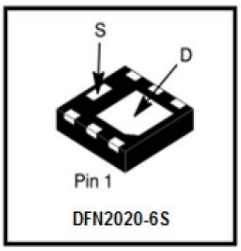
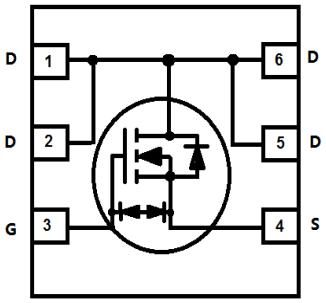
# N2323ED

## N-Channel 20V (D-S) MOSFET , ESD Protection




### 1. FEATURES

- Low Gate Threshold Voltage
- Fast Switching Speed
- ESD Protected Gate
- We declare that the material of product are Halogen Free and compliance with RoHS requirements.

### 2.APPLICATIONS

- Battery Management Application
- Power Management Functions
- DC-DC Converters

### 3. ORDERING INFORMATION

| Device | Marking | Shipping |
|---|---|---|
| N2323ED | N7S | 4000/Tape&Reel |

### 4. MAXIMUM RATINGS(Ta = 25ºC unless otherwise stated)

| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Drain−to−Source Voltage | | VDSS | 20 | V |
| Gate−to−Source Voltage | | VGS | ±8 | V |
| Continuous Drain Current | | ID | 7 | A |
| Pulsed Drain Current | | IDM | 28 | A |
| Avalanche Current | | IAS | 4 | A |
| Avalanche Energy(L=0.1mH) | | EAS | 0.8 | mJ |
| Maximum Power Dissipation | TA =25°C | PD | 1.4 | W |
| | TA =70°C | | 1.1 | |
| Operating Junction Temperature | | TJ | −55 ~+150 | ℃ |
| Thermal Resistance-Junction to Ambient(Note1) | | RθJA | 90 | ºC/W |

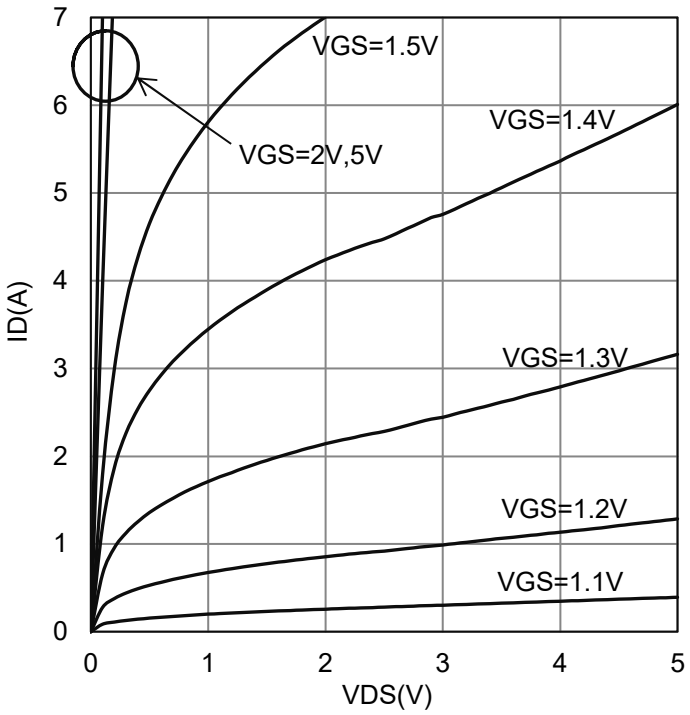
1. The device mounted on 1in ² FR4 board with 2 oz copper

## 5. ELECTRICAL CHARACTERISTICS

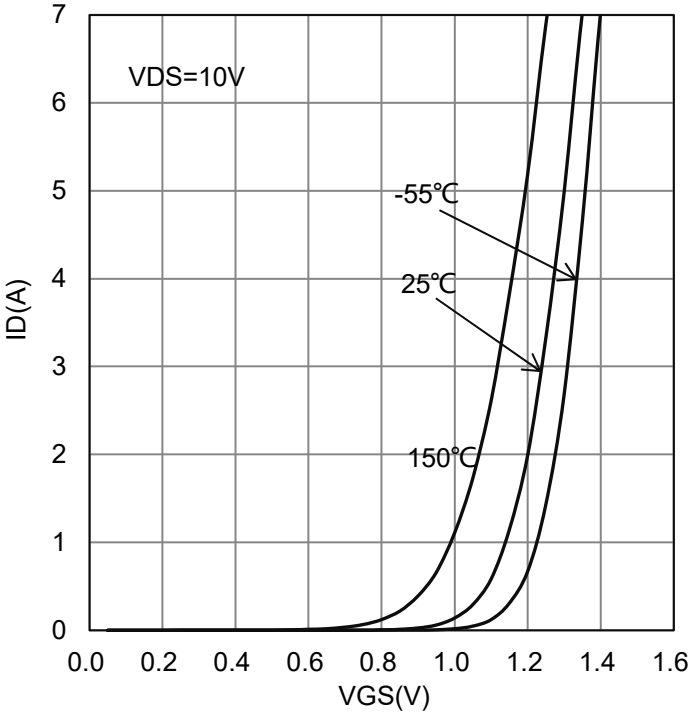
| Characteristic | | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Static | | | | | | |
| Drain-Source Breakdown Voltage (VGS =0V, ID =250μA) | | V(BR)DSS | 20 | - | - | V |
| Gate Threshold Voltage (VDS =VGS , ID =250μA) | | VGS(th) | 0.5 | - | 1.1 | V |
| Gate Leakage Current (VDS =0V, VGS =±8V) | | IGSS | - | - | ±10 | μA |
| Zero Gate Voltage Drain Current (VDS =16V, VGS =0V ) | | IDSS | - | - | 1 | μA |
| Drain-Source On-Resistance(Note 2)<br>(VGS =4.5V, ID = 2A)<br>(VGS =2.5V, ID = 2A) | | RDS(ON) | -<br>- | -<br>- | 20<br>28 | mΩ |
| Diode Forward Voltage (VGS = 0V, IS = 1A) | | VSD | - | - | 1.2 | V |
| DYNAMIC | | | | | | |
| Total Gate Charge(VGS=4.5V) | (VDS =10V, VGS =2.5V, ID =3.5A) | Qg | - | 6.3 | - | nC |
| Total Gate Charge(VGS=2.5V) | | Qg | - | 4 | - | |
| Gate-Source Charge | | Qgs | - | 1 | - | |
| Gate-Drain Charge | | Qgd | - | 1.8 | - | |
| Input Capacitance | (VDS =10V, VGS =0V,f=1MHz) | Ciss | - | 392 | - | pF |
| Output Capacitance | | Coss | - | 98.5 | - | |
| Reverse Transfer Capacitance | | Crss | - | 80 | - | |
| Turn-On Delay Time | (VDS =10V, RL = 2.85Ω ,VGS=4.5V ,ID=3.5A, RG =10Ω) | td(on) | - | 250 | - | ns |
| Turn-On Rise Time | | tr | - | 420 | - | |
| Turn-Off Delay Time | | td(off) | - | 3950 | - | |
| Turn-Off Fall Time | | tf | - | 3700 | - | |
| Gate Resistance (VDS=0V,VGS=0V,f=1.0MHz) | | Rg | - | 130 | - | Ω |

2. Pulse test; pulse width ≤ 300us, duty cycle≤ 2%

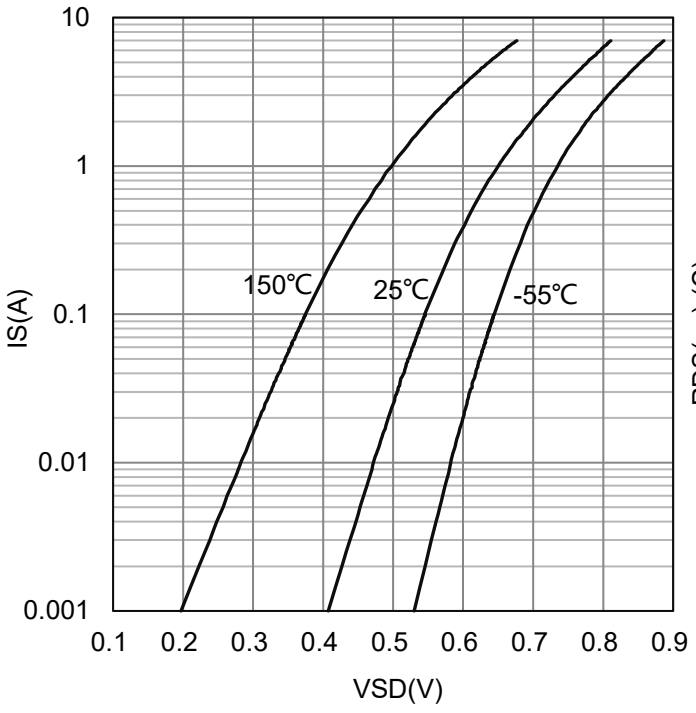
## 6.ELECTRICAL CHARACTERISTICS CURVES



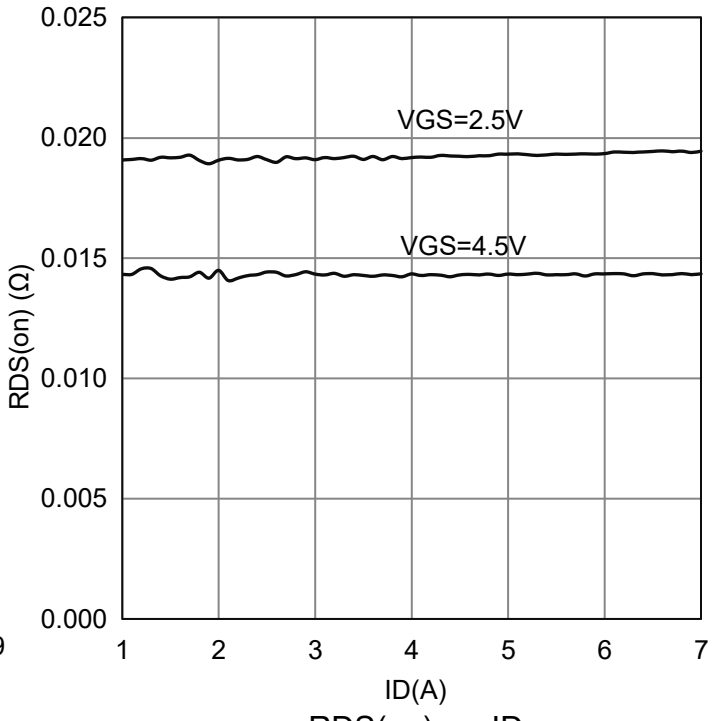

ID vs. VDS




ID vs. VGS

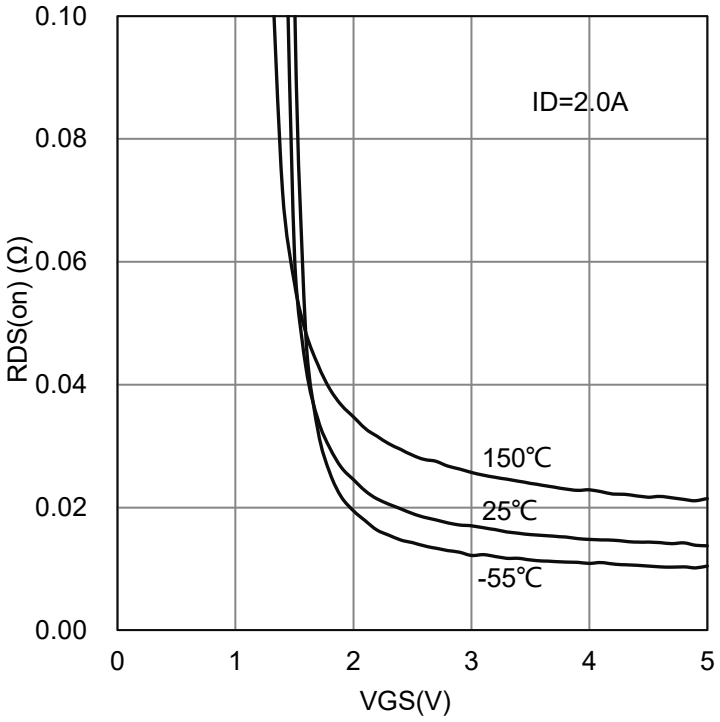



IS vs. VSD

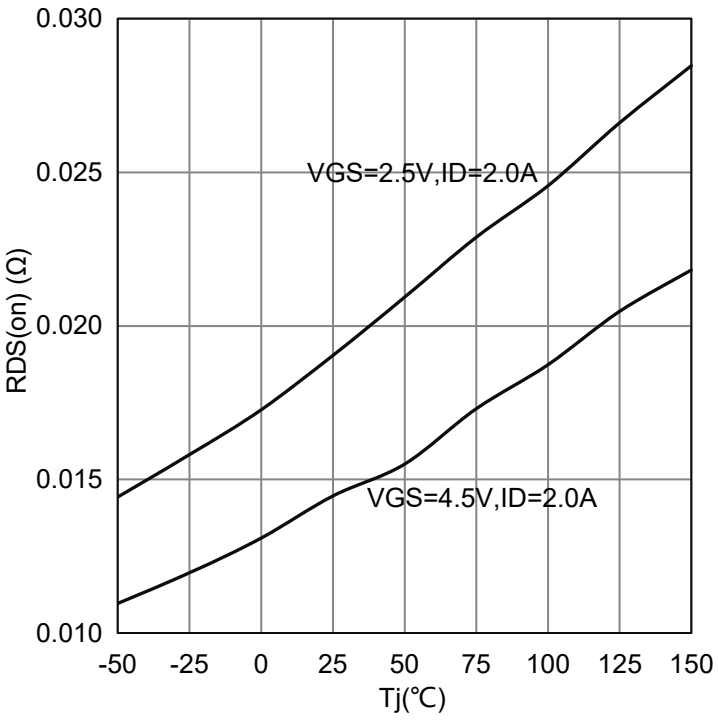



RDS(on) vs. ID

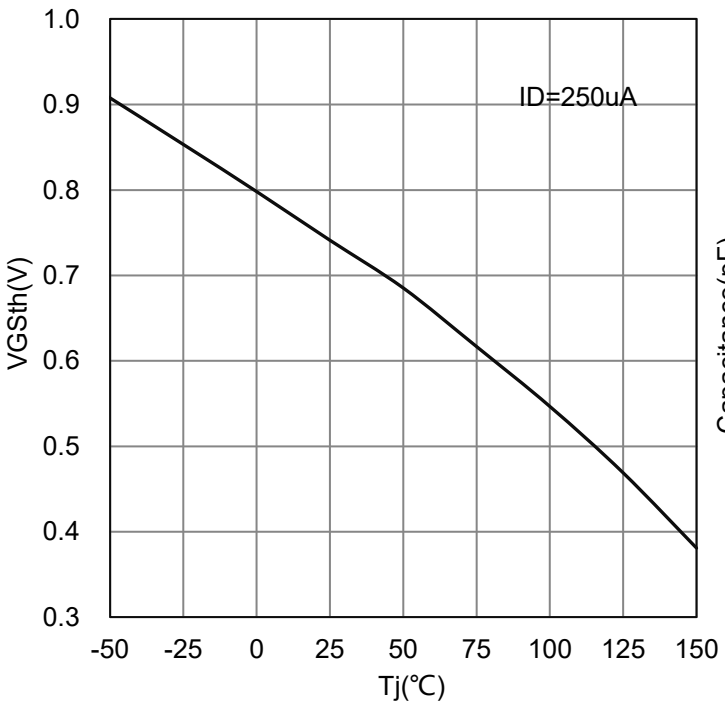
## 6.ELECTRICAL CHARACTERISTICS CURVES(Con.)



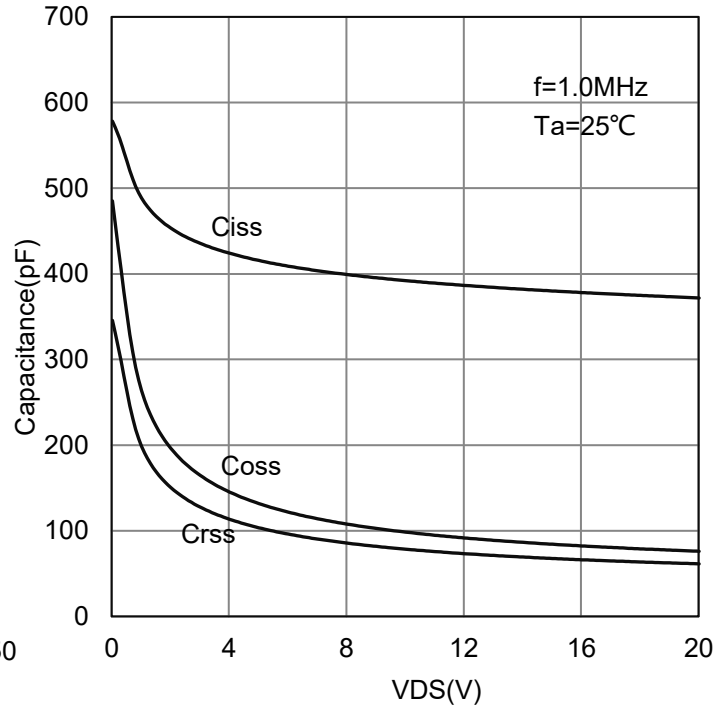

RDS(on) vs. VGS




RDS(on) vs. Tj

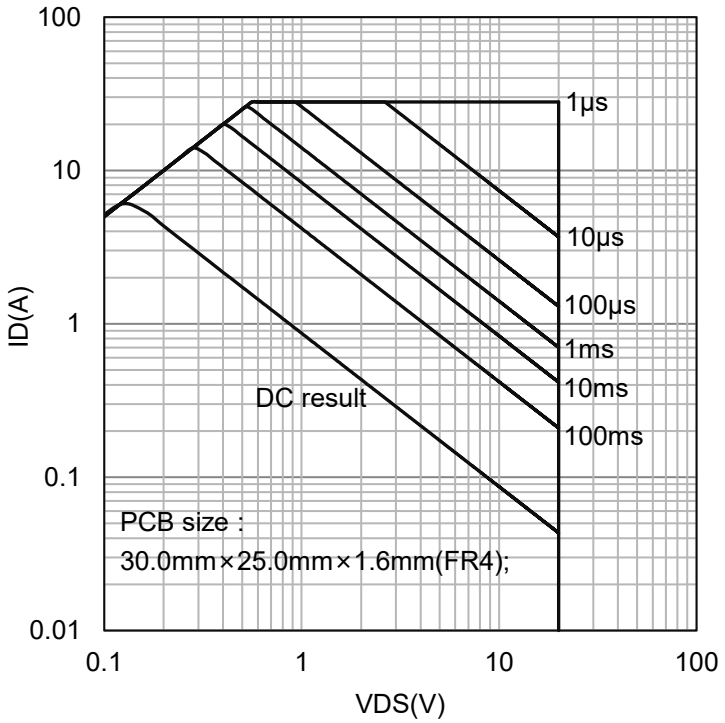



VGSth vs. Tj



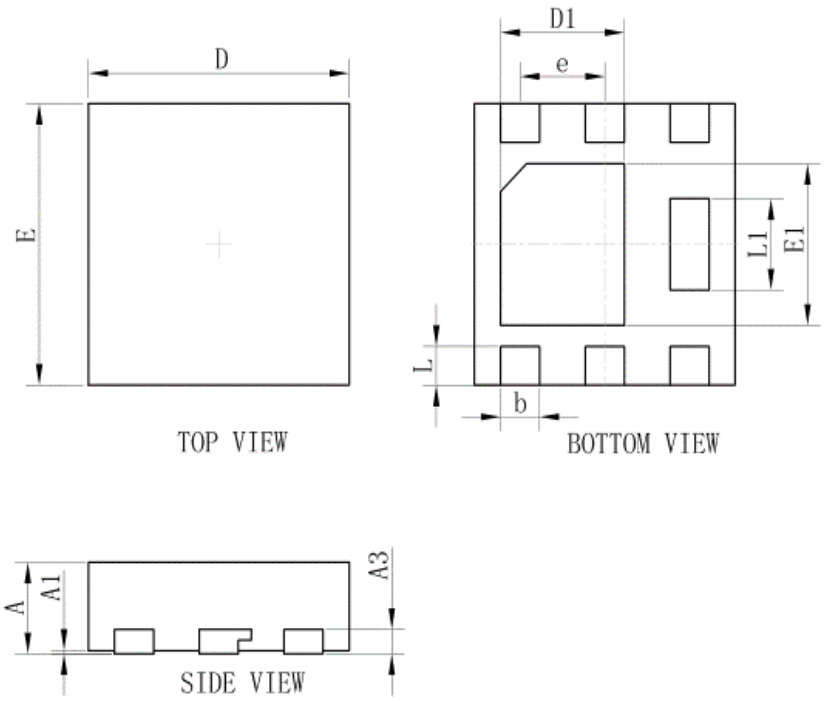

Capacitance

## 6.ELECTRICAL CHARACTERISTICS CURVES(Con.)



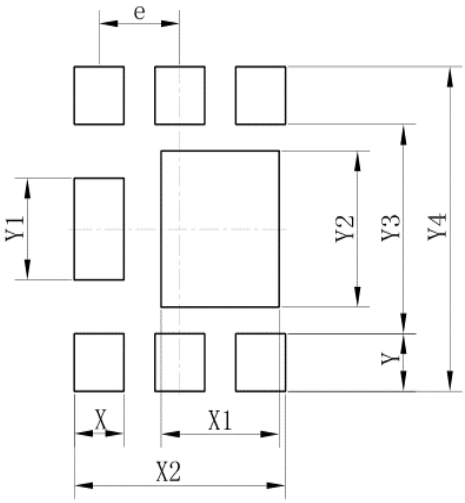

Safe Operating Area

## 7.OUTLINE AND DIMENSIONS




| DFN2020-6S | | | |
|---|---|---|---|
| DIM | MIN | NOR | MAX |
| A | 0.60 | 0.65 | 0.70 |
| A1 | 0.01 | 0.03 | 0.05 |
| b | 0.25 | 0.30 | 0.35 |
| D | 1.95 | 2.00 | 2.05 |
| E | 1.95 | 2.00 | 2.05 |
| e | 0.65TYP. | | |
| L | 0.23 | 0.28 | 0.33 |
| L1 | 0.60 | 0.65 | 0.65 |
| D1 | 0.90 | 0.95 | 1.00 |
| E1 | 1.10 | 1.15 | 1.20 |
| A3 | 0.152REF | | |
| All Dimensions in mm | | | |

## 8.SOLDERING FOOTPRINT




| DFN2020-6S | |
|---|---|
| Dim | (mm) |
| X | 0.40 |
| X1 | 0.95 |
| X2 | 1.70 |
| e | 0.65 |
| Y | 0.43 |
| Y1 | 0.75 |
| Y2 | 1.15 |
| Y3 | 1.54 |
| Y4 | 2.39 |