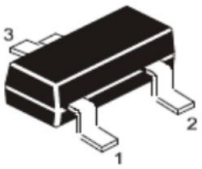
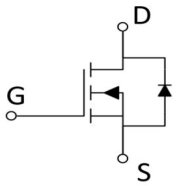
# N CHANNEL STANDARD LEVEL FET

**CDM213SN**
**SOT-23**
**Surface Mounted**
**Plastic Package**




**1. GATE**
**2. SOURCE**
**3. DRAIN**




## FEATURES

■ Low on-state resistance in a small surface mount package.

## APPLICATIONS

■ DC-to-DC primary side switching.

## MARKING CODE : 0102

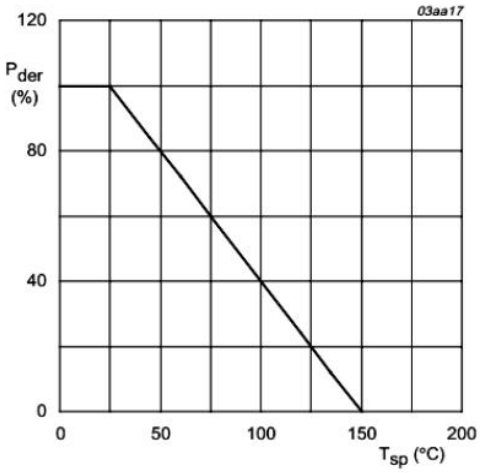
## MAXIMUM RATINGS ($T_a$ =25°C unless otherwise specified)

| PARAMETER | | | SYMBOL | VALUE | UNIT |
|---|---|---|---|---|---|
| Drain-Source voltage | | | $V_{DS}$ | 100 | V |
| Drain-Gate Voltage | | | $V_{DGR}$ | 100 | |
| Gate-Source voltage | | | $V_{GS}$ | ±30 | |
| Drain Current | $V_{GS}$ at 10 V | $T_{sp}$ = 25 °C | $I_D$ | 1.9 | A |
| | | $T_{sp}$ = 100 °C | | 1.2 | |
| Pulsed Drain Current | | | $I_{DM}$ | 7.6 | |
| Total Power Dissipation | | | $P_{tot}$ | 2 | W |
| junction temperature | | | $T_J$ | -55 to 150 | °C |
| storage temperature | | | $T_{STG}$ | -55 to 150 | °C |
| **SOURCE-DRAIN DIODE** | | | | | |
| Source (Diode Forward) Current (DC) | | | $I_S$ | 1.7 | A |
| Peak Source (Diode Forward) Current | | | $I_{SM}$ | 6.9 | A |

## ELECTRICAL CHARACTERISTICS ($T_J$ =25°C unless otherwise specified)

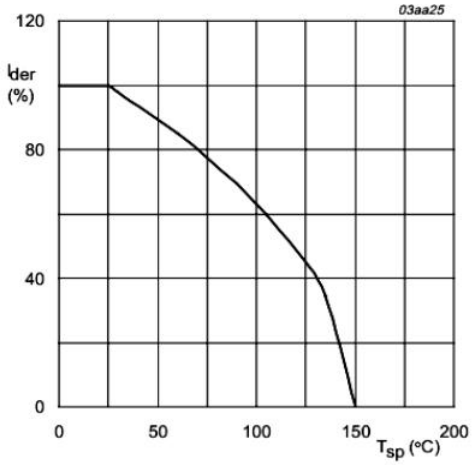
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| **STATIC CHARACTERISTICS** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=250µA | 100 | | | V |
| | | $V_{GS}$=0V, $I_D$=250µA, $T_j$=-55°C | 90 | | | |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=1mA | 1.3 | 1.8 | 2.5 | V |
| | | $V_{DS}$=$V_{GS}$, $I_D$=1mA, $T_j$=150°C | 1.2 | | | |
| | | $V_{DS}$=$V_{GS}$, $I_D$=1mA, $T_j$=-55°C | | | 4.4 | |
| Gate-body Leakage current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±20V | | ±10 | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=100V, $V_{GS}$=0V | | | 1 | µA |
| | | $V_{DS}$=100V, $V_{GS}$=0V, $T_J$=150°C | | | 100 | |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$=0.5 | | 213 | 250 | mΩ |
| | | $V_{GS}$=10V, $I_D$=0.5, $T_J$=150°C | | 490 | 575 | |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| Total Gate Charge | $Q_{g(tot)}$ | $V_{GS}$=10V, $I_D$=1.2A, $V_{DS}$=80V | | 7 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 1.4 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 2.5 | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=20V, f=1.0MHz | | 330 | | pF |
| Output Capacitance | $C_{oss}$ | | | 36 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 22 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$= 50V; $R_L$=33 Ω; $V_{GS}$=10V; $R_G$ = 6Ω | | 5.5 | | ns |
| Rise Time | $t_r$ | | | 5 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 9.5 | | |
| Fall Time | $t_f$ | | | 3 | | |
| **SOURCE-DRAIN DIODE** | | | | | | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$ = 1.5A, $V_{GS}$ = 0V | | 0.83 | 1.2 | V |
| Body Diode Reverse Recovery Time | $t_{rr}$ | $I_s$=1.2A, dI/dt =-100A/µs, $V_{GS}$=0V | | 36 | | ns |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | | | 23 | | nC |

## CHARACTERISTIC CURVES



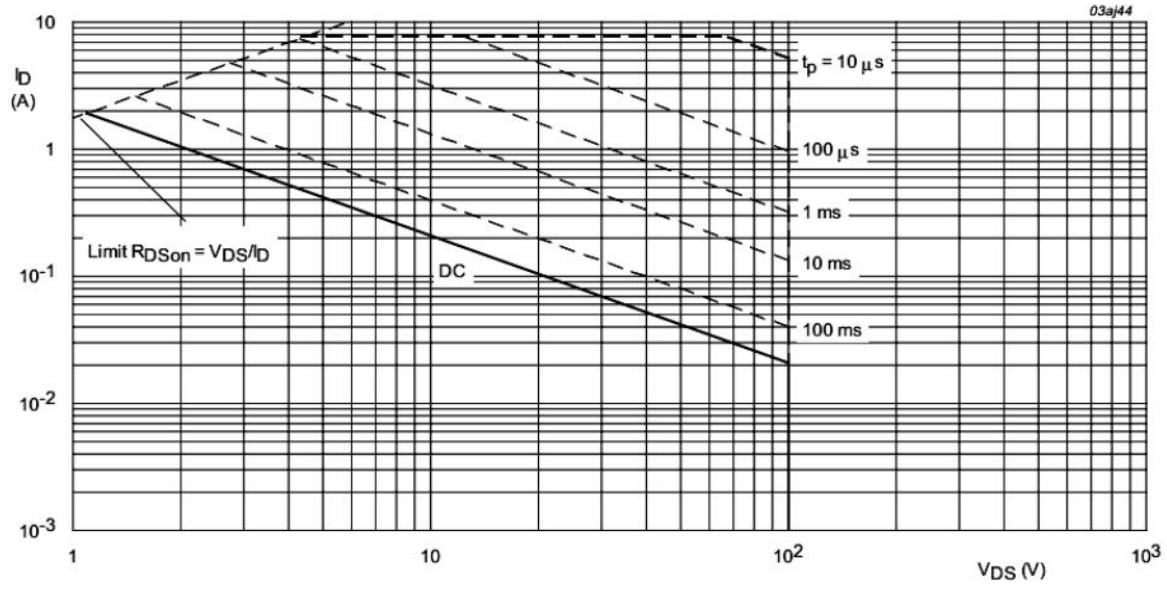

$$P_{der} = \frac{P_{tot}}{P_{tot(25^{\circ}C)}} \times 100\%$$

Fig 1. Normalized total power dissipation as a function of solder point temperature.




$$I_{der} = \frac{I_D}{I_{D(25^{\circ}C)}} \times 100\%$$

Fig 2. Normalized continuous drain current as a function of solder point temperature.




$T_{sp}$ = 25 °C; $I_{DM}$ is single pulse; $V_{GS}$ = 10V

Fig 3. Safe operating area; continuous and peak drain currents as a function of drain-source voltage.

## CHARACTERISTIC CURVES (Cont..)

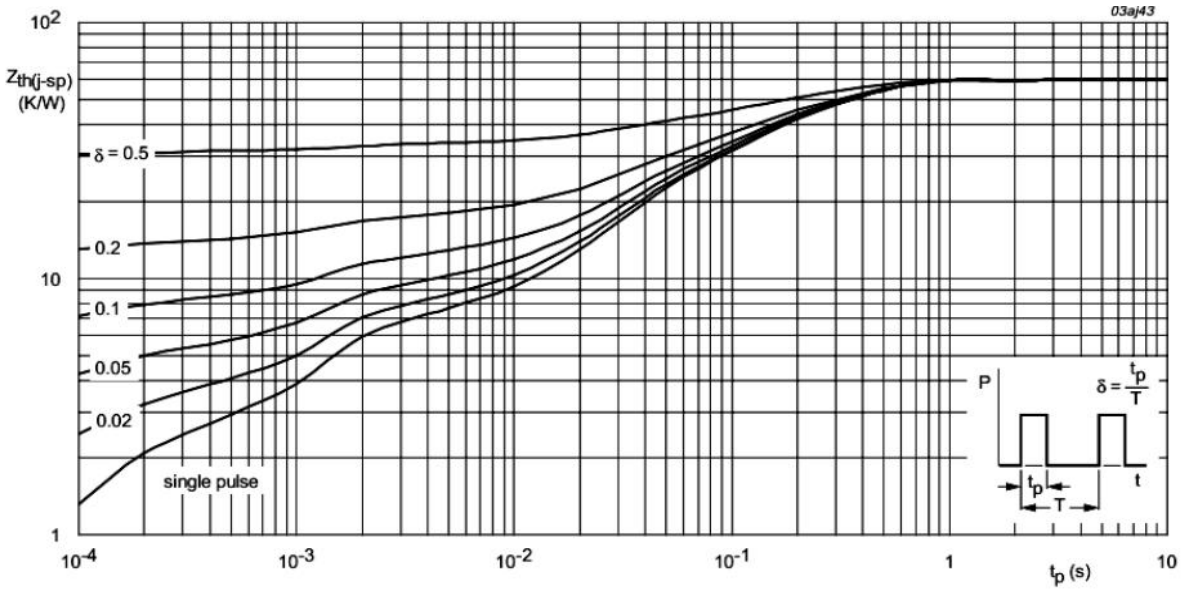
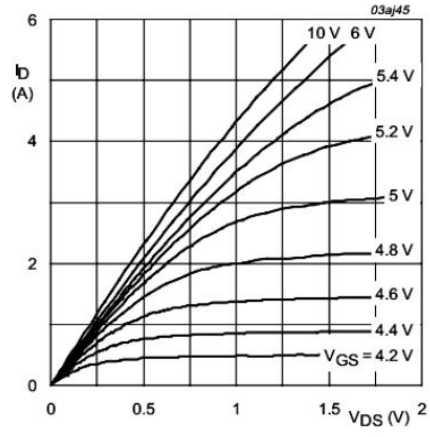
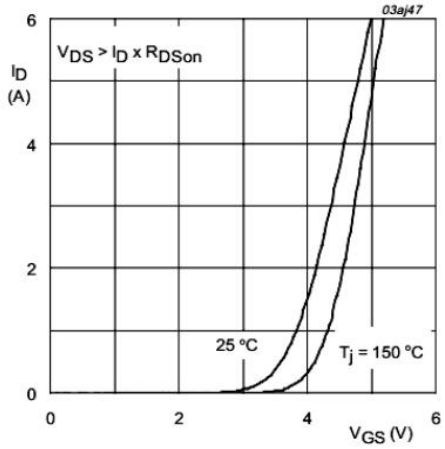



**Fig 4. Transient thermal impedance from junction to solder point as a function of pulse duration.**




$T_j$ = 25 °C

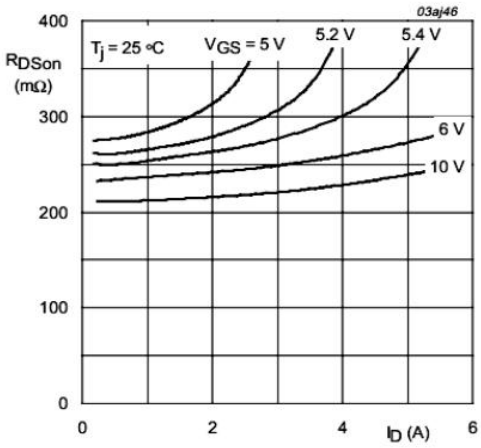
**Fig 5. Output characteristics: drain current as a function of drain-source voltage; typical values.**




$T_j$ = 25 °C and 150 °C; $V_{DS} > I_D \times R_{DSon}$

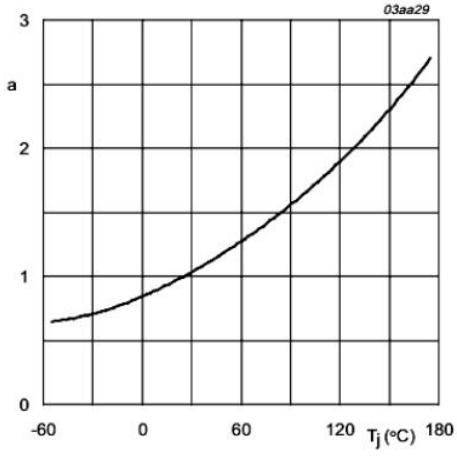
**Fig 6. Transfer characteristics: drain current as a function of gate-source voltage; typical values.**

## CHARACTERISTIC CURVES (Cont..)



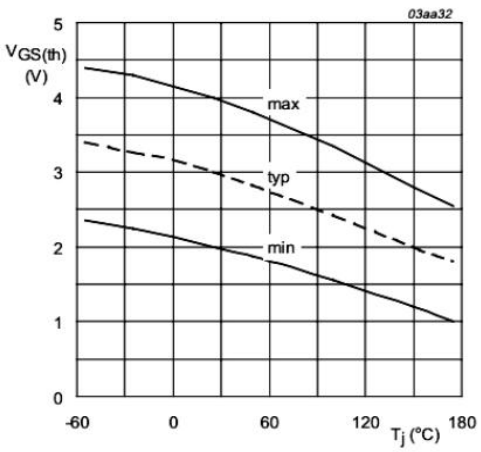

$T_j$ = 25 °C

Fig 7. Drain-source on-state resistance as a function of drain current; typical values.



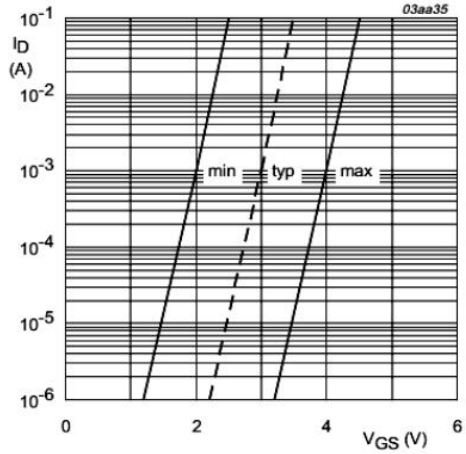

$$a = \frac{R_{DSon}}{R_{DSon(25°C)}}$$

Fig 8. Normalized drain-source on-state resistance factor as a function of junction temperature.




$I_D$ = 1 mA; $V_{DS}$ = $V_{GS}$

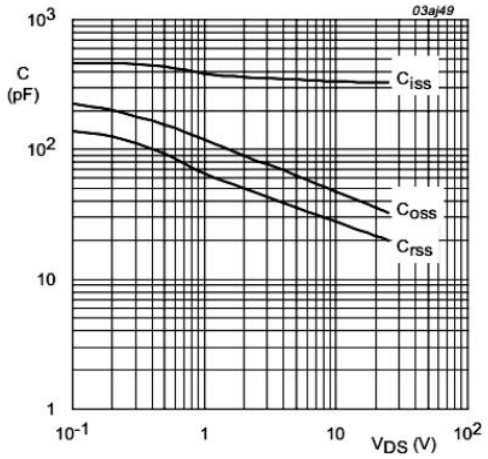
Fig 9. Gate-source threshold voltage as a function of junction temperature.




$T_j$ = 25 °C

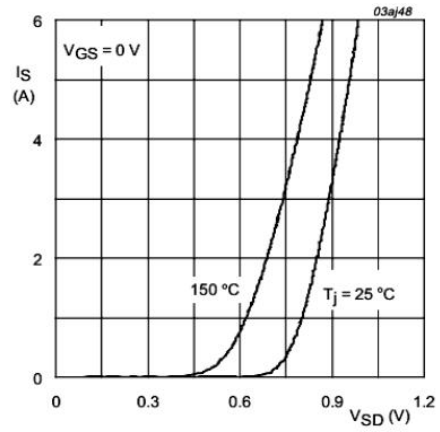
Fig 10. Sub-threshold drain current as a function of gate-source voltage.

## CHARACTERISTIC CURVES (Cont..)



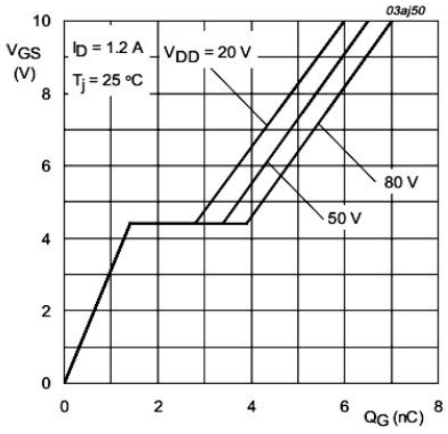

$V_{GS}$ = 0 V; f = 1 MHz

**Fig 11. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values.**




$T_j$ = 25 °C and 150 °C; $V_{GS}$ = 0 V

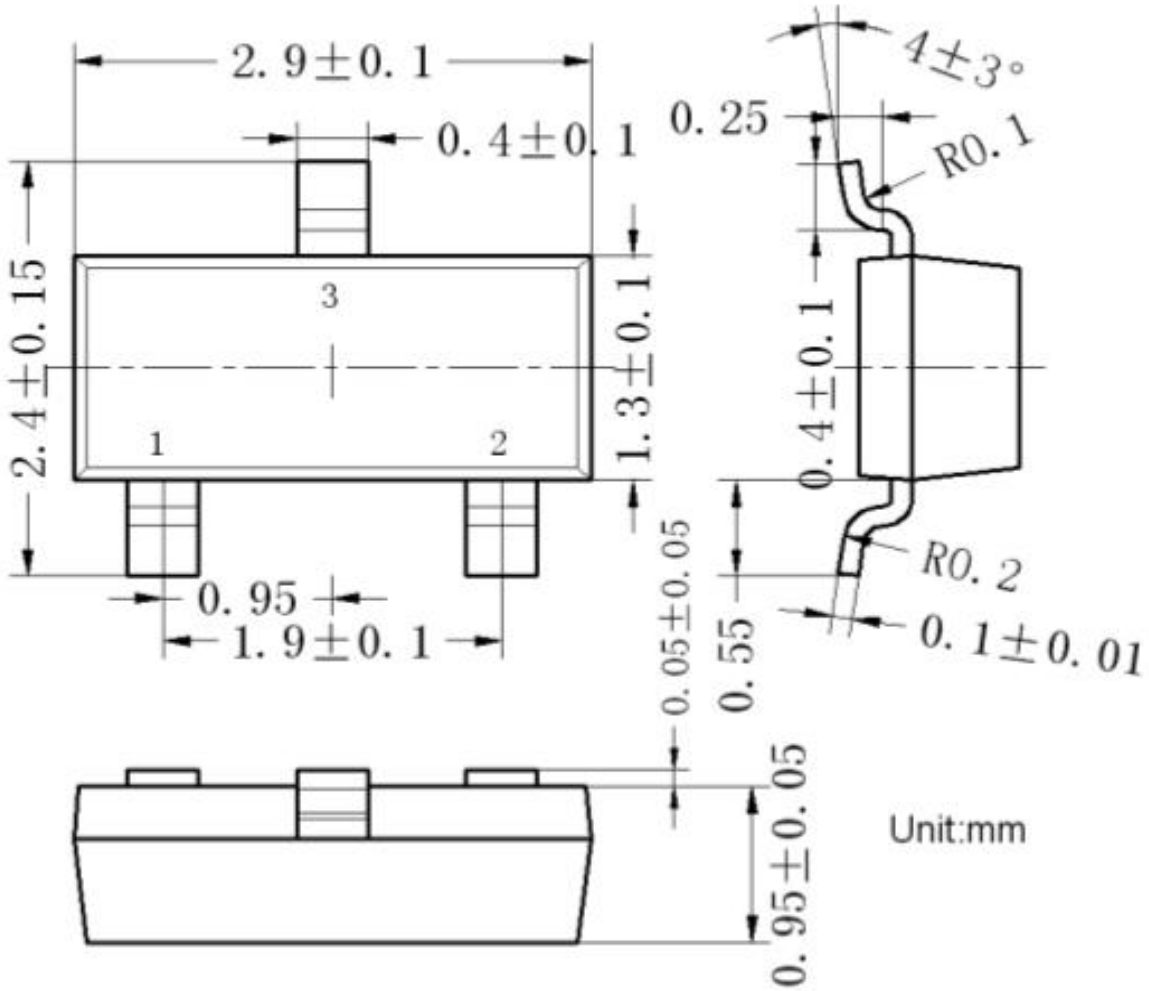
**Fig 12. Source (diode forward) current as a function of source-drain (diode forward) voltage; typical values.**




$I_D$ = 1.2 A; $V_{DD}$ = 20 V, 50 V, 80 V

**Fig 13. Gate-source voltage as a function of gate charge; typical values.**

## SOT-23 PACKAGE DIMENSIONS AND OUTLINE



## Customer Notes:

## Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.

2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

## DICLAIMER

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