

NCE N-Channel Enhancement Mode Power MOSFET

Description

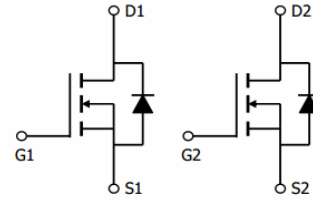
The NCE30ND35Q uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

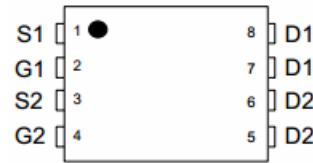
- $V_{DS} = 30V, I_D = 35A$
 $R_{DS(ON)} < 13m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 19m\Omega @ V_{GS} = 4.5V$
- High density cell design for ultra low R_{dson}
- Fully characterized Avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

Application

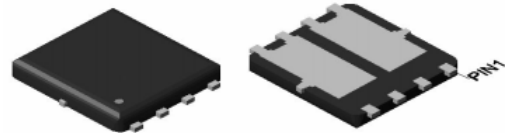
- Power switching application
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply



Schematic Diagram



pin assignment



Top View

Bottom View

100% UIS TESTED!
100% ΔVds TESTED!

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|------------|----------------|-----------|------------|----------|
| NCE30ND35Q | NCE30ND35Q | DFN3.3X3.3-8L | - | - | - |

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|--------------------|------------|---------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | 35 | A |
| Drain Current-Continuous($T_C = 100^\circ C$) | $I_D(100^\circ C)$ | 24.8 | A |
| Pulsed Drain Current | I_{DM} | 140 | A |
| Maximum Power Dissipation | P_D | 30 | W |
| Derating factor | | 0.24 | W/ $^\circ C$ |
| Single pulse avalanche energy ^(Note 5) | E_{AS} | 72 | mJ |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | $^\circ C$ |

Thermal Characteristic

| | | | |
|--|-----------------|------|--------------|
| Thermal Resistance, Junction-to-Case ^(Note 2) | $R_{\theta JC}$ | 4.17 | $^\circ C/W$ |
|--|-----------------|------|--------------|

Electrical Characteristics (T_C=25°C unless otherwise noted)

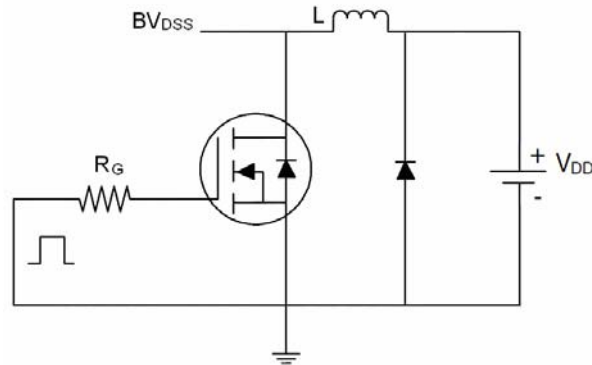
| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---------------------|---|-----|-------|------|------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =250μA | 30 | - | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =30V, V _{GS} =0V | - | - | 1 | μA |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} =±20V, V _{DS} =0V | - | - | ±100 | nA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 0.9 | 1.3 | 2.0 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =10V, I _D =20A | - | 11 | 13 | mΩ |
| | | V _{GS} =4.5V, I _D =20A | - | 14.5 | 19 | mΩ |
| Forward Transconductance | g _{FS} | V _{DS} =5V, I _D =20A | 26 | - | - | S |
| Dynamic Characteristics (Note4) | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =15V, V _{GS} =0V, F=1.0MHz | 800 | 1000 | 1500 | PF |
| Output Capacitance | C _{oss} | | - | 180.8 | - | PF |
| Reverse Transfer Capacitance | C _{rss} | | - | 164.4 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | t _{d(on)} | V _{DD} =15V, R _L =0.75Ω V _{GS} =10V, R _G =3Ω | - | 5 | - | nS |
| Turn-on Rise Time | t _r | | - | 12 | - | nS |
| Turn-Off Delay Time | t _{d(off)} | | - | 19 | - | nS |
| Turn-Off Fall Time | t _f | | - | 6 | - | nS |
| Total Gate Charge | Q _g | V _{DS} =15V, I _D =20A, V _{GS} =10V | - | 17 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 2.8 | - | nC |
| Gate-Drain Charge | Q _{gd} | | - | 3.9 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V _{SD} | V _{GS} =0V, I _S =20A | - | - | 1.2 | V |
| Diode Forward Current (Note 2) | I _S | | - | - | 35 | A |
| Reverse Recovery Time | t _{rr} | T _J = 25°C, I _F =20A di/dt = 100A/μs (Note3) | - | 19 | - | nS |
| Reverse Recovery Charge | Q _{rr} | | - | 10 | - | nC |
| Forward Turn-On Time | t _{on} | Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD) | | | | |

Notes:

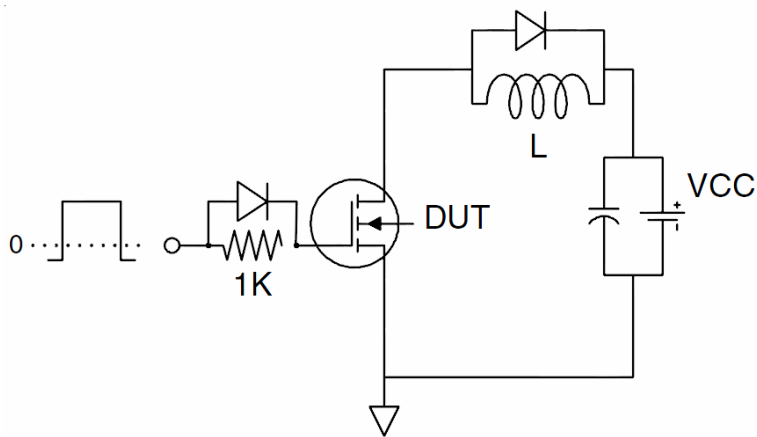
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition: T_J=25°C, V_{DD}=15V, V_G=10V, L=0.5mH, R_G=25Ω

Test circuit

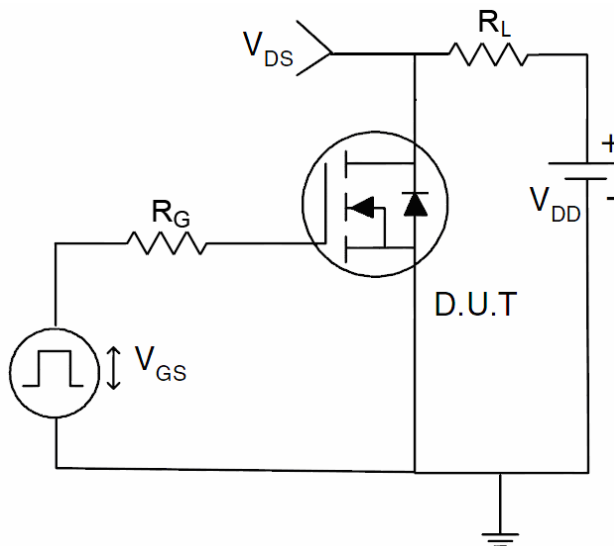
1) E_{AS} test Circuits



2) Gate charge test Circuit:



3) Switch Time Test Circuit:



Typical Electrical and Thermal Characteristics (Curves)

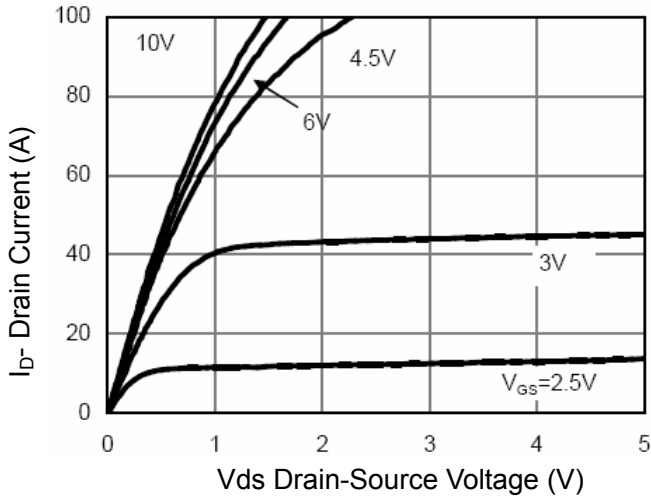


Figure 1 Output Characteristics

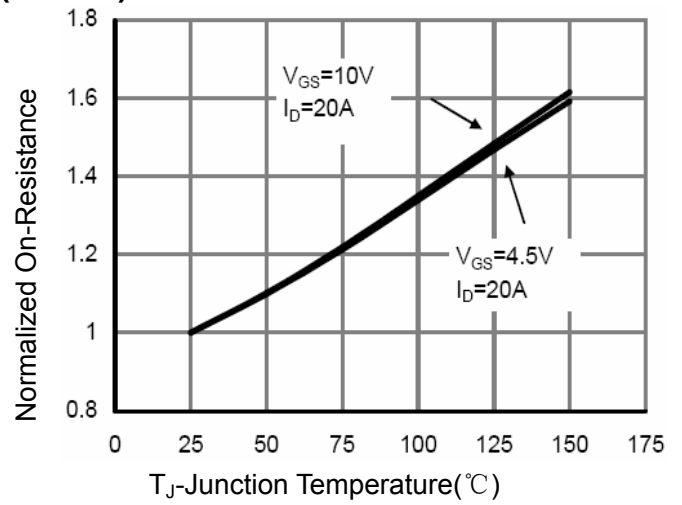


Figure 4 R_{dson} -Junction Temperature

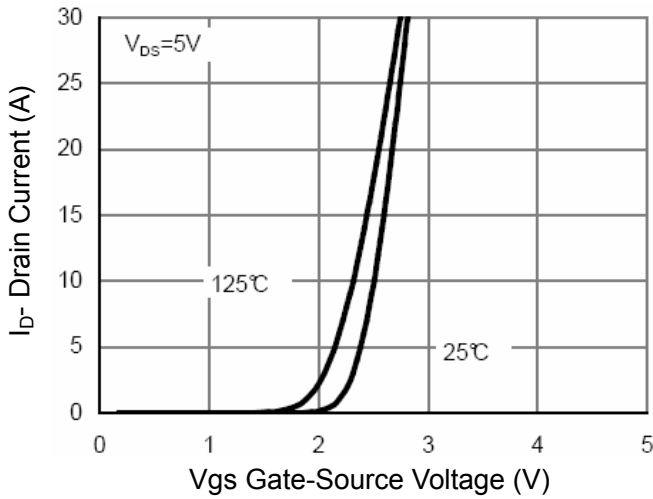


Figure 2 Transfer Characteristics

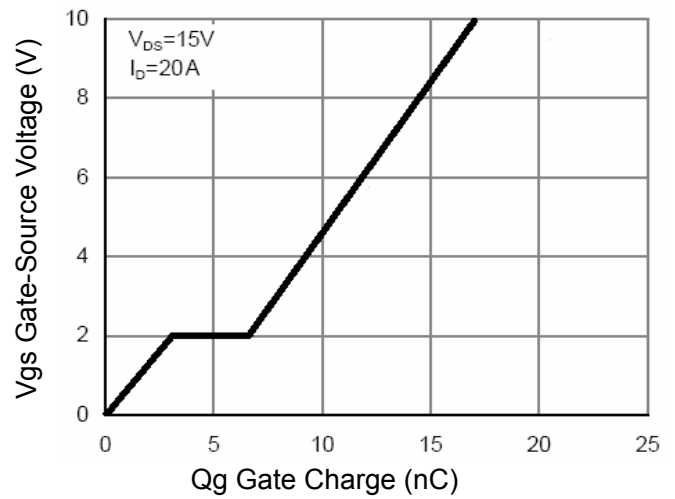


Figure 5 Gate Charge

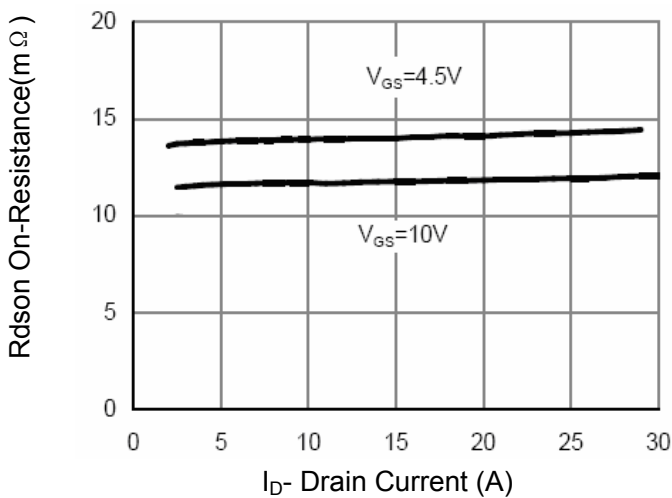


Figure 3 R_{dson} - Drain Current

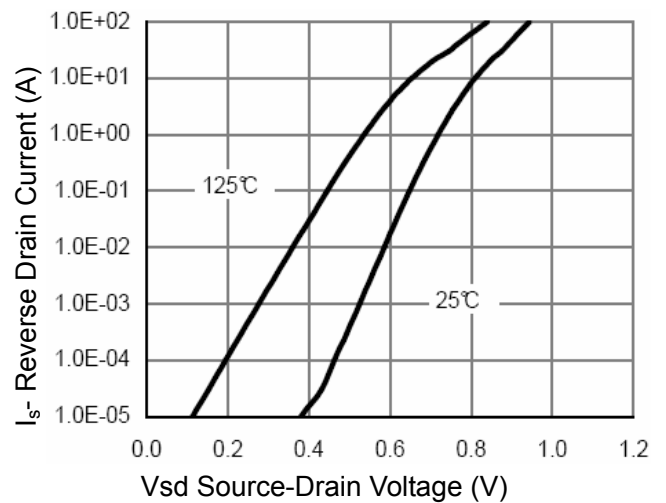


Figure 6 Source- Drain Diode Forward

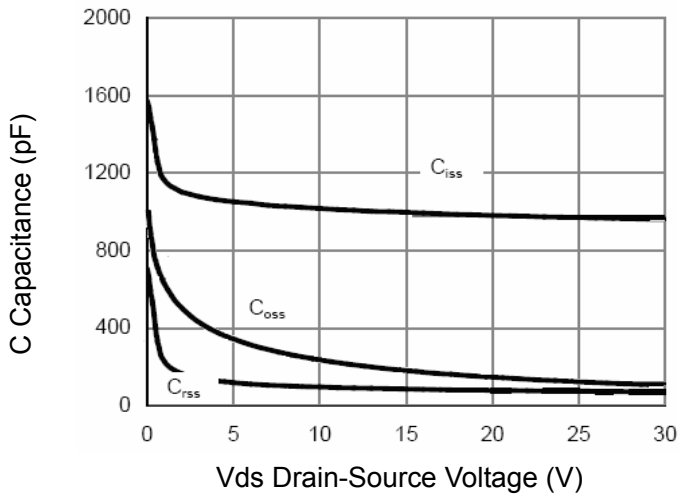


Figure 7 Capacitance vs Vds

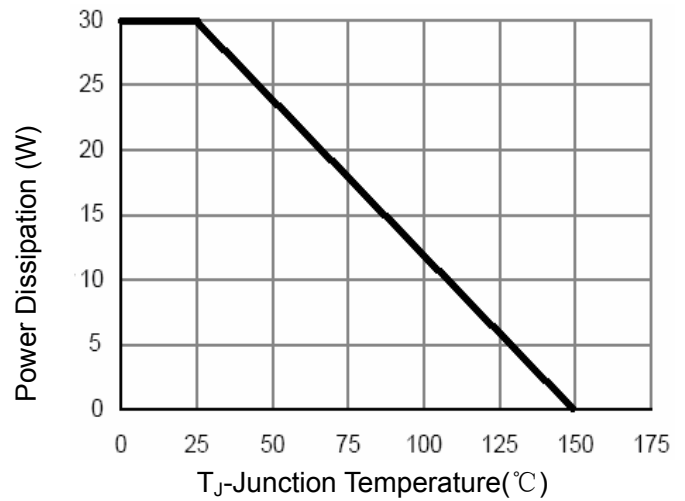


Figure 9 Power De-rating

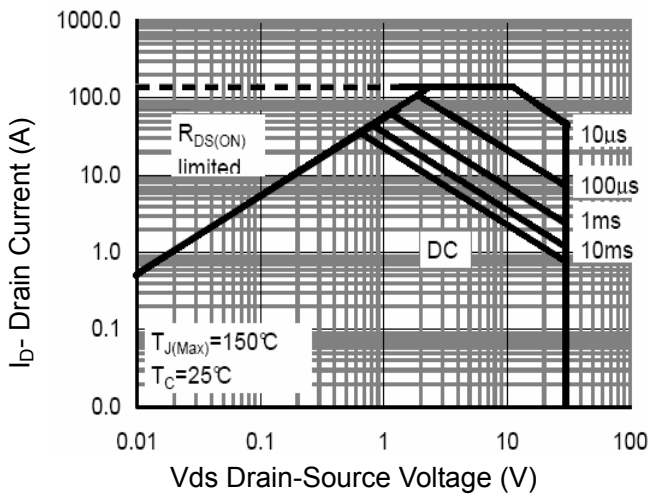


Figure 8 Safe Operation Area

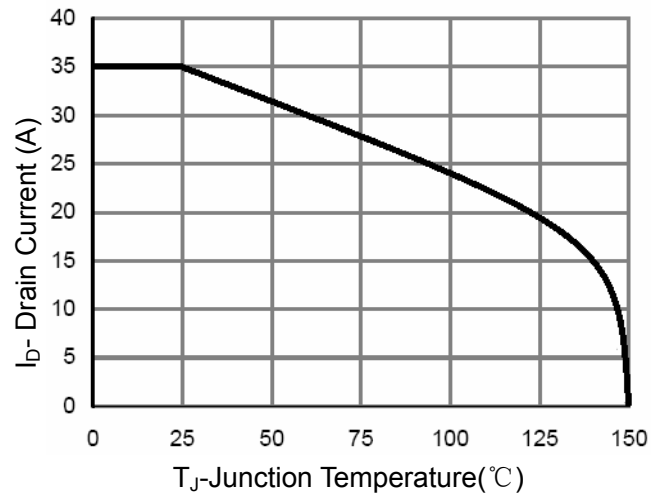


Figure 10 I_D Current De-rating

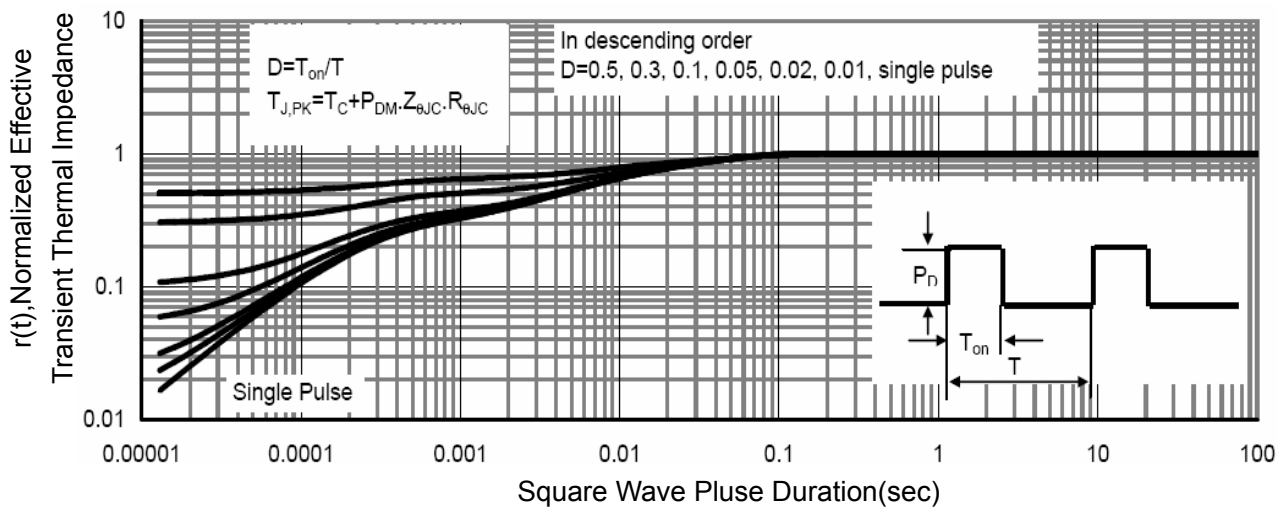
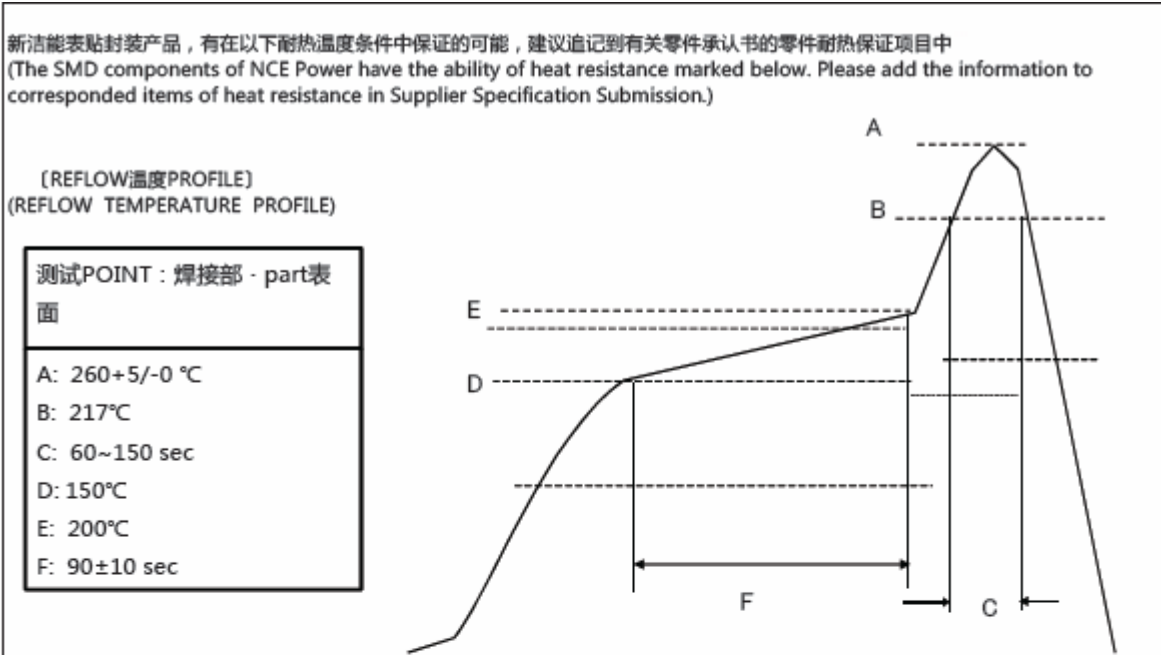


Figure 11 Normalized Maximum Transient Thermal Impedance

Reflow Curve

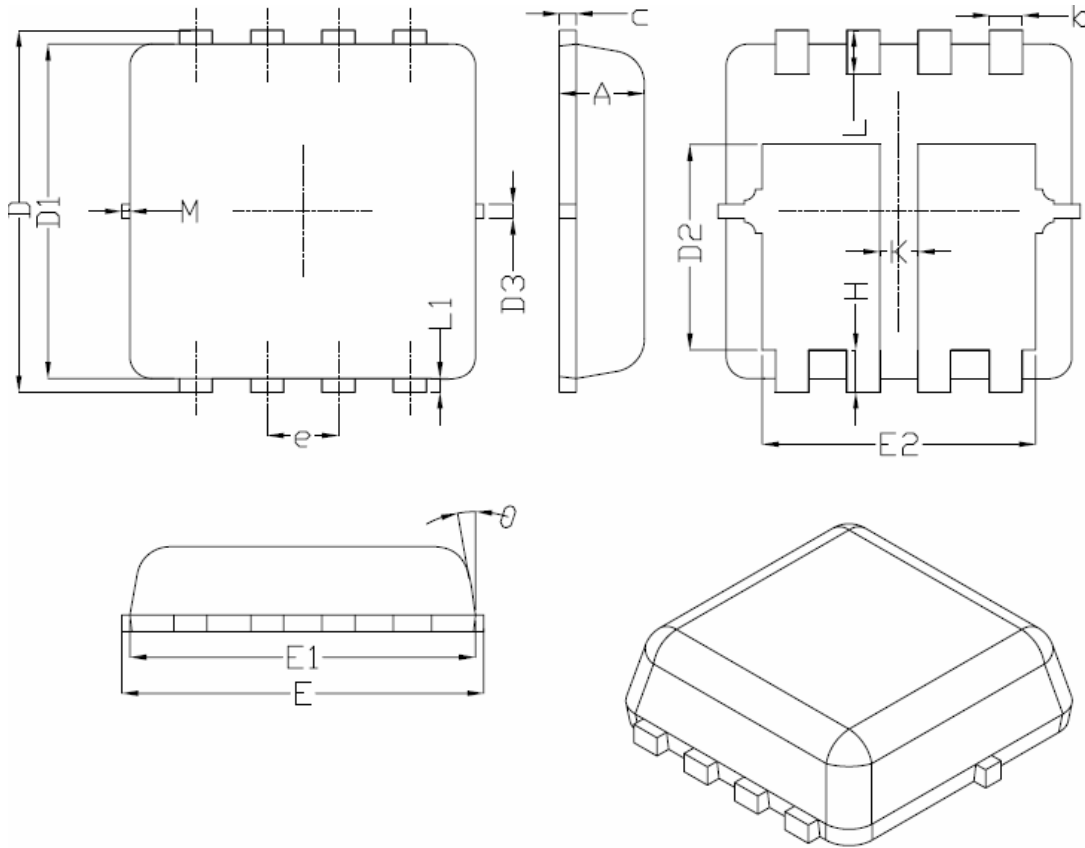
The Guarantee Letter of Parts Heat Resistance



| | | | |
|---|---|--|---------------------|
| reflow条件(次数等) (Reflow condition (times)) | <input checked="" type="checkbox"/> 可用以上PROFILE进行3次 (can use the above profile for two times) <input type="checkbox"/> 不可REFLOW (can not Reflow) | | |
| 开封后的吸湿保证条件 (Damp resistance after opening) | <input type="checkbox"/> 无限制 (保管条件 30°C 70%RH以下) (no limit) (store condition: 30 °C 70%RH below) | | |
| | <input checked="" type="checkbox"/> 开封后 30°C 60%RH168H→REFLOW (after opening) | | |
| 手焊耐热 (Soldering iron) | 350±10°C 5+1/-0 sec | flow耐热 (flow heat-resistant) | 270±3°C 10+1/-0 sec |
| Pb含有状况 (Pb content status) | 零件外部 (external) | <input checked="" type="checkbox"/> Pb完全无使用 Pb-free <input type="checkbox"/> Pb有使用其位置 (无铅化予定 年 月) Pb used in location (realize Pb-free year month) | |
| | 零件内部 (inside) | <input type="checkbox"/> Pb完全无使用 Pb-free <input checked="" type="checkbox"/> Pb有使用其位置 (内部电极含有Pb, 无铅化予定 年 月) Pb used in the inside electrodes (realize Pb-free year month) | |
| | 电极镀层的组成 (Composition of lead cladding) | <input checked="" type="checkbox"/> Sn, <input type="checkbox"/> Sn-Cu, <input type="checkbox"/> Sn-Ag, <input type="checkbox"/> Sn-Bi, <input type="checkbox"/> 其他(other)() <input type="checkbox"/> Sn-Pb (无铅化予定 年 月) (realize Pb-free year month) | |
| | 无铅区分 (Pb-free manage) | <input type="checkbox"/> 料号变更 (无铅零件料号: ABC12345) P/N changed (Pb-free P/N:) <input checked="" type="checkbox"/> 料号不变,自然切换 (切换时间点: 年 月 日) P/N not changed,switch naturally (switch time: year month date) | |

| | |
|------------|-------------------------|
| Solder Dip | 260°C /10Sec Whole body |
|------------|-------------------------|

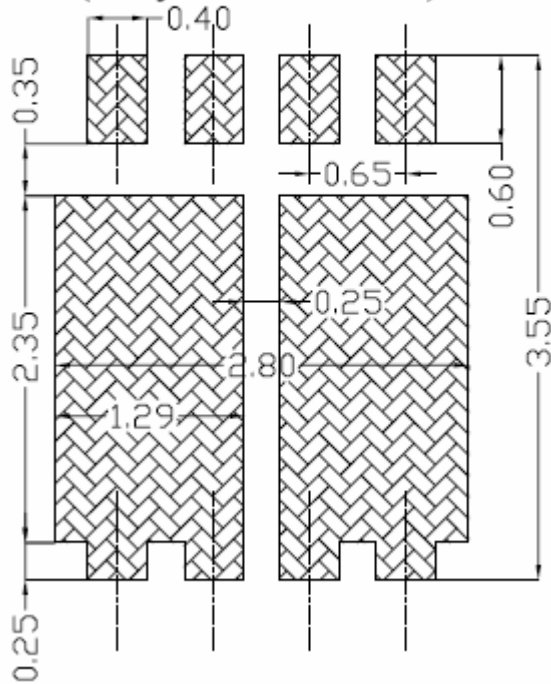
DFN3.3X3.3-8L Package Information



Land Pattern (Only for Reference)

| SYMBOL | DIMENSIONAL REOMTS | | |
|--------|--------------------|------|------|
| | MIN | NOM | MAX |
| A | 0.70 | 0.75 | 0.80 |
| b | 0.25 | 0.30 | 0.35 |
| c | 0.10 | 0.15 | 0.25 |
| D | 3.25 | 3.35 | 3.45 |
| D1 | 3.00 | 3.10 | 3.20 |
| D2 | 1.78 | 1.88 | 1.98 |
| D3 | --- | 0.13 | --- |
| E | 3.20 | 3.30 | 3.40 |
| E1 | 3.00 | 3.15 | 3.20 |
| E2 | 2.39 | 2.49 | 2.59 |
| e | 0.65BSC | | |
| H | 0.30 | 0.39 | 0.50 |
| L | 0.30 | 0.40 | 0.50 |
| L1 | --- | 0.13 | --- |
| K | 0.30 | --- | --- |
| θ | --- | 10° | 12° |
| M | * | * | 0.15 |

* Not specified



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