

RBE056N08R1SZN6

REXFET-1 N-Channel [Power MOSFET](#)

80 V - 90 A - 5.6 mΩ - SO8-FL(5×6)

Description

The RBE056N08R1SZN6 N-channel power MOSFET features REXFET-1 split-gate technology and is offered in a 5x6 SO8-FL package. The SO8-FL package features ultra compact, leadless designs with Wettable Flanks to support enhanced thermal performance, reliability and ease of assembly. Renesas' split gate technology is suitable for applications requiring low RDS(on) and switching capability for high-power and high-frequency applications.

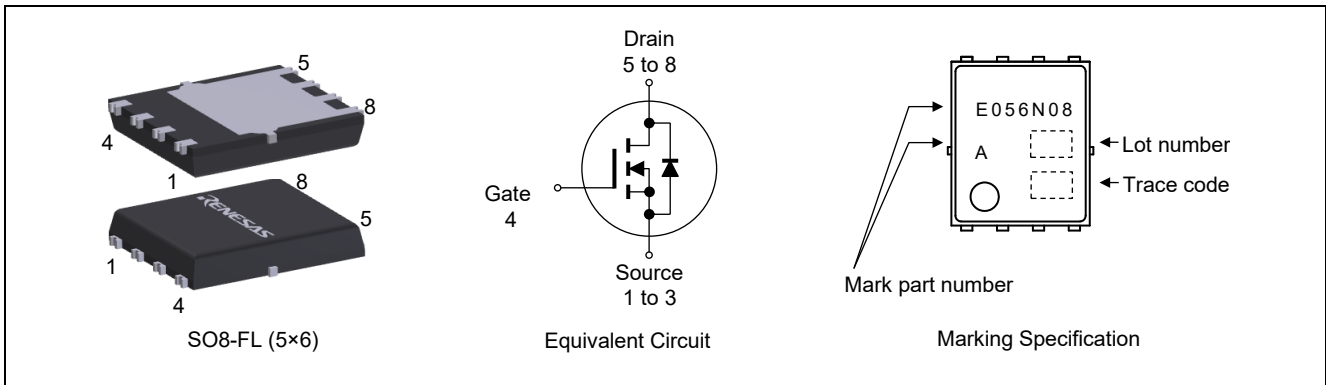
Features

- Standard level gate drive voltage: $V_{GS(th)} = 2.0$ to 4.0 V
- Super low on-state resistance: $R_{DS(on)} = 5.6$ mΩ Max.
- Low input capacitance
- Low thermal resistance
- 100% Avalanche tested
- Pb-free lead plating: RoHS compliant
- MSL1 classified according to IPC/JEDEC J-STD-020

Application

Motor Control, Energy Infrastructure, Industrial Automation, DC-DC Power Conversion, Power, Tools, Robotics

Outline



Absolute Maximum Ratings

($T_j = 25$ °C unless otherwise notice.)

| Item | Symbol | Ratings | Unit |
|--------------------------------|-----------------------------------------------------|------------|------|
| Drain to Source Voltage | V_{DSS} | 80 | V |
| Gate to Source Voltage | V_{GSS} | ±20 | V |
| Drain Current (DC) | $I_{D(DC)}$ $T_c = 25$ °C <small>Note 2, 6</small> | ±90 | A |
| | $I_{D(DC)}$ $T_c = 100$ °C <small>Note 2, 6</small> | ±65 | A |
| Drain Current (pulse) | $I_{D(pulse)}$ <small>Note 1, 3, 6</small> | ±270 | A |
| Power Dissipation | P_D <small>Note 1, 6</small> | 100 | W |
| Operating Junction Temperature | T_j | -55 to 175 | °C |
| Storage Temperature | T_{stg} | -55 to 175 | °C |
| Single Avalanche Current | I_{AS} <small>Note 4</small> | 25 | A |
| Single Avalanche Energy | E_{AS} <small>Note 4</small> | 62.5 | mJ |

Thermal Resistance

| Item | Symbol | Max. | Unit |
|----------------------------------------|------------------------------------|------|------|
| Junction to Case Thermal Resistance | $R_{th(j-c)}$ ^{Note 6} | 1.5 | °C/W |
| Junction to Ambient Thermal Resistance | $R_{th(j-a)}$ ^{Note 5, 6} | 50 | °C/W |

Electrical Characteristics

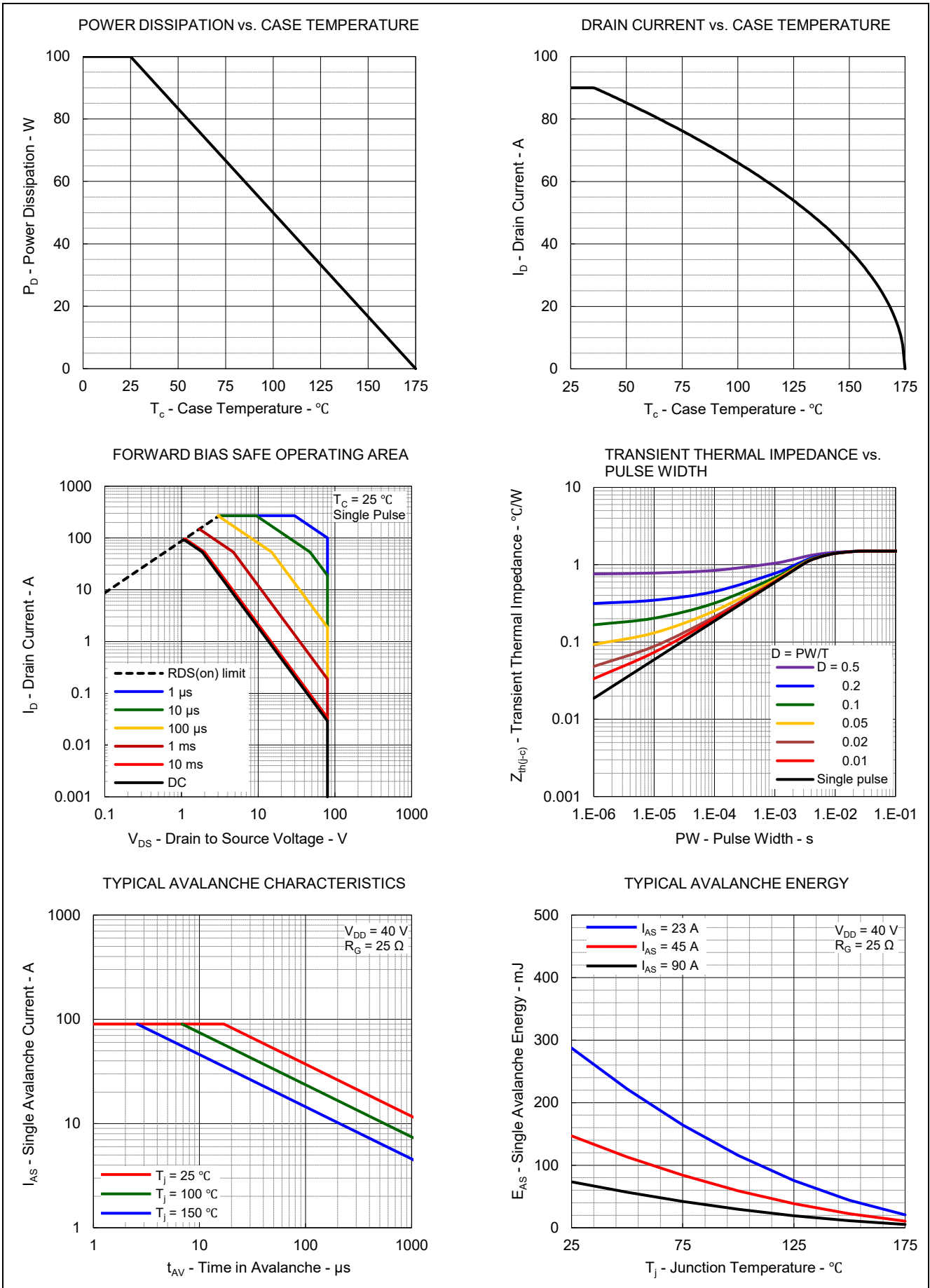
(T_j = 25 °C unless otherwise notice.)

| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|-------------------------------------|----------------------|-----|------|------|------|------------------------------------------------------------|
| Zero Gate Voltage Drain Current | I_{DSS} | — | — | 10 | μA | V _{DS} = 80 V, V _{GS} = 0 V |
| Gate Leakage Current | I_{GSS} | — | — | ±100 | nA | V _{GS} = ± 20 V, V _{DS} = 0 V |
| Gate to Source Threshold Voltage | V _{GS(th)} | 2.0 | — | 4.0 | V | V _{DS} = V _{GS} , I _D = 46 μA |
| Drain to Source On-state Resistance | R _{DS(on)} | — | 4.8 | 5.6 | mΩ | V _{GS} = 10 V, I _D = 45 A |
| Input Capacitance | C _{iss} | — | 2900 | — | pF | V _{DS} = 40 V |
| Output Capacitance | C _{oss} | — | 470 | — | pF | V _{GS} = 0 V |
| Reverse Transfer Capacitance | C _{rss} | — | 20 | — | pF | f = 100 kHz |
| Gate Resistance | R _g | — | 0.9 | — | Ω | — |
| Turn-on Delay Time | t _{d(on)} | — | 23 | — | ns | V _{DD} = 40 V |
| Rise Time | t _r | — | 11 | — | ns | I _D = 45 A |
| Turn-off Delay Time | t _{d(off)} | — | 39 | — | ns | V _{GS} = 10 V |
| Fall Time | t _f | — | 14 | — | ns | R _G = 5 Ω |
| Total Gate Charge | Q _g | — | 44 | — | nC | V _{DD} = 40 V |
| Gate to Source Charge | Q _{gs} | — | 19 | — | nC | V _{GS} = 10 V |
| Gate to Drain Charge | Q _{gd} | — | 8.0 | — | nC | I _D = 45 A |
| Gate Plateau Voltage | V _{plateau} | — | 5.7 | — | V | |
| Output Charge | Q _{oss} | — | 40 | — | nC | V _{DD} = 40 V, V _{GS} = 0 V |
| Body Diode Forward Voltage | V _{F(S-D)} | — | 0.88 | 1.5 | V | I _F = 45 A, V _{GS} = 0 V |
| Reverse Recovery Time | t _{rr} | — | 49 | — | ns | I _F = 45 A, V _{GS} = 0 V |
| Reverse Recovery Charge | Q _{rr} | — | 75 | — | nC | di/dt = 100 A/μs |

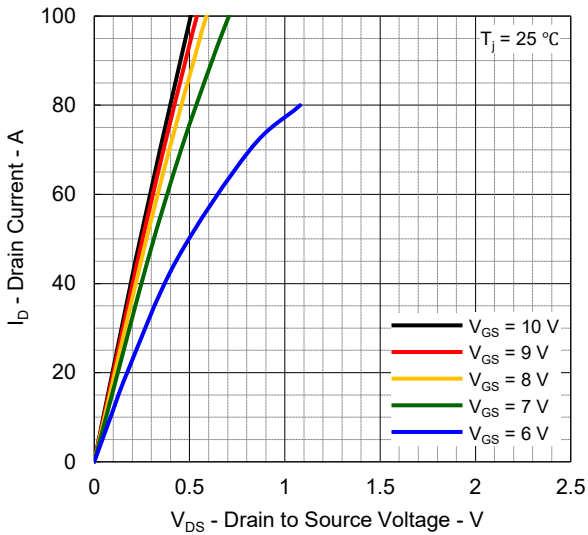
Note 1. T_c = 25 °C

2. Value is limited by overall system design including PCB.
3. PW ≤ 100 μs
4. L = 100 μH, V_{DD} = 40 V, R_G = 25 Ω
5. Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4. (2 oz Cu pad.)
6. Defined by design. Not subject to production test.

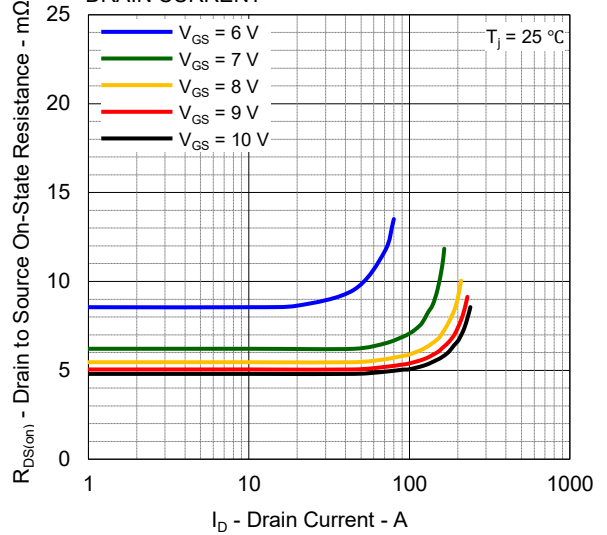
Typical Characteristics



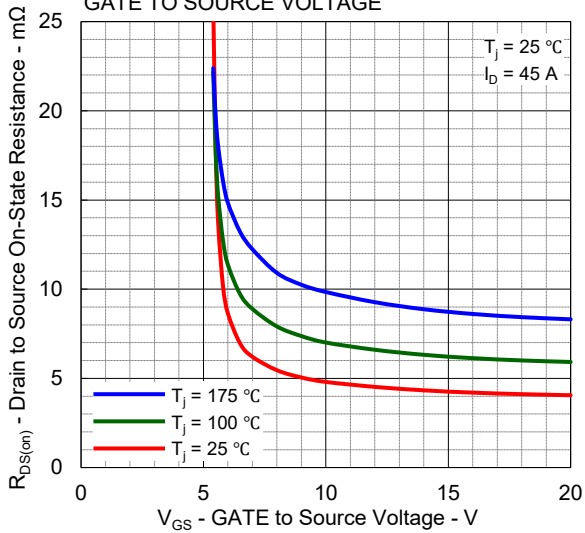
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



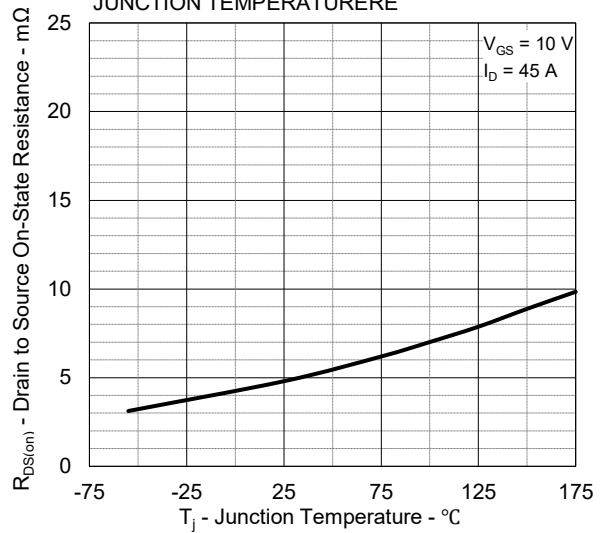
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



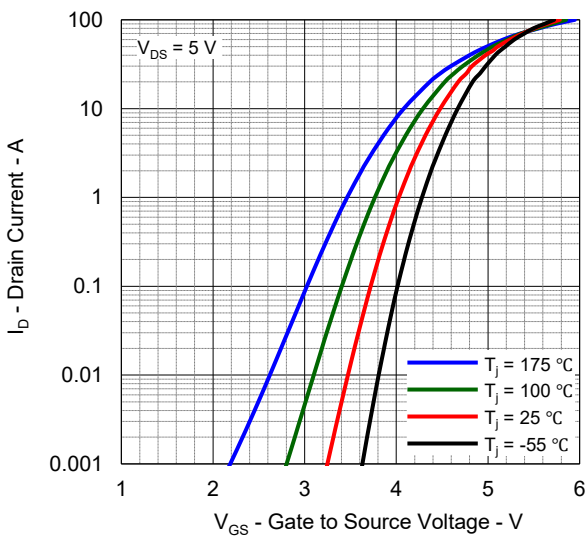
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



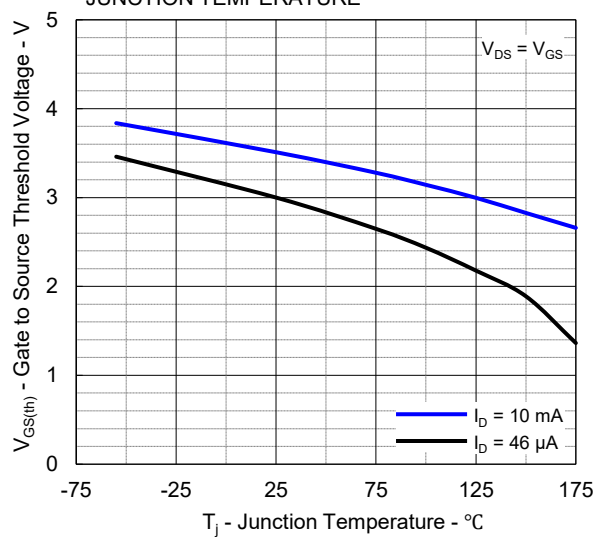
DRAIN TO SOURCE ON-STATE RESISTANCE vs. JUNCTION TEMPERATURE



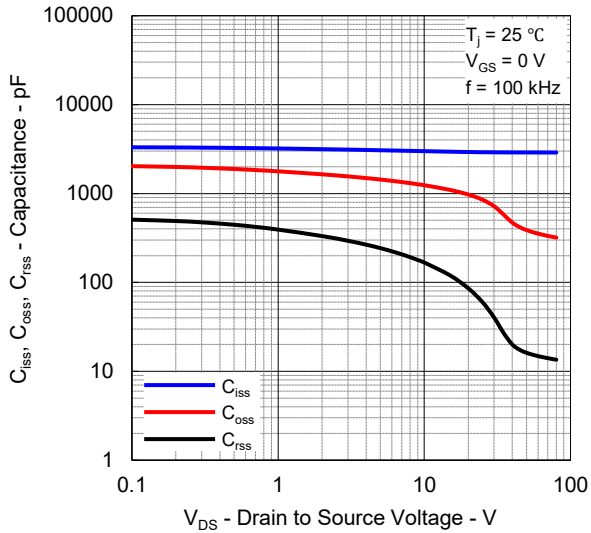
FORWARD TRANSFER CHARACTERISTICS



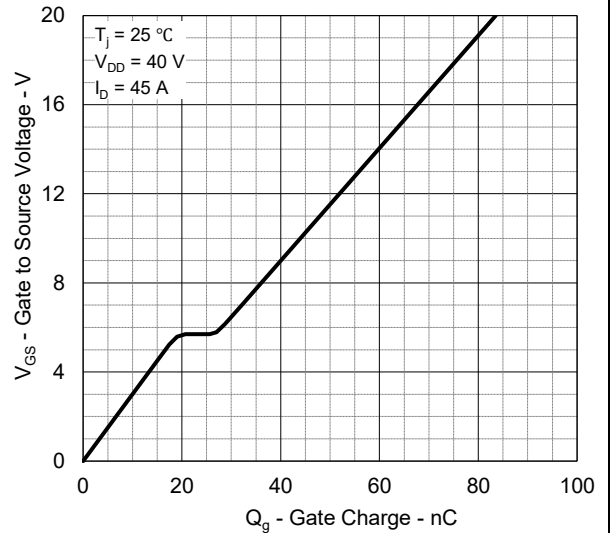
GATE TO SOURCE THRESHOLD VOLTAGE vs. JUNCTION TEMPERATURE



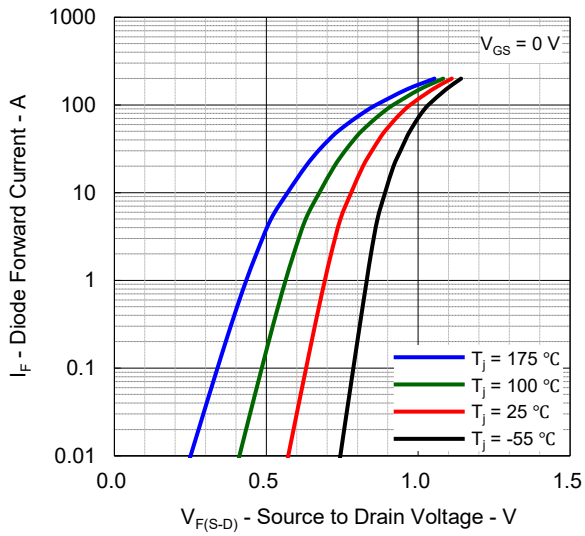
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



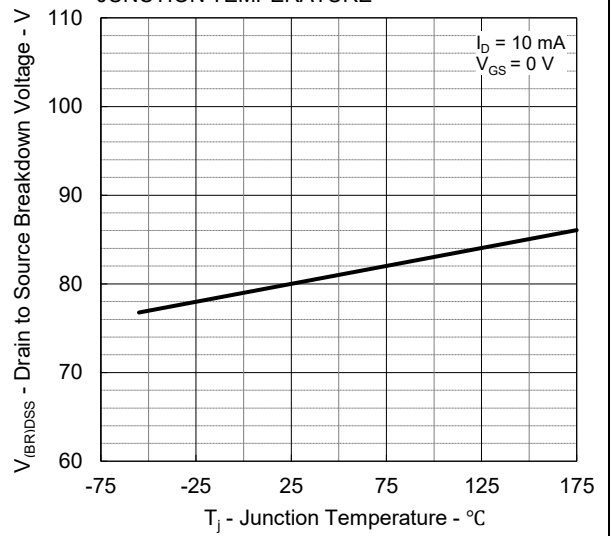
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE

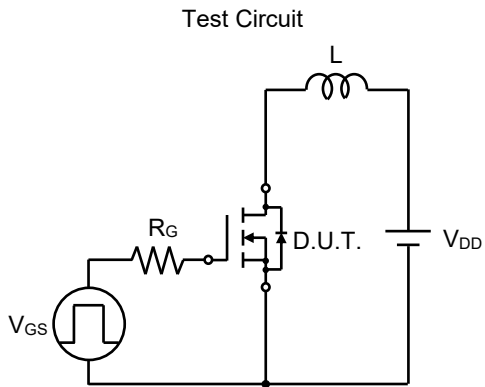


DRAIN TO SOURCE BREAKDOWN VOLTAGE vs. JUNCTION TEMPERATURE

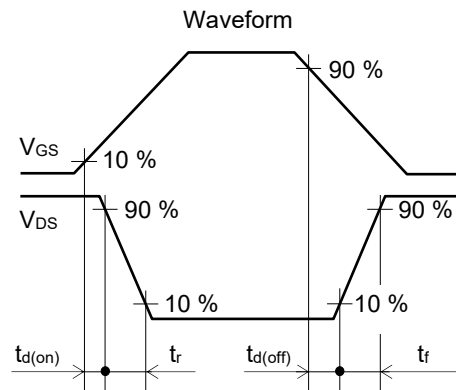
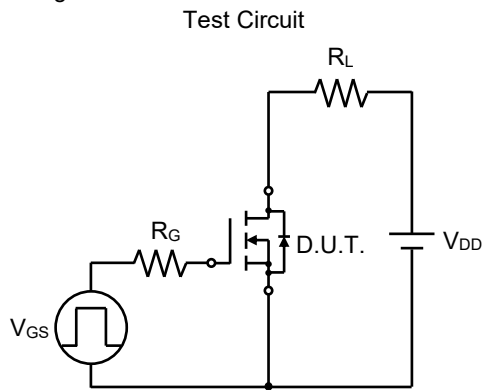


Test Circuit

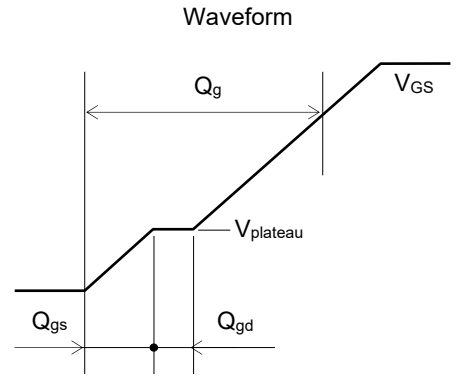
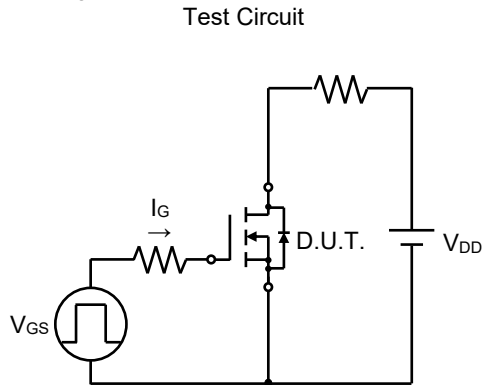
Avalanche



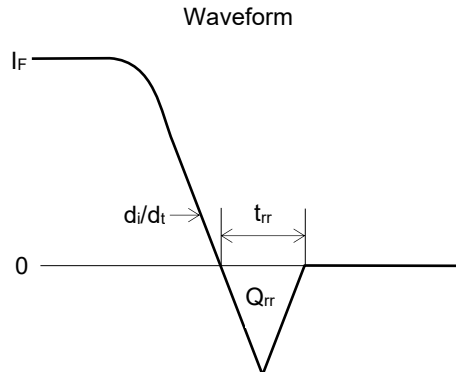
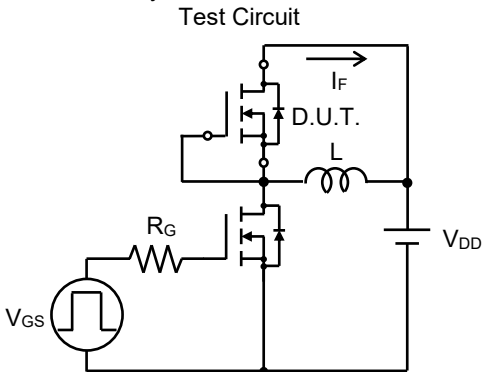
Switching Time



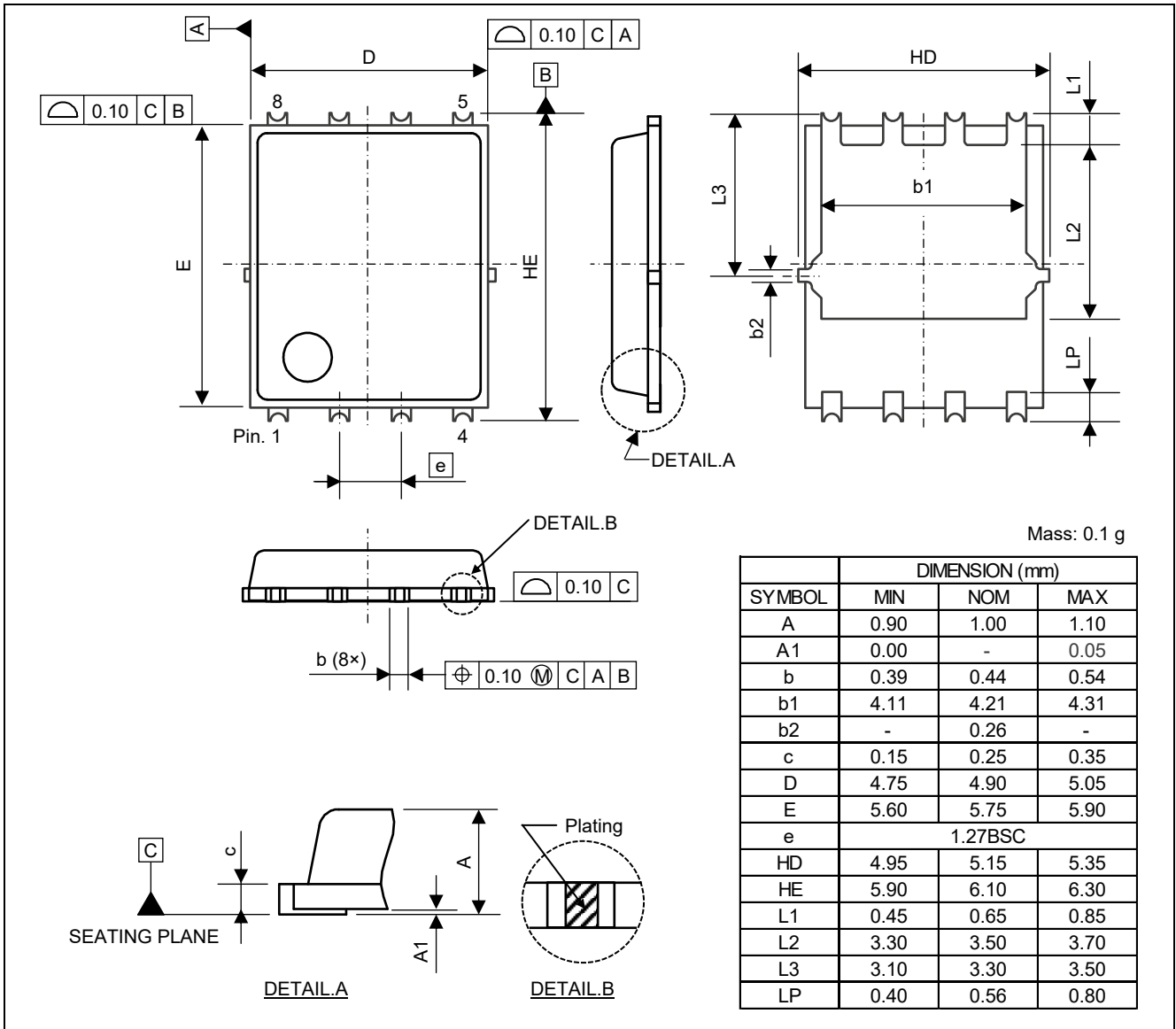
Gate Charge



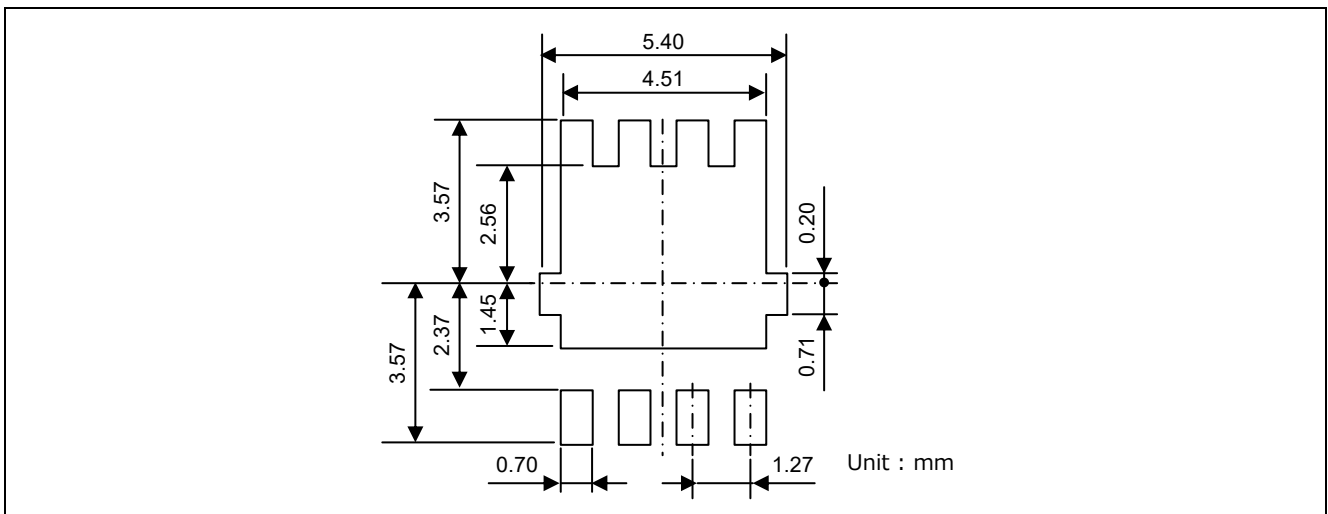
Reverse Recovery



Package Dimensions



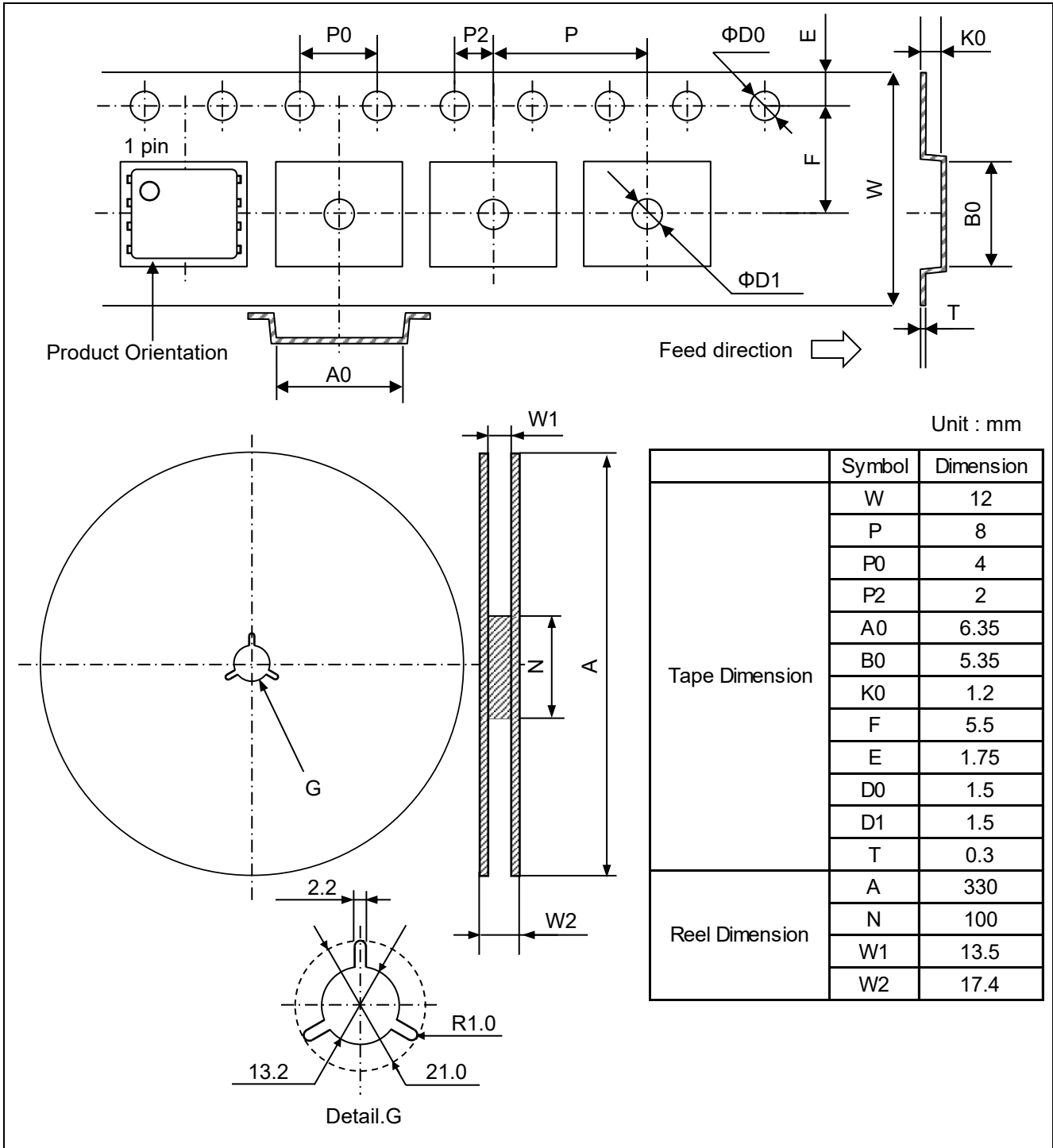
Mount Pad



Ordering Information

| Part No. | Packing | Quantity |
|---------------------|---------|---------------|
| RBE056N08R1SZN6#HB0 | Taping | 5000 pcs/reel |

Packing Specification



Remark : Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.

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(Rev.5.0-1 October 2020)

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