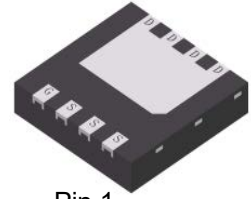
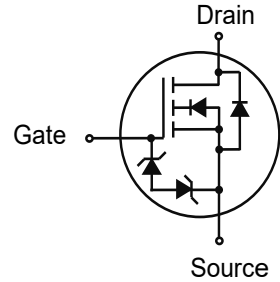


# NB8304ED

N-Channel 30-V (D-S) MOSFET , ESD Protection



Pin 1  
DFN3333-8A



## 1. FEATURES

- Low RDS(on) trench technology.
- Low thermal impedance.
- Fast switching speed.
- ESD Protected Gate
- We declare that the material of product are Halogen Free and compliance with RoHS requirements.

## 2. APPLICATION

- Power Routing
- DC/DC Conversion
- Motor Drives

## 3. ORDERING INFORMATION

| Device   | Marking | Shipping       |
|----------|---------|----------------|
| NB8304ED | E2B     | 2000/Tape&Reel |

## 4. MAXIMUM RATINGS(Ta = 25°C)

| Parameter                      | Symbol | Limits    | Unit |
|--------------------------------|--------|-----------|------|
| Drain-to-Source Voltage        | VDSS   | 30        | V    |
| Gate-to-Source Voltage         | VGS    | ±20       | V    |
| Continuous Drain Current       | ID     | 22        | A    |
| Pulsed Drain Current (Note 2)  | IDM    | 88        | A    |
| Avalanche Current              | IAS    | 34        | A    |
| Avalanche energy(L=0.1mH)      | EAS    | 57.8      | mJ   |
| Power Dissipation              | PD     | 2.2       | W    |
| Operating Junction Temperature | TJ     | -55 ~+150 | °C   |
| Storage Temperature Range      | Tstg   | -55 ~+150 |      |

## 5. THERMAL CHARACTERISTICS

| Parameter                           | Symbol | Limits | Unit |
|-------------------------------------|--------|--------|------|
| Maximum Junction-to-Ambient(Note 1) | RθJA   | 55     | °C/W |
| Maximum Junction-to-Case            | RθJC   | 4      |      |

- 1.Surface mounted on "1.5 x 1.5" FR4 board using 1 sq in pad, 2 oz Cu.
- 2.Pulse width limited by maximum junction temperature

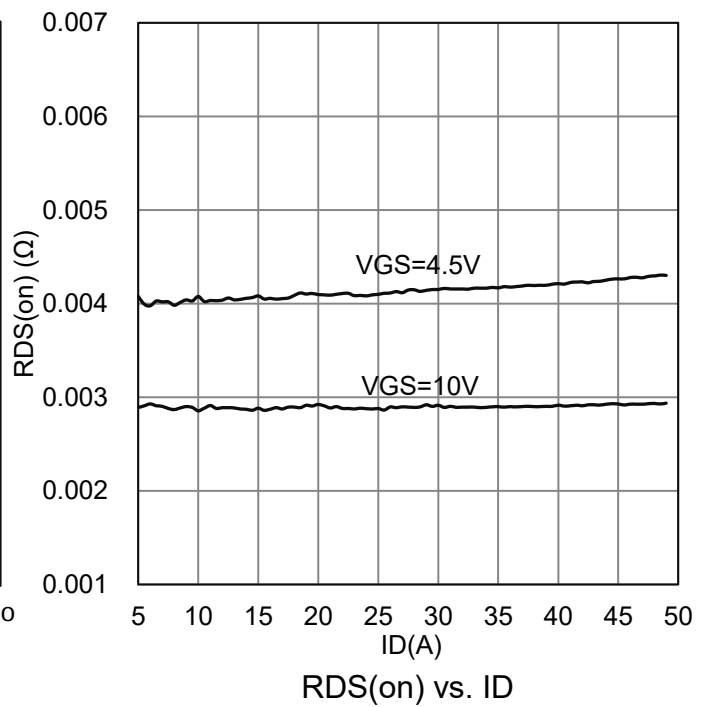
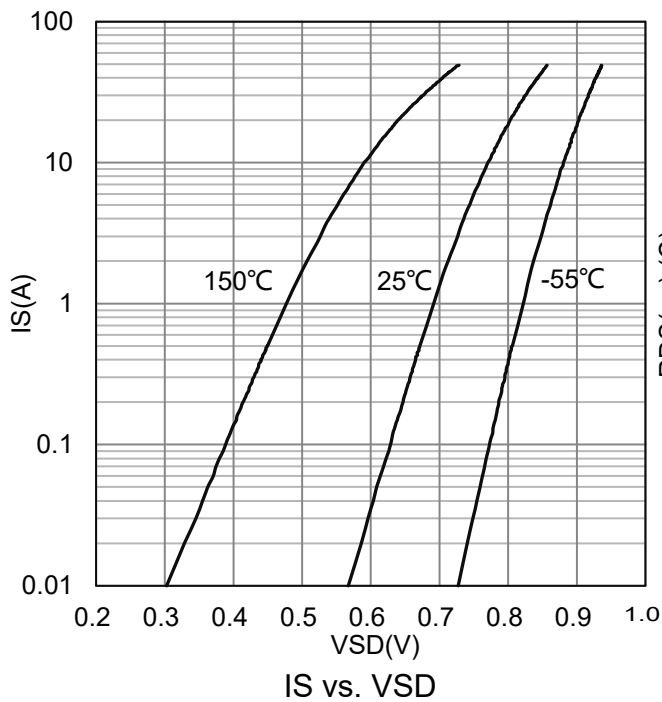
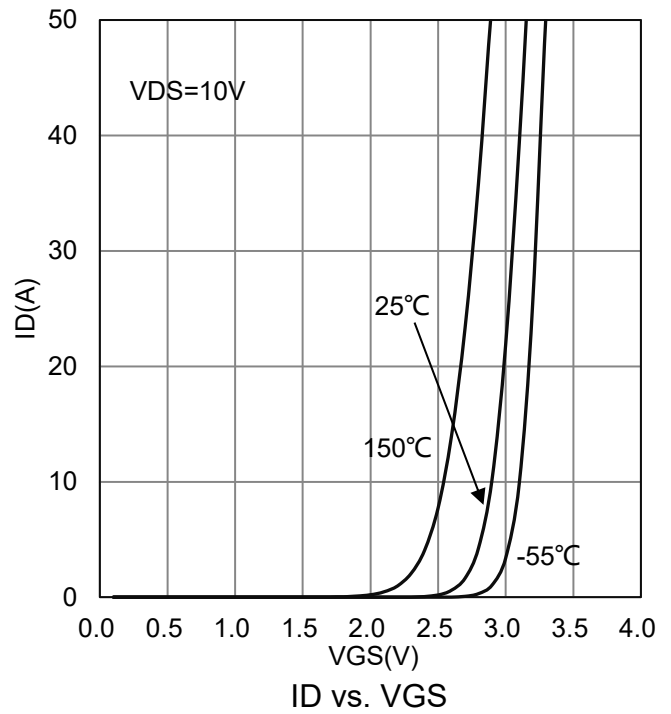
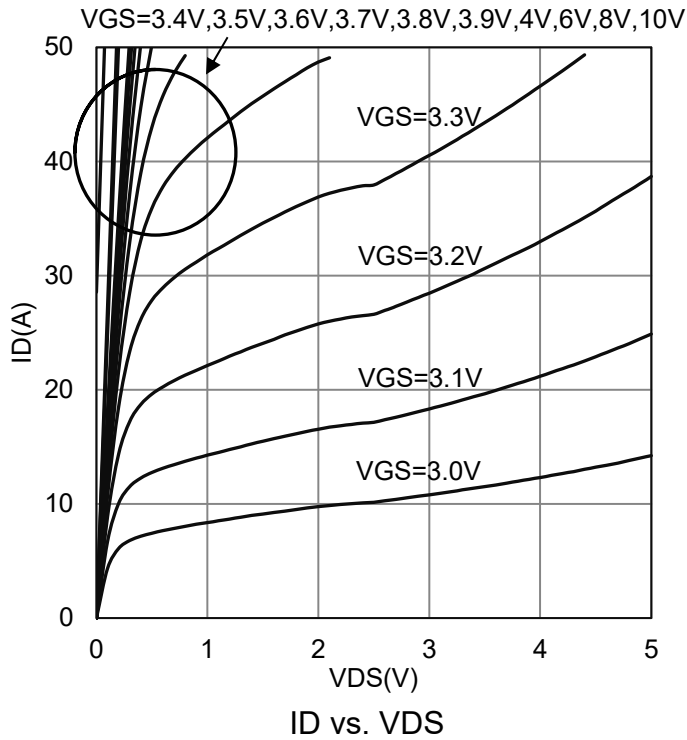


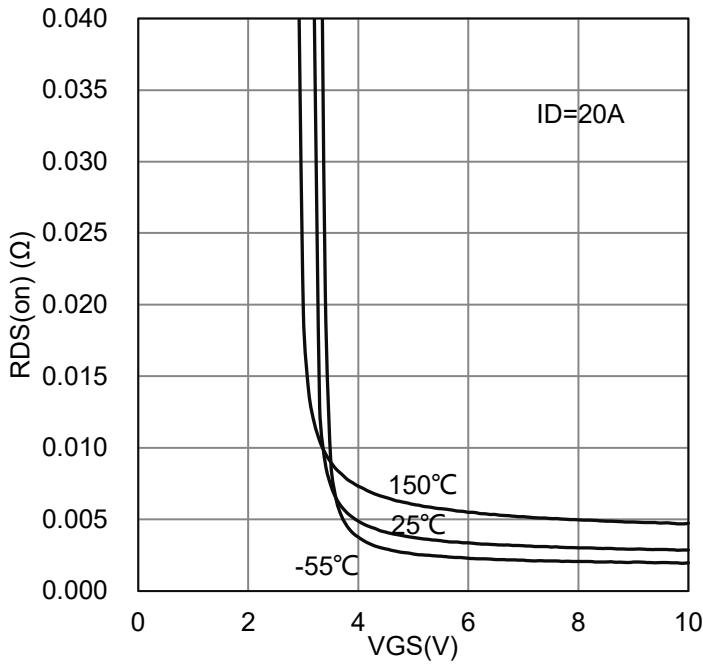
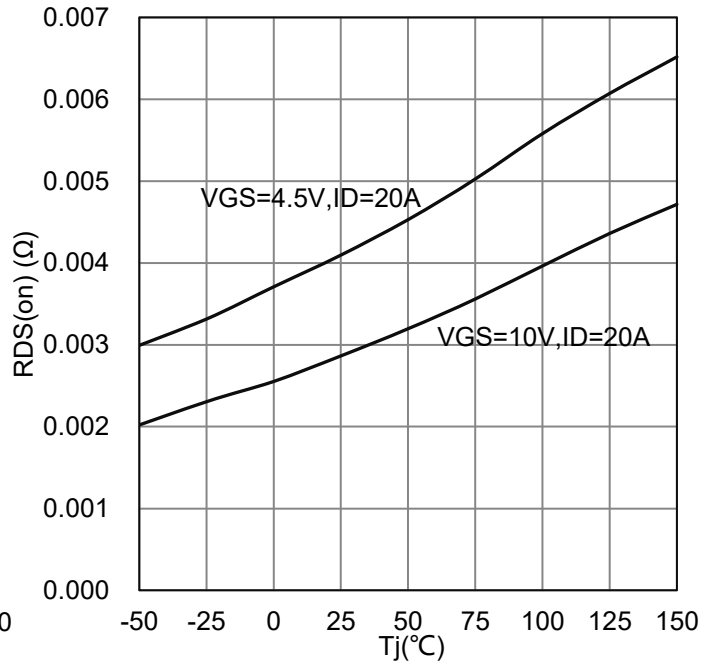
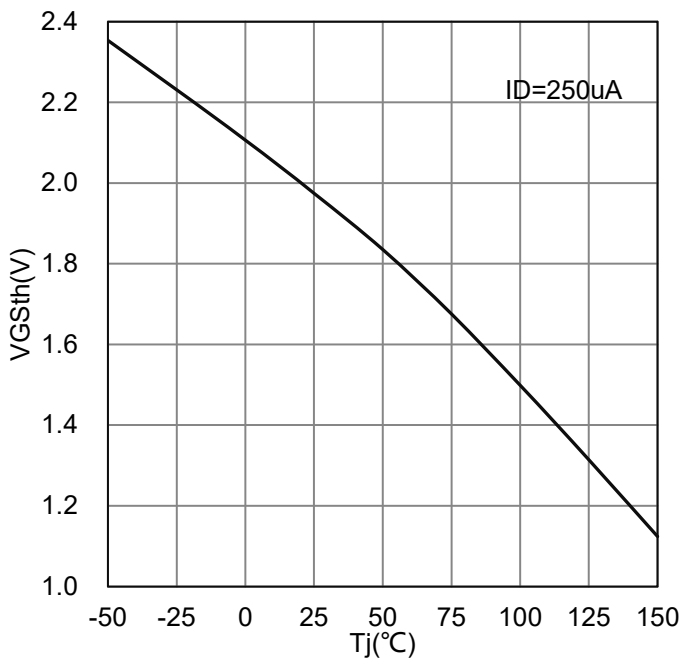
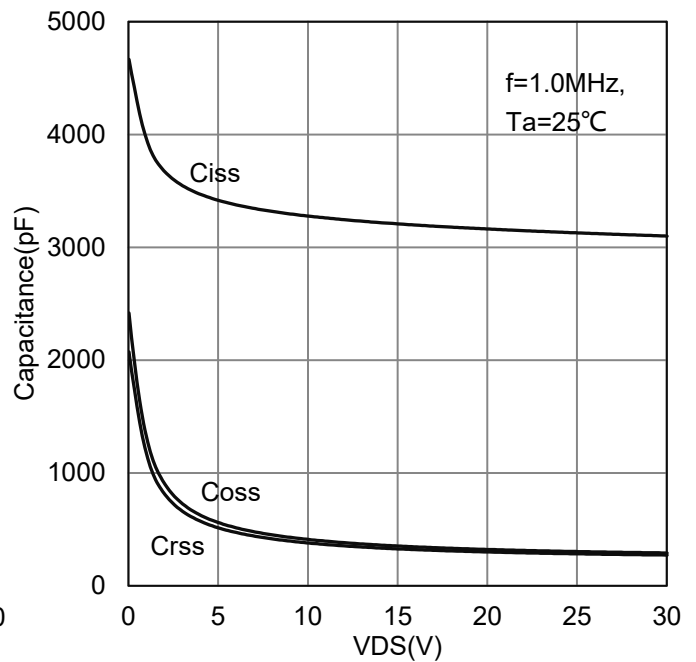
**6. ELECTRICAL CHARACTERISTICS(Ta = 25°C)**

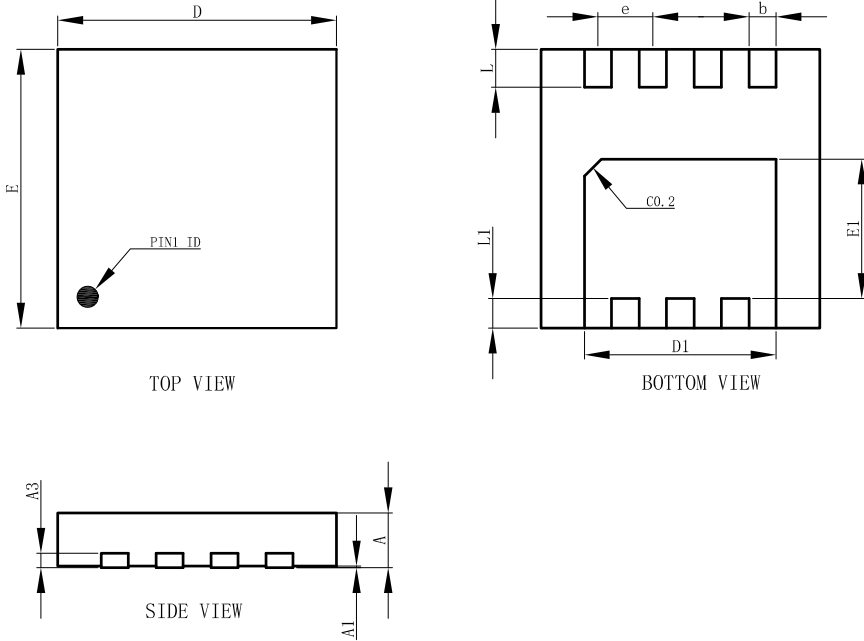
| Characteristic  | Symbol                                    | Min.     | Typ.     | Max.       | Unit |    |
|---|---|----------|----------|------------|------|----|
| <b>Static</b>   |   |          |          |            |      |    |
| Drain-Source Breakdown Voltage<br>(VGS = 0V, ID = 250μA)                                  | V(BR)DSS                                  | 30       | -        | -          | V    |    |
| Gate-Source Threshold Voltage<br>(VDS = VGS, ID = 250 μA)                                 | VGS(th)                                   | 1.4      | 1.9      | 2.4        | V    |    |
| Gate-Body Leakage<br>(VDS = 0 V, VGS = ±20 V)   | IGSS                                      | -        | -        | ±10        | μA   |    |
| Zero Gate Voltage Drain Current<br>(VDS = 30 V, VGS = 0 V)                                | IDSS                                      | -        | -        | 1          | μA   |    |
| Drain-Source On-Resistance(Note 3)<br>(VGS = 10 V, ID = 20 A)<br>(VGS = 4.5 V, ID = 20 A) | RDS(on)                                   | -        | 3<br>4.1 | 4.5<br>5.7 | mΩ   |    |
| Diode Forward Voltage(Note 3)<br>(IS = 1 A, VGS = 0 V)                                    | VSD                                       | -        | 0.7      | 1          | V    |    |
| <b>Dynamic</b>  |   |          |          |            |      |    |
| Total Gate Charge   | (VDS = 15 V,<br>VGS = 10 V, ID =<br>20 A) | Qg(10V)  | -        | 63.5       | -    | nC |
| Total Gate Charge   |   | Qg(4.5V) | -        | 31.7       | -    |    |
| Gate-Source Charge  |   | Qgs      | -        | 10.5       | -    |    |
| Gate-Drain Charge   |   | Qgd      | -        | 15         | -    |    |
| Input Capacitance   | (VDS = 15 V,<br>VGS = 0 V, f = 1<br>Mhz)  | Ciss     | -        | 3207       | -    | pF |
| Output Capacitance  |   | Coss     | -        | 352        | -    |    |
| Reverse Transfer Capacitance  |   | Crss     | -        | 326        | -    |    |
| Gate Resistance<br>(VDS=0V, VGS=0V, f=1.0MHz)   | Rg  | -        | 25       | -          | Ω    |    |

3.Pulse test: PW ≤ 300μs duty cycle ≤ 2%.

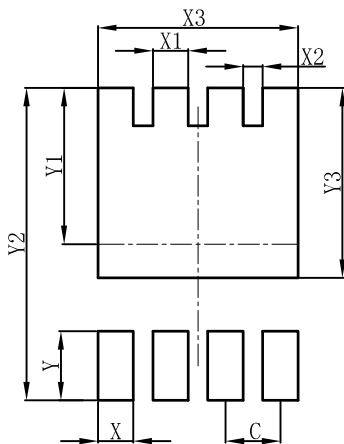


**7. ELECTRICAL CHARACTERISTICS CURVES**


**7. ELECTRICAL CHARACTERISTICS CURVES(Con.)**

 **$R_{DS(on)}$  vs.  $V_{GS}$** 

 **$R_{DS(on)}$  vs.  $T_j$** 

 **$V_{GS(th)}$  vs.  $T_j$** 

**Capacitance**


**8.OUTLINE AND DIMENSIONS**
**DFN3333-8A**


| DFN3333-8A           |           |      |      |
|----------------------|-----------|------|------|
| DIM                  | MIN       | NOR  | MAX  |
| A                    | 0.60      | 0.65 | 0.70 |
| A1                   | 0.00      | 0.03 | 0.05 |
| b                    | 0.27      | 0.32 | 0.37 |
| D                    | 3.25      | 3.30 | 3.35 |
| E                    | 3.25      | 3.30 | 3.35 |
| D1                   | 2.22      | 2.27 | 2.32 |
| E1                   | 1.60      | 1.65 | 1.70 |
| e                    | 0.65BSC   |      |      |
| L                    | 0.40      | 0.45 | 0.50 |
| L1                   | 0.30      | 0.35 | 0.40 |
| A3                   | 0.152REF. |      |      |
| All Dimensions in mm |           |      |      |

**9.SOLDERING FOOTPRINT**
**DFN3333-8A**


| DFN3333-8A |      |
|------------|------|
| DIM        | (mm) |
| C          | 0.65 |
| X          | 0.42 |
| X1         | 0.42 |
| X2         | 0.23 |
| X3         | 2.37 |
| Y          | 0.70 |
| Y1         | 1.85 |
| Y2         | 3.70 |
| Y3         | 2.25 |

