

| | |
|---------------------|-------|
| V_{DSS} | 250V |
| $R_{DS(on)}$ (Max.) | 600mΩ |
| I_D | 8.0A |
| P_D | 35W |

●Features

- 1) Low on-resistance.
- 2) Fast switching speed.
- 3) Drive circuits can be simple.
- 4) Parallel use is easy.
- 5) Pb-free lead plating ; RoHS compliant
- 6) 100% Avalanche tested

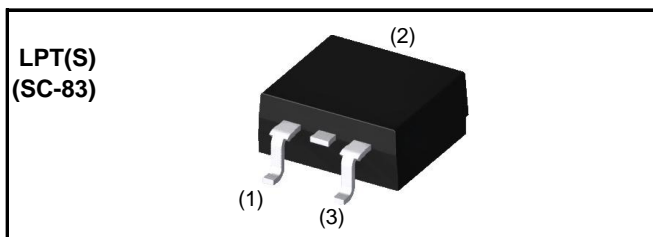
●Application

Switching Power Supply
Automotive Motor Drive
Automotive Solenoid Drive

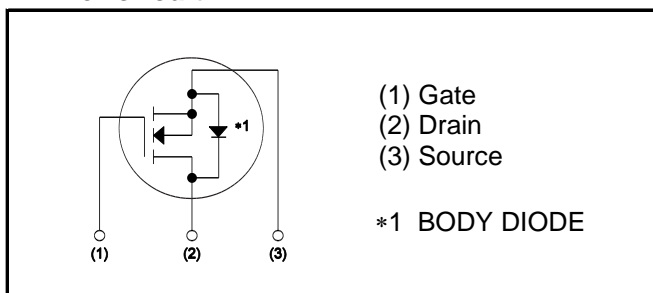
●Absolute maximum ratings($T_a = 25^\circ\text{C}$)

| Parameter | | Symbol | Value | Unit |
|--------------------------------|-------------------------------|--------------------|-------------|------|
| Drain - Source voltage | | V_{DSS} | 250 | V |
| Continuous drain current | $T_c = 25^\circ\text{C}$ | I_D^{*1} | ±8.0 | A |
| | $T_c = 100^\circ\text{C}$ | I_D^{*1} | ±4.3 | A |
| Pulsed drain current | | $I_{D,pulse}^{*2}$ | ±32 | A |
| Gate - Source voltage | | V_{GSS} | ±30 | V |
| Avalanche energy, single pulse | | E_{AS}^{*3} | 4.66 | mJ |
| Avalanche current | | I_{AR}^{*3} | 4.0 | A |
| Power dissipation | $T_c = 25^\circ\text{C}$ | P_D | 35 | W |
| | $T_a = 25^\circ\text{C}^{*4}$ | P_D | 1.56 | W |
| Junction temperature | | T_j | 150 | °C |
| Range of storage temperature | | T_{stg} | -55 to +150 | °C |

●Outline



●Inner circuit



●Packaging specifications

| Type | Packaging | Taping |
|------|---------------------------|-----------|
| | Reel size (mm) | 330 |
| | Tape width (mm) | 24 |
| | Basic ordering unit (pcs) | 1,000 |
| | Taping code | TL |
| | Marking | RCJ080N25 |

●Thermal resistance

| Parameter | Symbol | Values | | | Unit |
|--|------------|--------|------|------|------|
| | | Min. | Typ. | Max. | |
| Thermal resistance, junction - case | R_{thJC} | - | - | 3.57 | °C/W |
| Thermal resistance, junction - ambient ^{*4} | R_{thJA} | - | - | 80 | °C/W |
| Soldering temperature, wavesoldering for 10s | T_{sold} | - | - | 265 | °C |

●Electrical characteristics($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Conditions | Values | | | Unit |
|---|-------------------|--|--------|------|-----------|---------------|
| | | | Min. | Typ. | Max. | |
| Drain - Source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 1mA$ | 250 | - | - | V |
| Zero gate voltage drain current | I_{DSS} | $V_{DS} = 250V, V_{GS} = 0V$ $T_j = 25^\circ\text{C}$ | - | - | 10 | μA |
| Gate - Source leakage current | I_{GSS} | $V_{GS} = \pm 30V, V_{DS} = 0V$ | - | - | ± 100 | nA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS} = 10V, I_D = 1mA$ | 3.3 | - | 5.25 | V |
| Static drain - source on - state resistance | $R_{DS(on)}^{*5}$ | $V_{GS} = 10V, I_D = 4.0A$ | - | 460 | 600 | m Ω |
| | | $V_{GS} = 10V, I_D = 4.0A$ $T_j = 125^\circ\text{C}$ | - | 910 | 1280 | |
| Forward transfer admittance | g_{fs} | $V_{DS} = 10V, I_D = 4.0A$ | 2.2 | 4.4 | - | S |

●Electrical characteristics($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Conditions | Values | | | Unit |
|------------------------------|-------------------|---|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Input capacitance | C_{iss} | $V_{GS} = 0\text{V}$ | - | 840 | - | pF |
| Output capacitance | C_{oss} | $V_{DS} = 25\text{V}$ | - | 50 | - | |
| Reverse transfer capacitance | C_{rss} | $f = 1\text{MHz}$ | - | 25 | - | |
| Turn - on delay time | $t_{d(on)}^{*5}$ | $V_{DD} \approx 125\text{V}, V_{GS} = 10\text{V}$ | - | 22 | - | ns |
| Rise time | t_r^{*5} | $I_D = 4.0\text{A}$ | - | 28 | - | |
| Turn - off delay time | $t_{d(off)}^{*5}$ | $R_L = 31.6\Omega$ | - | 28 | - | |
| Fall time | t_f^{*5} | $R_G = 10\Omega$ | - | 14 | - | |

●Gate Charge characteristics($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Conditions | Values | | | Unit |
|----------------------|-----------------|---|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Total gate charge | Q_g^{*5} | $V_{DD} \approx 125\text{V}$ | - | 15 | - | nC |
| Gate - Source charge | Q_{gs}^{*5} | $I_D = 8.0\text{A}$ | - | 6.25 | - | |
| Gate - Drain charge | Q_{gd}^{*5} | $V_{GS} = 10\text{V}$ | - | 5.5 | - | |
| Gate plateau voltage | $V_{(plateau)}$ | $V_{DD} \approx 125\text{V}, I_D = 8.0\text{A}$ | - | 8.4 | - | V |

●Body diode electrical characteristics (Source-Drain)($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Conditions | Values | | | Unit |
|---------------------------|---------------|---|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Continuous source current | I_S^{*1} | $T_c = 25^\circ\text{C}$ | - | - | 8.0 | A |
| Pulsed source current | I_{SM}^{*2} | | - | - | 32 | A |
| Forward voltage | V_{SD}^{*5} | $V_{GS} = 0\text{V}, I_S = 8.0\text{A}$ | - | - | 1.5 | V |
| Reverse recovery time | t_{rr}^{*5} | $I_S = 4.0\text{A}$ | - | 90 | - | ns |
| Reverse recovery charge | Q_{rr}^{*5} | $di/dt = 100\text{A}/\mu\text{s}$ | - | 300 | - | nC |

*1 Limited only by maximum temperature allowed.

*2 $P_w \leq 10\mu\text{s}$, Duty cycle $\leq 1\%$

*3 $L \approx 500\mu\text{H}$, $V_{DD} = 50\text{V}$, $R_g = 25\Omega$, starting $T_j = 25^\circ\text{C}$

*4 Mounted on a epoxy PCB FR4 (25mm x 27mm x 0.8mm)

*5 Pulsed

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

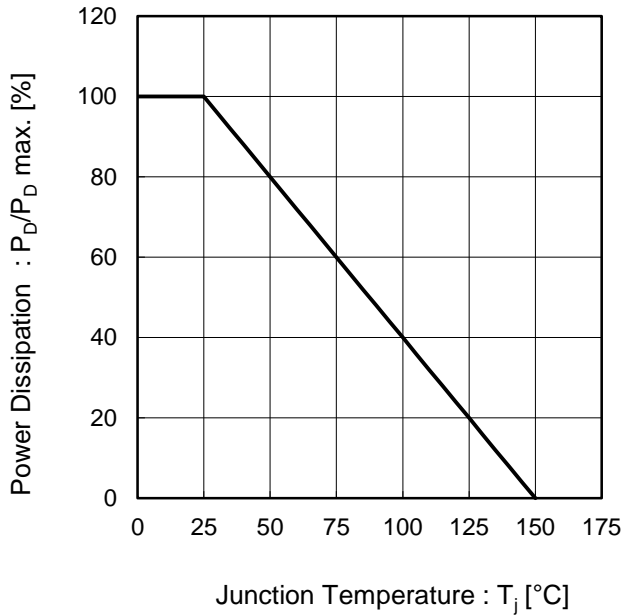


Fig.2 Maximum Safe Operating Area

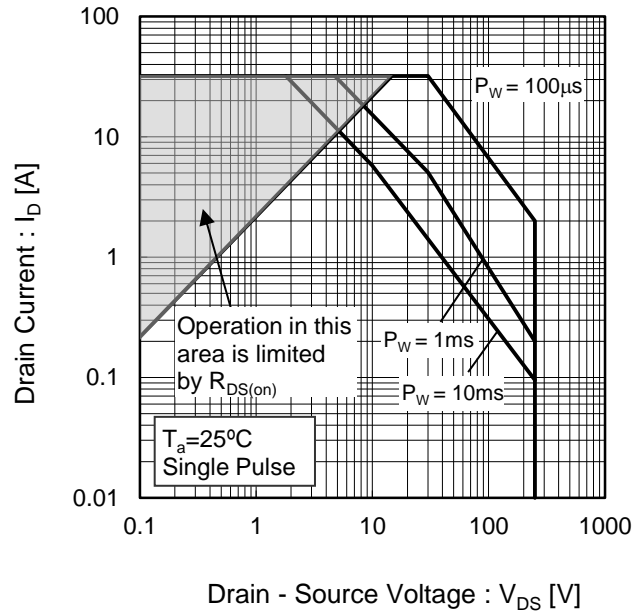
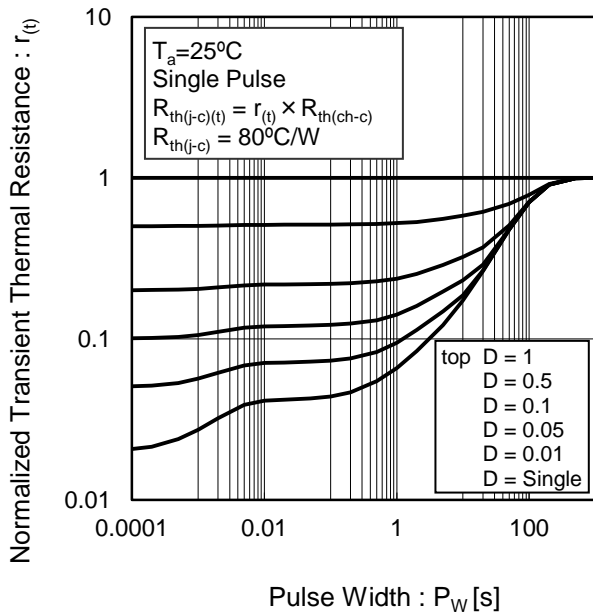


Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width



●Electrical characteristic curves

Fig.4 Avalanche Current vs Inductive Load

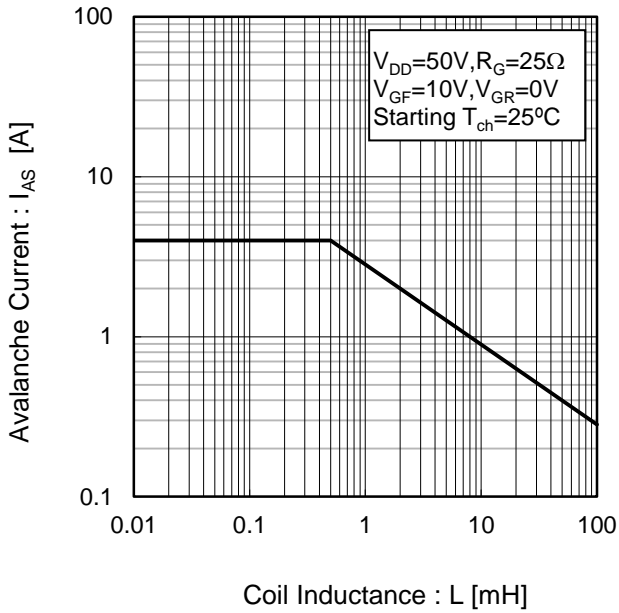


Fig.5 Avalanche Energy Derating Curve vs Junction Temperature

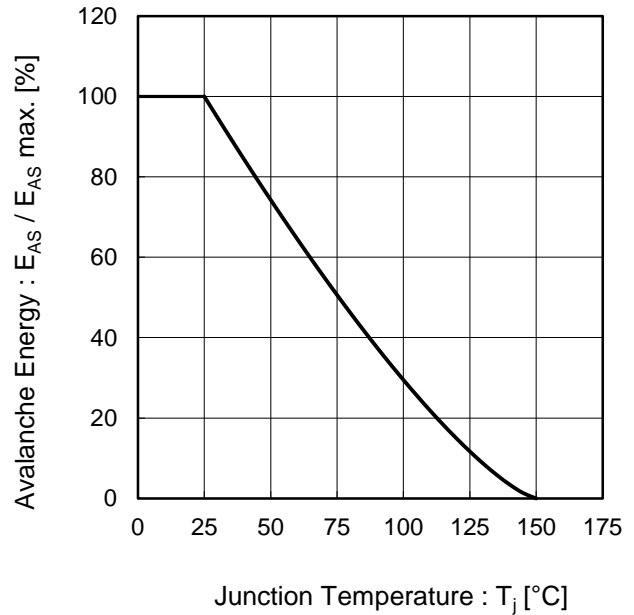


Fig.6 Typical Output Characteristics(I)

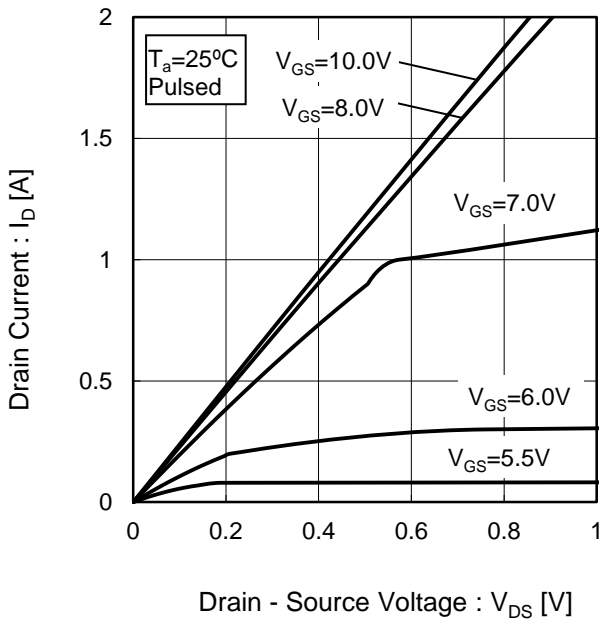
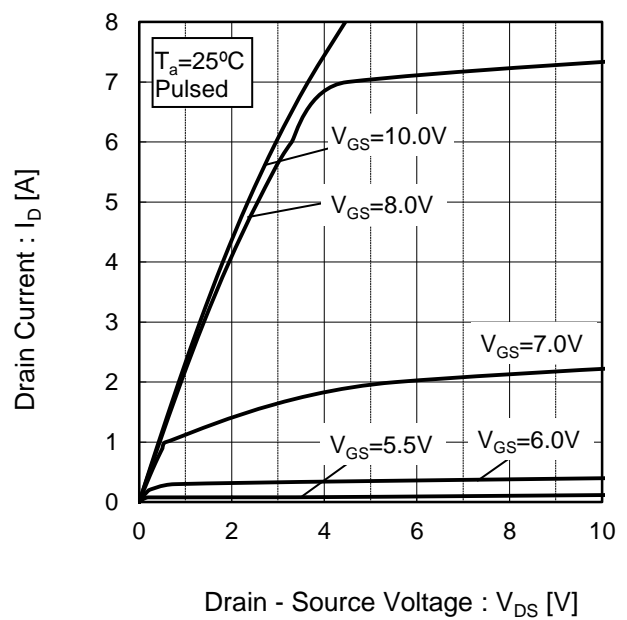


Fig.7 Typical Output Characteristics(II)



●Electrical characteristic curves

Fig.8 Breakdown Voltage vs. Junction Temperature

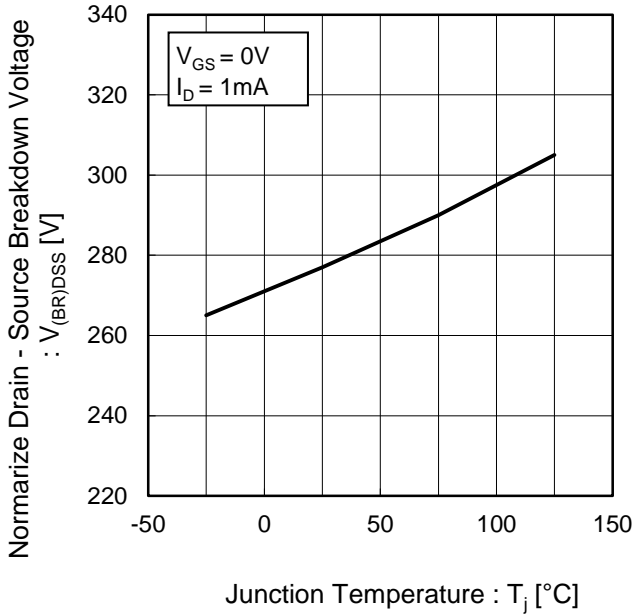


Fig.9 Typical Transfer Characteristics

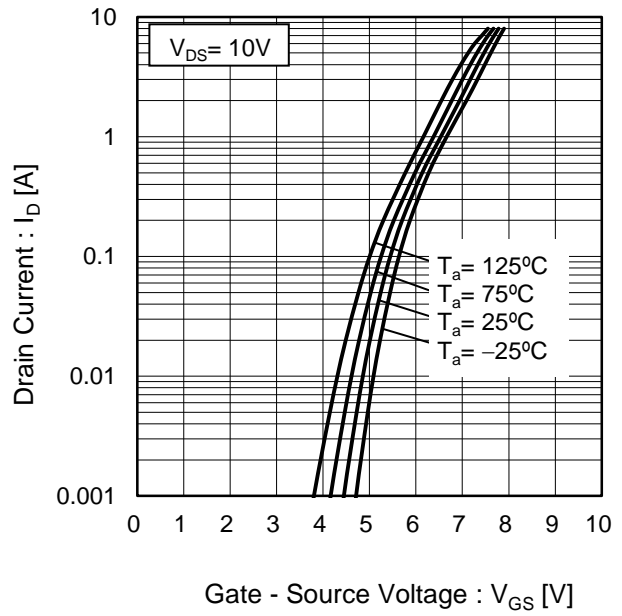


Fig.10 Gate Threshold Voltage vs. Junction Temperature

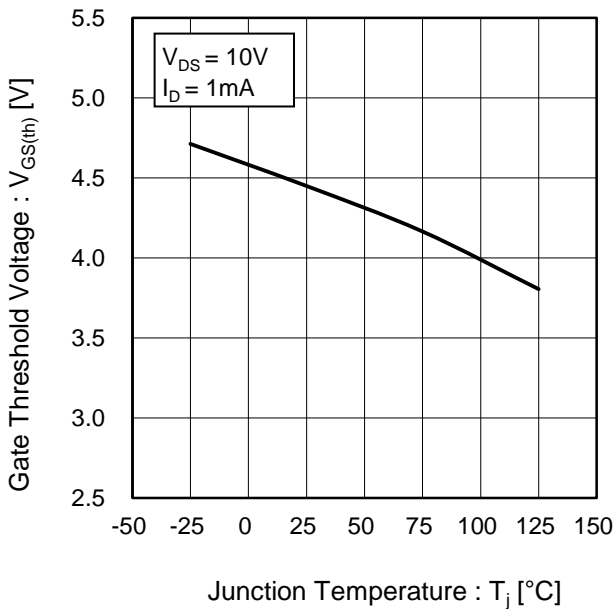
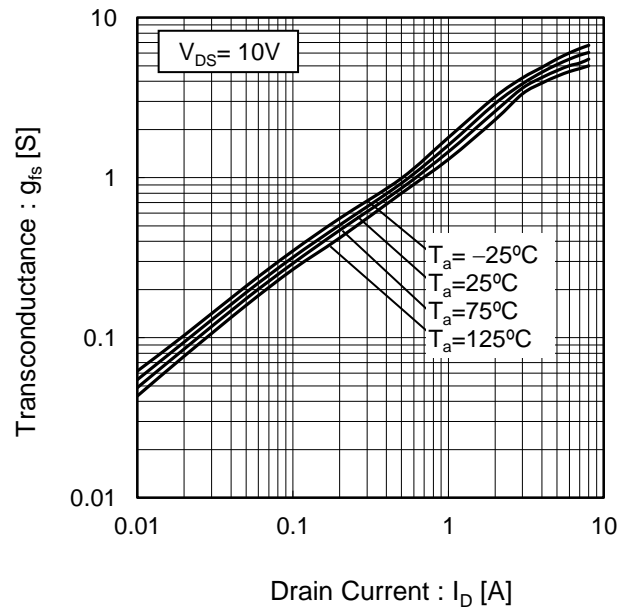


Fig.11 Transconductance vs. Drain Current



●Electrical characteristic curves

Fig.12 Static Drain - Source On - State Resistance vs. Gate Source Voltage

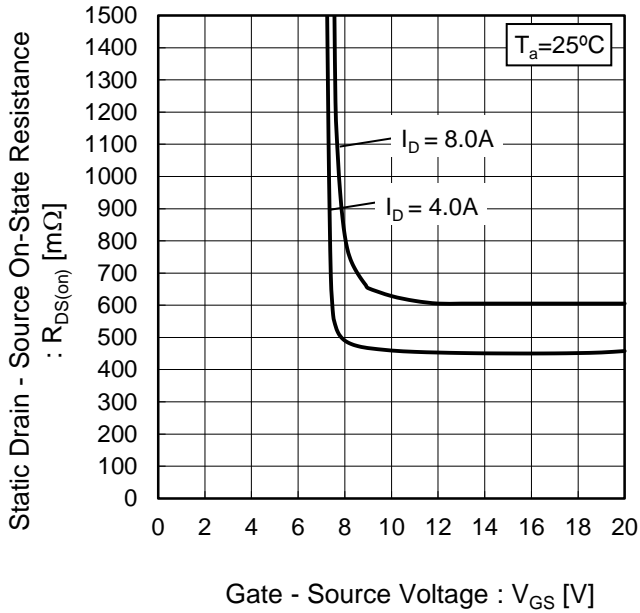


Fig.13 Static Drain - Source On - State Resistance vs. Drain Current(I)

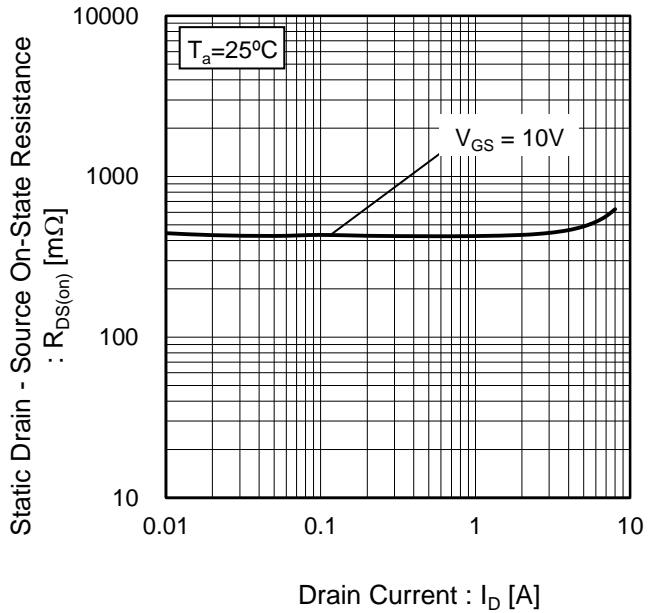
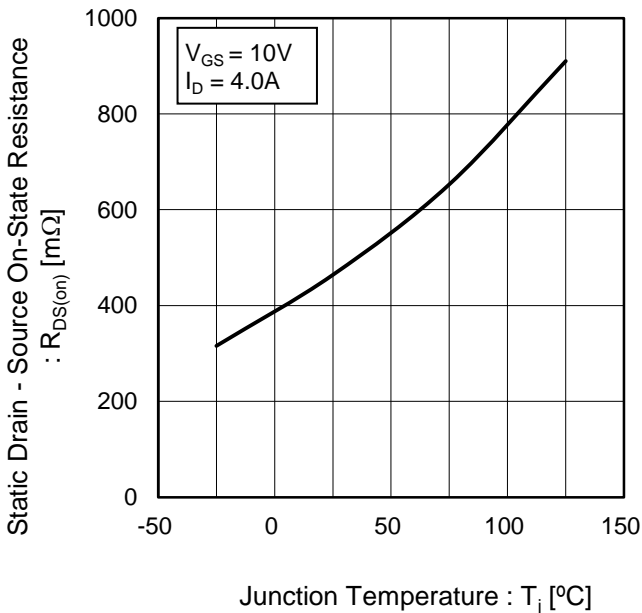


Fig.14 Static Drain - Source On - State Resistance vs. Junction Temperature



●Electrical characteristic curves

Fig.15 Static Drain - Source On - State Resistance vs. Drain Current(II)

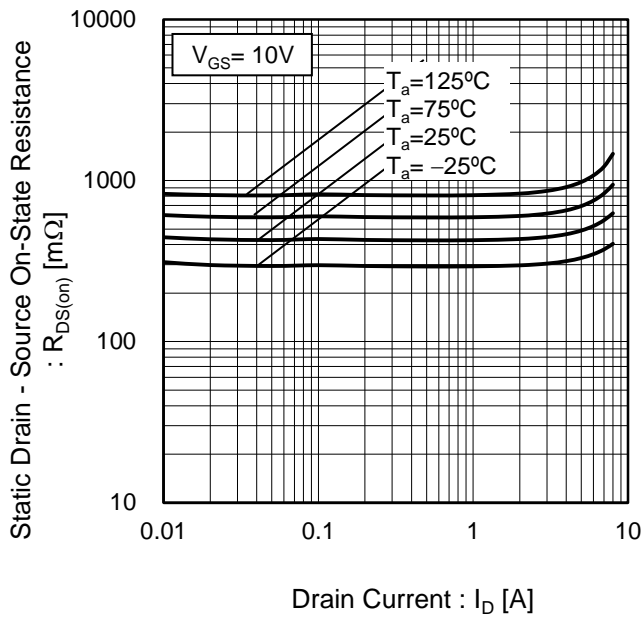
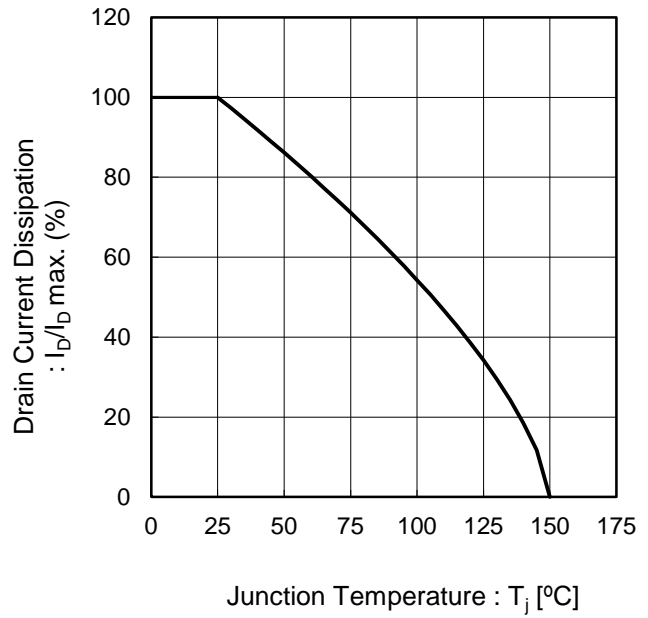


Fig.16 Drain Current Derating Curve



●Electrical characteristic curves

Fig.17 Typical Capacitance vs. Drain - Source Voltage

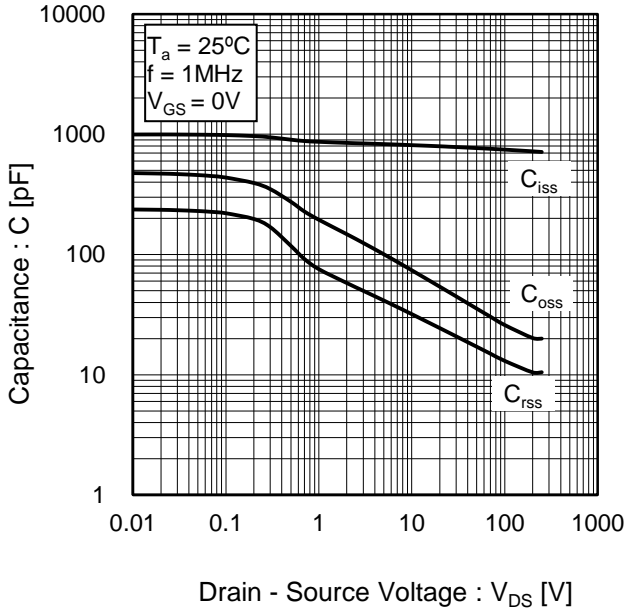


Fig.18 Switching Characteristics

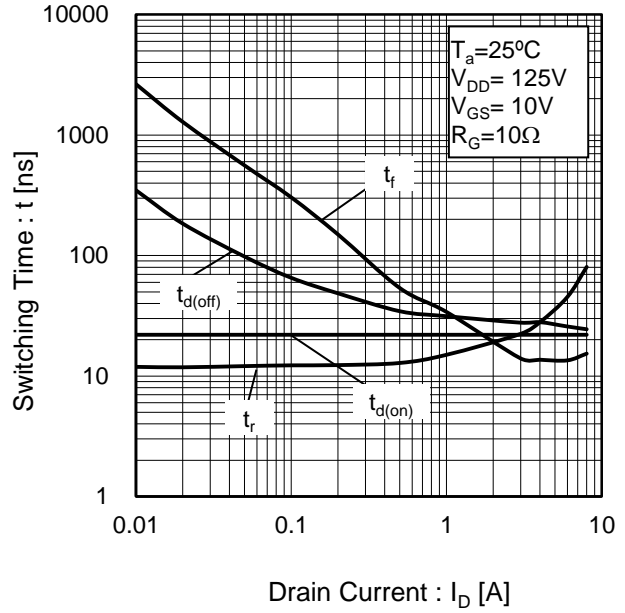
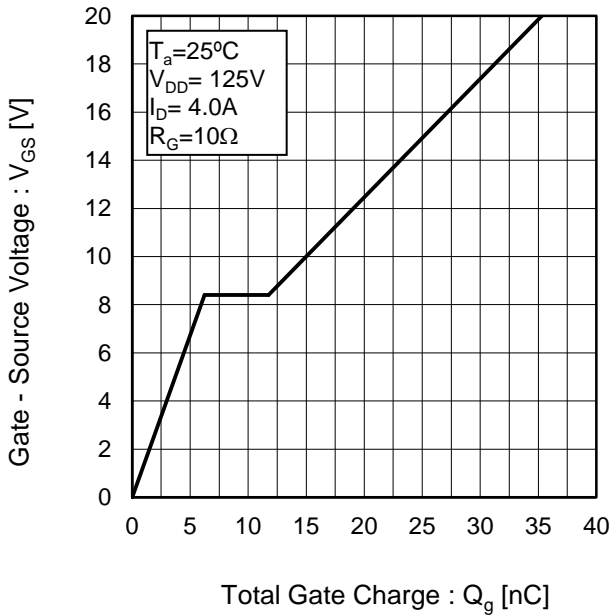


Fig.19 Dynamic Input Characteristics



●Electrical characteristic curves

Fig.20 Source Current vs. Source - Drain Voltage

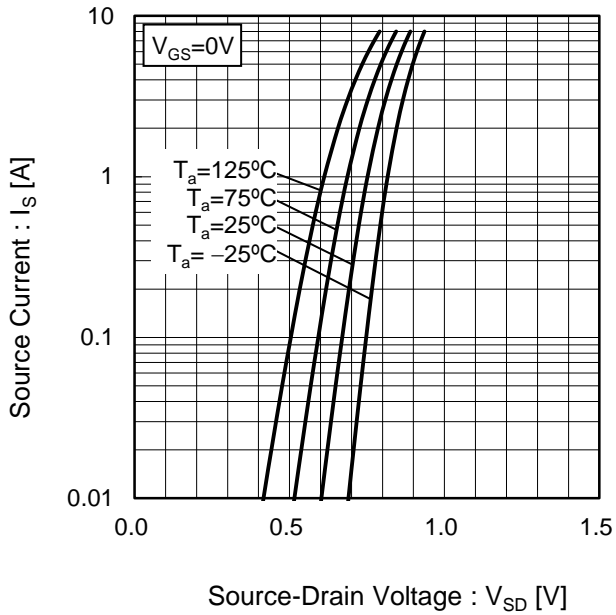
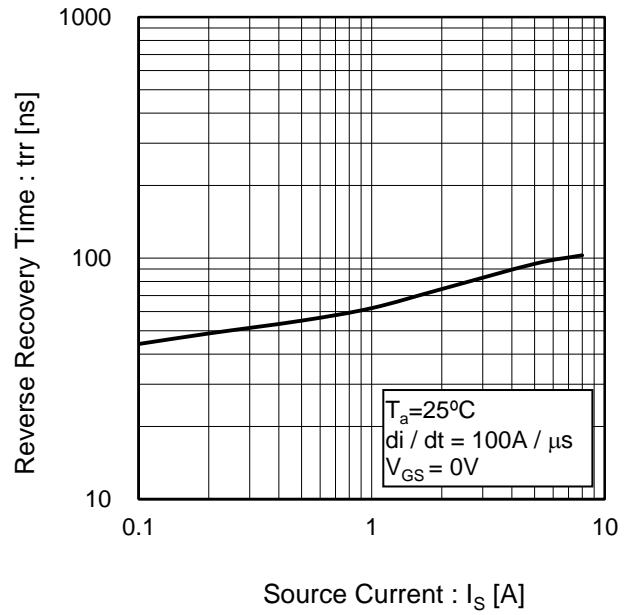


Fig.21 Reverse Recovery Time vs. Source Current



●Measurement circuits

Fig.1-1 Switching Time Measurement Circuit



Fig.1-2 Switching Waveforms



Fig.2-1 Gate Charge Measurement Circuit



Fig.2-2 Gate Charge Waveform



Fig.3-1 Avalanche Measurement Circuit

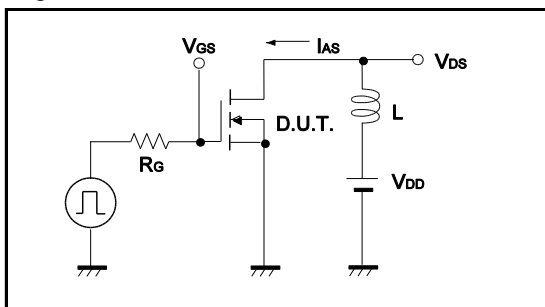
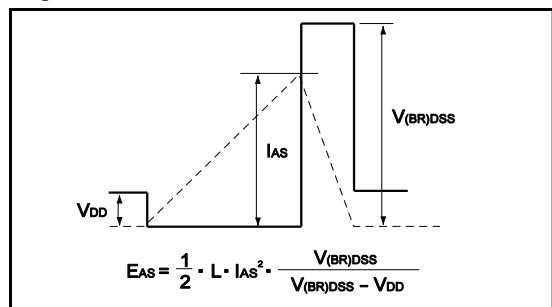
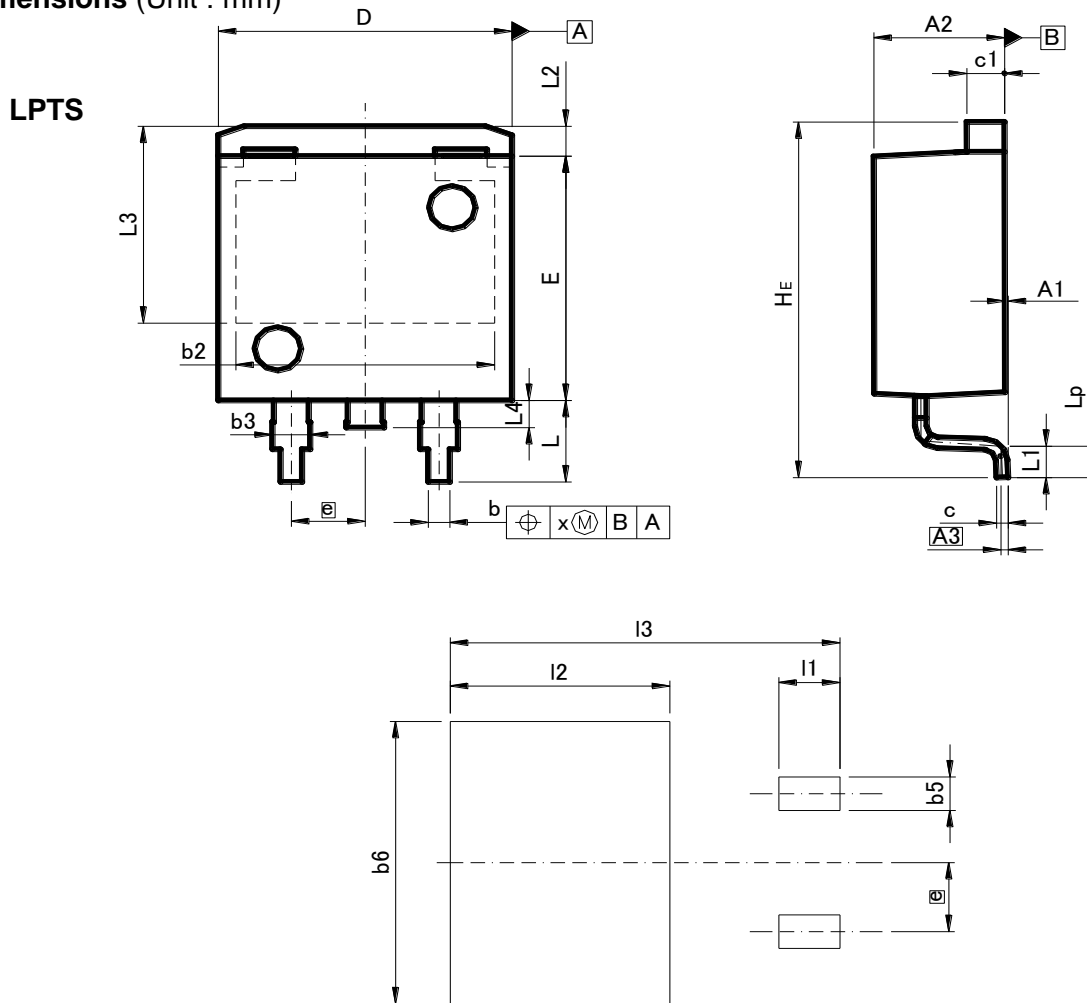


Fig.3-2 Avalanche Waveform



●Dimensions (Unit : mm)



Pattern of terminal position areas

| DIM | MILIMETERS | | INCHES | |
|-----|------------|-------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A1 | 0.00 | 0.30 | 0 | 0.012 |
| A2 | 4.30 | 4.70 | 0.169 | 0.185 |
| A3 | 0.25 | | 0.01 | |
| b | 0.68 | 0.98 | 0.027 | 0.039 |
| b2 | 8.90 | | 0.35 | |
| b3 | 1.14 | 1.44 | 0.045 | 0.057 |
| c | 0.30 | 0.60 | 0.012 | 0.024 |
| c1 | 1.10 | 1.50 | 0.043 | 0.059 |
| D | 9.80 | 10.40 | 0.386 | 0.409 |
| E | 8.80 | 9.20 | 0.346 | 0.362 |
| e | 2.54 | | 0.10 | |
| HE | 12.80 | 13.40 | 0.504 | 0.528 |
| L | 2.70 | 3.30 | 0.106 | 0.13 |
| L1 | 0.90 | 1.50 | 0.035 | 0.059 |
| L2 | 1.10 | | 0.043 | |
| L3 | 7.25 | | 0.285 | |
| L4 | 1.00 | | 0.039 | |
| Lp | 0.90 | 1.50 | 0.035 | 0.059 |
| x | - | 0.25 | - | 0.01 |

| DIM | MILIMETERS | | INCHES | |
|-----|------------|-------|--------|-------|
| | MIN | MAX | MIN | MAX |
| b5 | - | 1.23 | - | 0.049 |
| b6 | - | 10.40 | - | 0.409 |
| i1 | - | 2.10 | - | 0.083 |
| i2 | - | 7.55 | - | 0.297 |
| i3 | - | 13.40 | - | 0.528 |

Dimension in mm/inches

Notes

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RCJ080N25 - Web Page

| | |
|-----------------------------|-------------|
| Part Number | RCJ080N25 |
| Package | LPTS(D2PAK) |
| Unit Quantity | 1000 |
| Minimum Package Quantity | 1000 |
| Packing Type | Taping |
| Constitution Materials List | inquiry |
| RoHS | Yes |