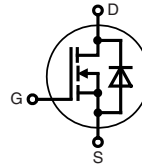
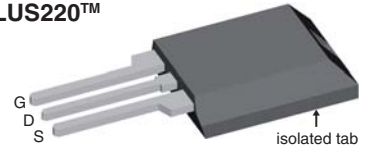


# CoolMOS™ 1) Power MOSFET

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



$V_{DSS} = 600\text{ V}$   
 $I_{D25} = 15\text{ A}$   
 $R_{DS(on) \text{ max}} = 190\text{ m}\Omega$

**ISOPLUS220™**


E72873

| MOSFET    |  |                 |    |
|-----------|--|-----------------|----|
| Symbol    | Conditions   | Maximum Ratings |    |
| $V_{DSS}$ | $T_{VJ} = 25^\circ\text{C}$                                  | 600             | V  |
| $V_{GS}$  |  | $\pm 20$        | V  |
| $I_{D25}$ | $T_C = 25^\circ\text{C}$                                     | 15              | A  |
| $I_{D90}$ | $T_C = 90^\circ\text{C}$                                     | 10.5            | A  |
| $E_{AS}$  | single pulse; $I_D = 10\text{ A}$ ; $T_C = 25^\circ\text{C}$ | 690             | mJ |
| $E_{AR}$  | repetitive; $I_D = 20\text{ A}$ ; $T_C = 25^\circ\text{C}$   | 1               | mJ |

**Features**

- Silicon chip on Direct-Copper-Bond substrate
  - high power dissipation
  - isolated mounting surface
  - 2500 V electrical isolation
  - low drain to tab capacitance ( $< 30\text{ pF}$ )
- CoolMOS™ 1) power MOSFET
  - 3rd 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

| Symbol       | Conditions   | Characteristic Values   |      |      |               |
|--------------|--|---|------|------|---------------|
|              |  | $(T_{VJ} = 25^\circ\text{C}, \text{ unless otherwise specified})$ |      |      |               |
|              |  | min.  | typ. | max. |               |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$ ; $I_D = 16\text{ A}$   |   | 160  | 190  | m $\Omega$    |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ ; $I_D = 1\text{ mA}$  | 2.1   |      | 3.9  | V             |
| $I_{DSS}$    | $V_{DS} = 600\text{ V}$ ; $V_{GS} = 0\text{ V}$  |   |      | 25   | $\mu\text{A}$ |
|              |  |   |      | 250  | $\mu\text{A}$ |
| $I_{GSS}$    | $V_{GS} = \pm 20\text{ V}$ ; $V_{DS} = 0\text{ V}$   |   |      | 100  | nA            |
| $C_{iss}$    | } $V_{GS} = 0\text{ V}$ ; $V_{DS} = 25\text{ V}$<br>$f = 1\text{ MHz}$   |   | 2400 |      | pF            |
| $C_{oss}$    |  |   |      | 780  |               |
| $Q_g$        | } $V_{GS} = 0\text{ to }10\text{ V}$ ; $V_{DS} = 350\text{ V}$ ; $I_D = 20\text{ A}$   |   | 87   | 114  | nC            |
| $Q_{gs}$     |  |   | 11   |      | nC            |
| $Q_{gd}$     |  |   | 33   |      | nC            |
| $t_{d(on)}$  | } $V_{GS} = 13\text{ V}$ ; $V_{DS} = 380\text{ V}$<br>$I_D = 21\text{ A}$ ; $R_G = 3.3\ \Omega$ ; $T_{VJ} = 125^\circ\text{C}$ |   | 10   |      | ns            |
| $t_r$        |  |   | 5    |      | ns            |
| $t_{d(off)}$ |  |   | 67   |      | ns            |
| $t_f$        |  |   | 4.5  |      | ns            |
| $R_{thJC}$   |  |   |      | 1    | K/W           |

**Applications**

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

**Advantages**

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

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

**Source-Drain Diode**

| Symbol  | Conditions   | Characteristic Values |      |      |               |
|---|--|-----------------------|------|------|---------------|
|   |  | min.                  | typ. | max. |               |
| ( $T_{VJ} = 25^{\circ}\text{C}$ , unless otherwise specified) |  |                       |      |      |               |
| $I_S$   | $V_{GS} = 0\text{ V}$  |                       |      | 20   | A             |
| $V_{SD}$  | $I_F = 16\text{ A}; V_{GS} = 0\text{ V}$                                     |                       | 0.9  | 1.2  | V             |
| $t_{rr}$  | $I_F = 20\text{ A}; -di_F/dt = 100\text{ A}/\mu\text{s}; V_R = 480\text{ V}$ |                       | 500  | 800  | ns            |
| $Q_{RM}$  |  |                       | 11   |      | $\mu\text{C}$ |
| $I_{RM}$  |  |                       | 70   |      | A             |

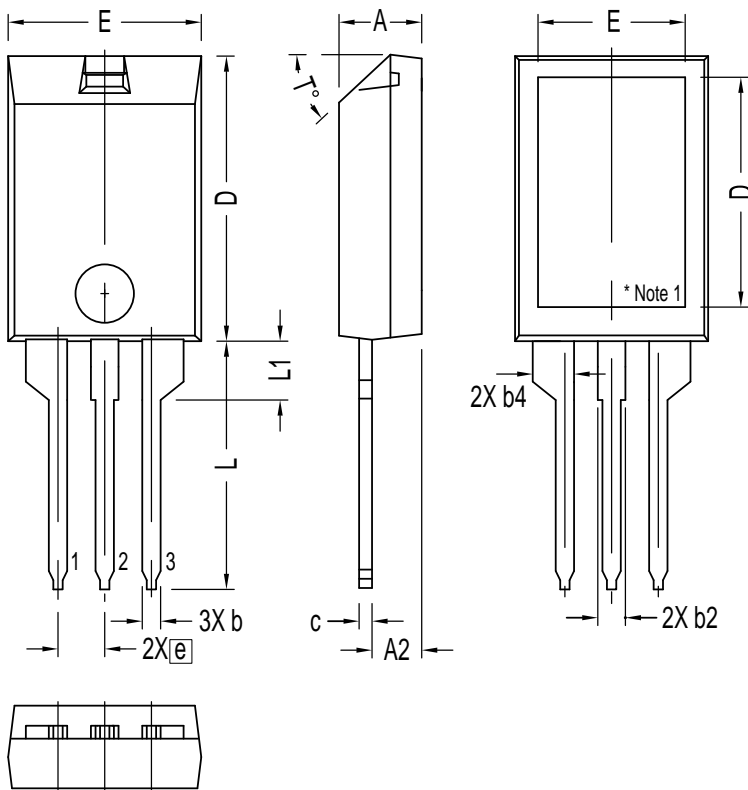
**Component**

| Symbol     | Conditions                                 | Maximum Ratings |                |                    |
|------------|--|-----------------|----------------|--------------------|
|            |  | min.            | typ.           | max.               |
| $T_{VJ}$   | operating                                  |                 | -55...+150     | $^{\circ}\text{C}$ |
| $T_{stg}$  | storage                                    |                 | -55...+150     | $^{\circ}\text{C}$ |
| $V_{ISOL}$ | RMS leads-to-tab, 50/60 Hz, $f = 1$ 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 |
| <b>Weight</b> |                        |                       | 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.

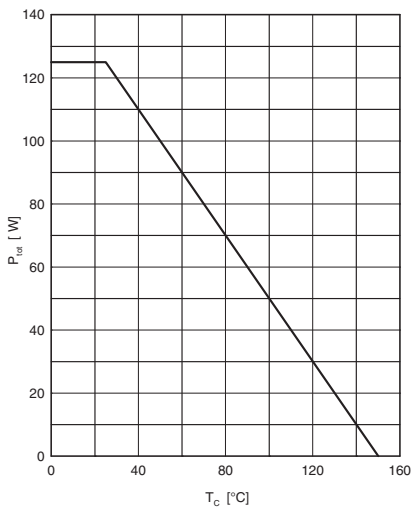


Fig. 1 Power dissipation

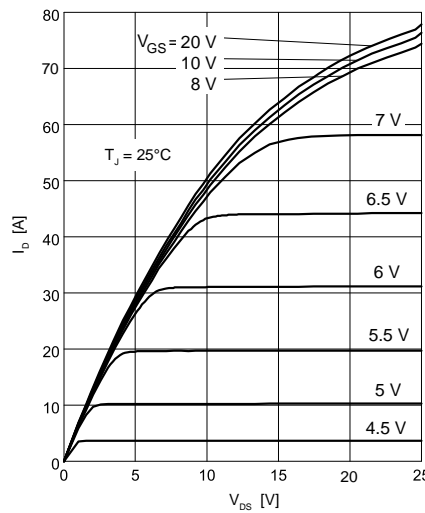


Fig. 2 Typ. output characteristics

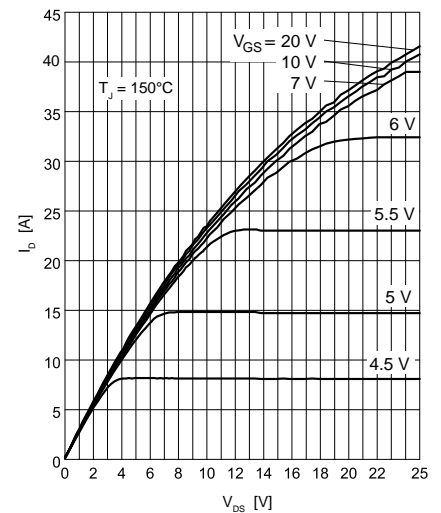


Fig. 3 Typ. output characteristics

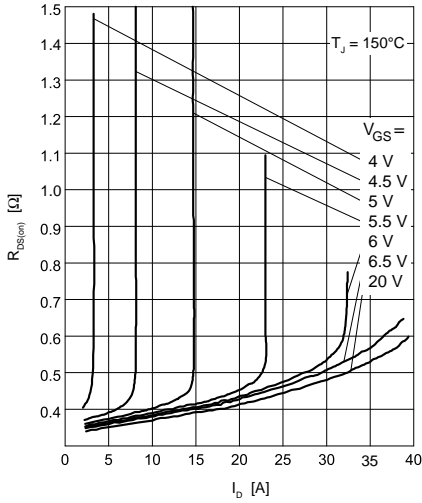


Fig. 4 Typ. drain-source on-state resistance

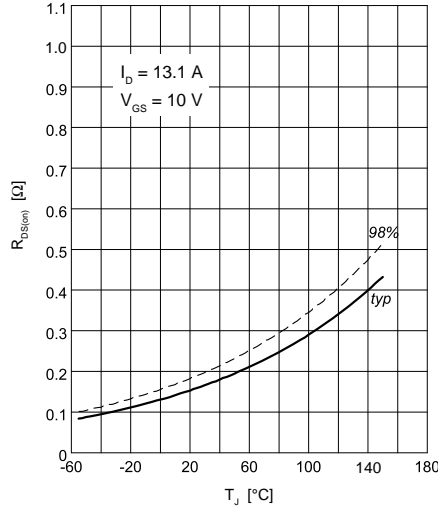


Fig. 5 Drain-source on-state resistance

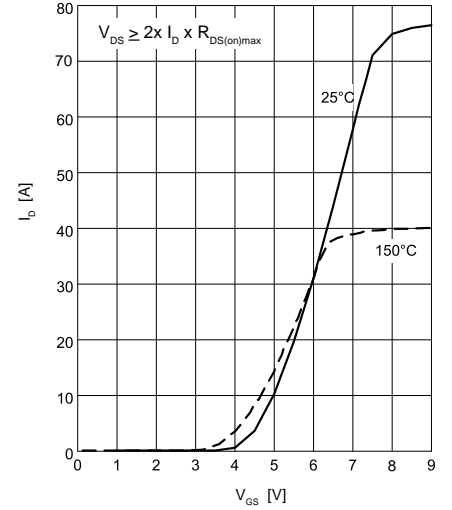


Fig. 6 Typ. transfer characteristics

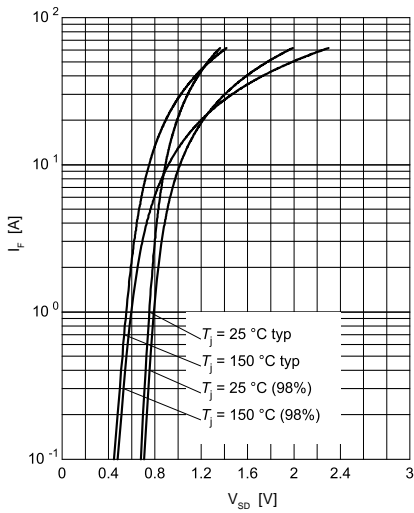


Fig. 7 Forward characteristic of reverse diode

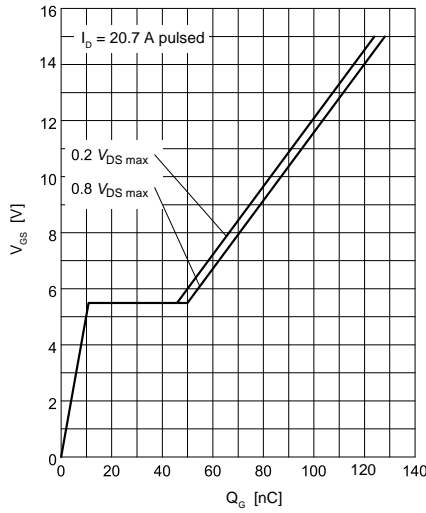


Fig. 8 Typ. gate charge

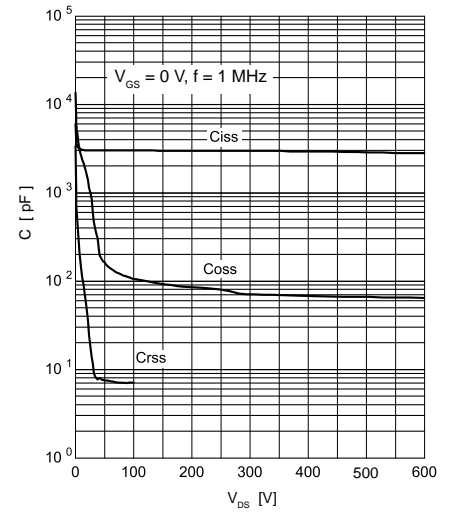


Fig. 9 Typ. capacitances

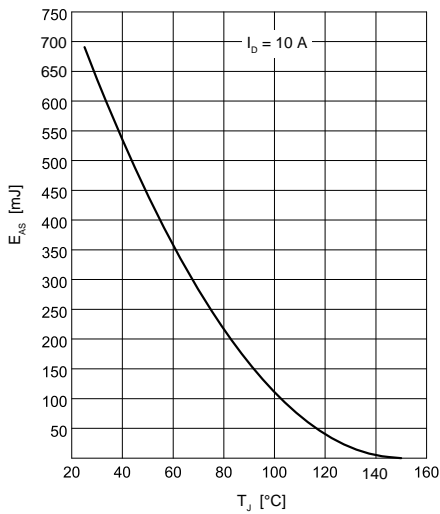


Fig. 10 Avalanche energy

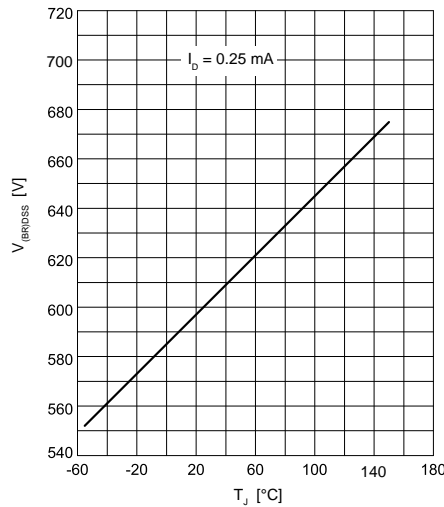


Fig. 11 Drain-source breakdown voltage



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