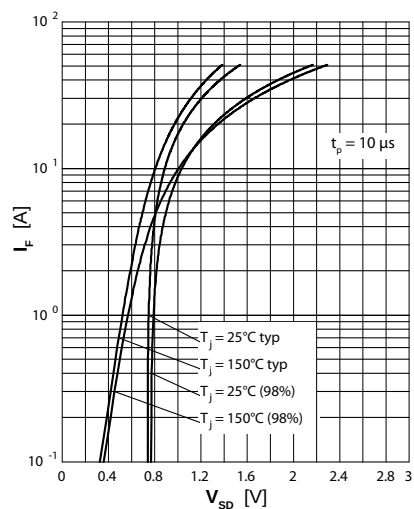


Fig. 7 Forward Characteristics of Body Diode

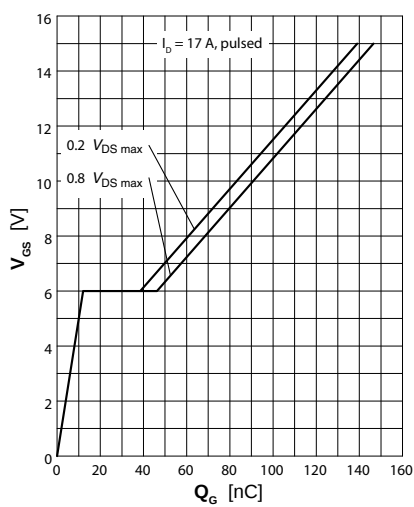


Fig. 8 Typ. Gate Charge

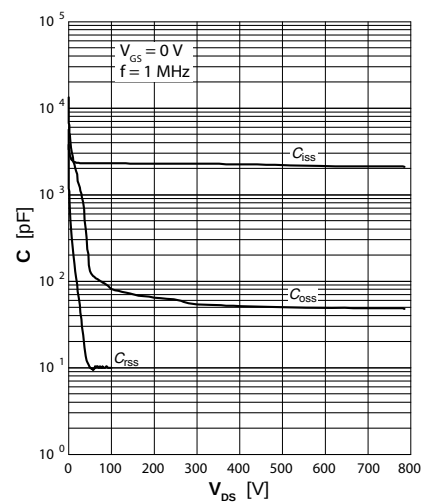


Fig. 9 Capacitance

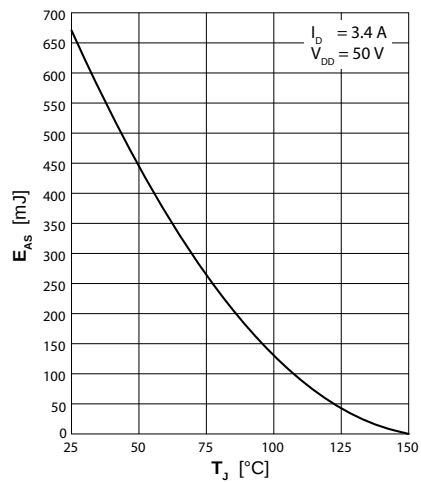


Fig. 10 Typ. Avalanche Energy

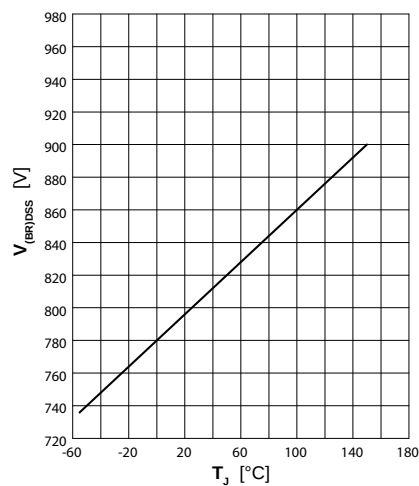


Fig. 11 Drain-Source Breakdown Voltage