

| | |
|---------------------|---------------|
| V_{DSS} | 250V |
| $R_{DS(on)}$ (Max.) | 300m Ω |
| I_D | 8A |
| P_D | 20W |

●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

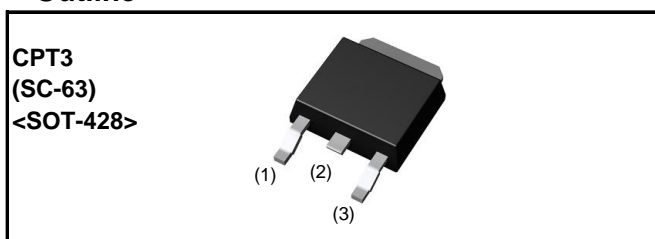
●Application

Switching Power Supply
 Automotive Motor Drive
 Automotive Solenoid Drive

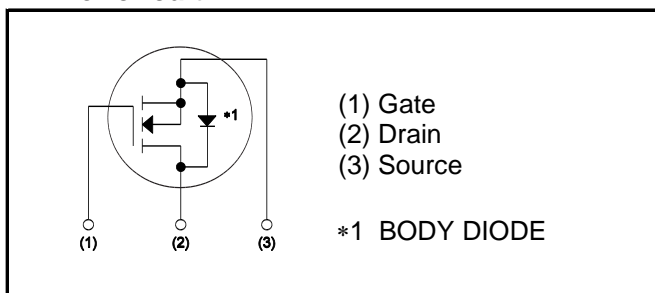
●Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

| 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} | 4.67 | mJ |
| Avalanche current | I_{AR}^{*3} | 4.0 | A |
| Power dissipation | $T_c = 25^\circ\text{C}$ | P_D | 20 W |
| | $T_a = 25^\circ\text{C}^{*4}$ | P_D | 0.85 W |
| Junction temperature | T_j | 150 | $^\circ\text{C}$ |
| Range of storage temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

●Outline



●Inner circuit



●Packaging specifications

| Type | Packaging | Taping |
|------|---------------------------|--------|
| | Reel size (mm) | 330 |
| | Tape width (mm) | 16 |
| | Basic ordering unit (pcs) | 2,500 |
| | Taping code | TL |
| | Marking | C08N25 |

●Thermal resistance

| Parameter | Symbol | Values | | | Unit |
|--|------------|--------|------|------|------|
| | | Min. | Typ. | Max. | |
| Thermal resistance, junction - case | R_{thJC} | - | - | 6.25 | °C/W |
| Thermal resistance, junction - ambient ^{*4} | R_{thJA} | - | - | 147 | °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 |
| | | $V_{DS} = 250V, V_{GS} = 0V$ $T_j = 125^\circ\text{C}$ | - | - | 100 | |
| Gate - Source leakage current | I_{GSS} | $V_{GS} = \pm 30V, V_{DS} = 0V$ | - | - | ± 100 | nA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS} = 10V, I_D = 1mA$ | 3.0 | - | 5.0 | V |
| Static drain - source on - state resistance | $R_{DS(on)}$ ^{*5} | $V_{GS} = 10V, I_D = 4.0A$ | - | 225 | 300 | $m\Omega$ |
| | | $V_{GS} = 10V, I_D = 4.0A$ $T_j = 125^\circ\text{C}$ | - | 480 | 640 | |
| Forward transfer admittance | g_{fs} | $V_{DS} = 10V, I_D = 4.0A$ | 2.7 | 5.4 | - | S |

●Electrical characteristics (T_a = 25°C)

| Parameter | Symbol | Conditions | Values | | | Unit |
|------------------------------|-----------------------------------|---|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Input capacitance | C _{iss} | V _{GS} = 0V | - | 1440 | - | pF |
| Output capacitance | C _{oss} | V _{DS} = 25V | - | 80 | - | |
| Reverse transfer capacitance | C _{rss} | f = 1MHz | - | 40 | - | |
| Turn - on delay time | t _{d(on)} ^{*5} | V _{DD} ≈ 125V, V _{GS} = 10V | - | 30 | - | ns |
| Rise time | t _r ^{*5} | I _D = 4.0A | - | 40 | - | |
| Turn - off delay time | t _{d(off)} ^{*5} | R _L = 31.25Ω | - | 40 | - | |
| Fall time | t _f ^{*5} | R _G = 10Ω | - | 15 | - | |

●Gate Charge characteristics (T_a = 25°C)

| Parameter | Symbol | Conditions | Values | | | Unit |
|----------------------|-------------------------------|---|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Total gate charge | Q _g ^{*5} | V _{DD} ≈ 125V | - | 25 | - | nC |
| Gate - Source charge | Q _{gs} ^{*5} | I _D = 8.0A | - | 10 | - | |
| Gate - Drain charge | Q _{gd} ^{*5} | V _{GS} = 10V | - | 10 | - | |
| Gate plateau voltage | V _(plateau) | V _{DD} ≈ 125V, I _D = 8.0A | - | 7.3 | - | V |

●Body diode electrical characteristics (Source-Drain)(T_a = 25°C)

| Parameter | Symbol | Conditions | Values | | | Unit |
|---------------------------|-------------------------------|---|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Continuous source current | I _S ^{*1} | T _c = 25°C | - | - | 8 | A |
| Pulsed source current | I _{SM} ^{*2} | | - | - | 32 | A |
| Forward voltage | V _{SD} ^{*5} | V _{GS} = 0V, I _S = 8.0A | - | - | 1.5 | V |
| Reverse recovery time | t _{rr} ^{*5} | I _S = 4.0A | - | 100 | - | ns |
| Reverse recovery charge | Q _{rr} ^{*5} | di/dt = 100A/μs | - | 350 | - | nC |

*1 Limited only by maximum temperature allowed.

*2 P_w ≤ 10μs, Duty cycle ≤ 1%

*3 L ≈ 500μH, V_{DD} = 50V, R_G = 25Ω, starting T_j = 25°C

*4 Mounted on a epoxy PCB FR4 (20mm × 20mm × 0.8mm)

*5 Pulsed

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

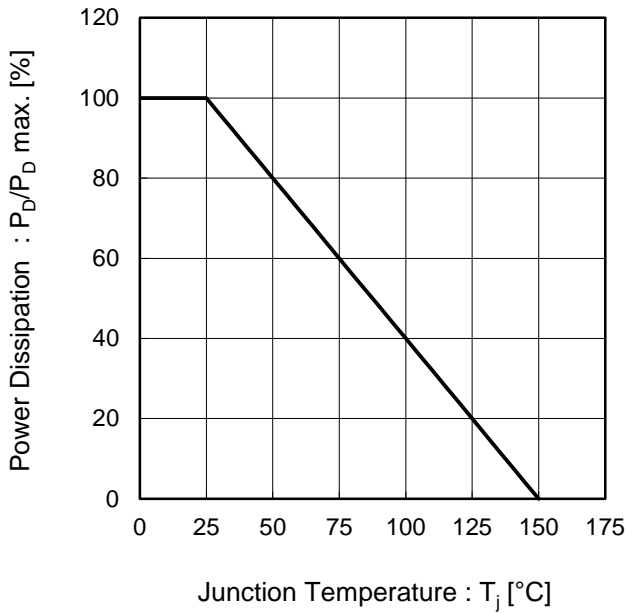


Fig.2 Maximum Safe Operating Area

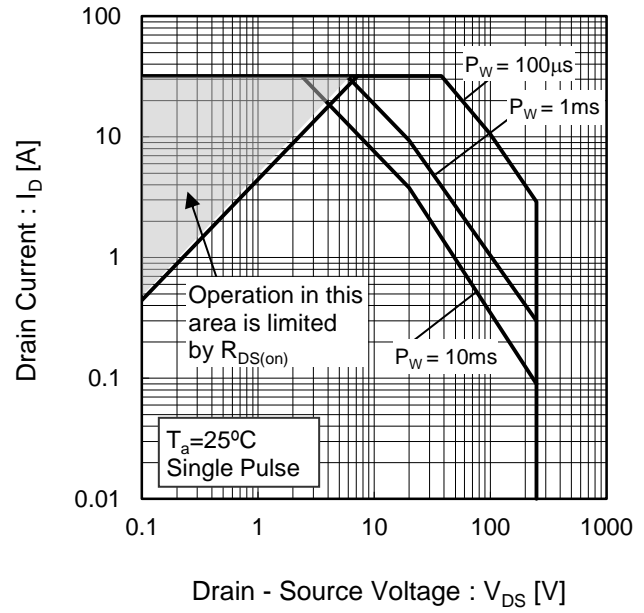
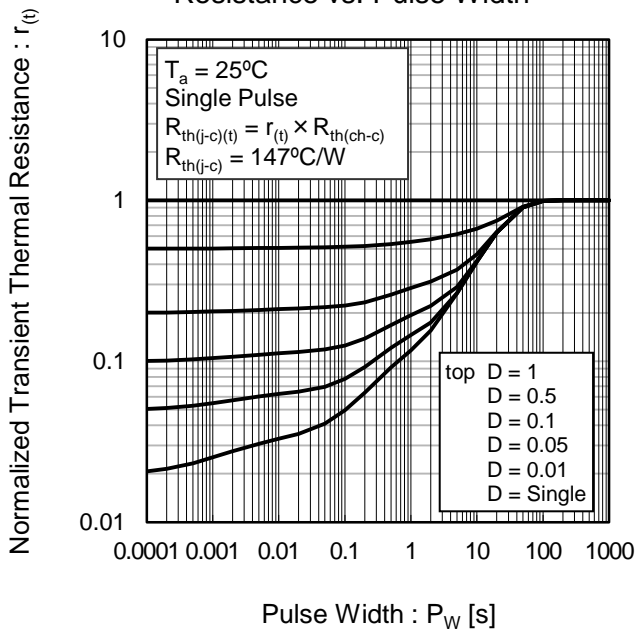


Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width



●Electrical characteristic curves

Fig.4 Avalanche Current vs Inductive Load

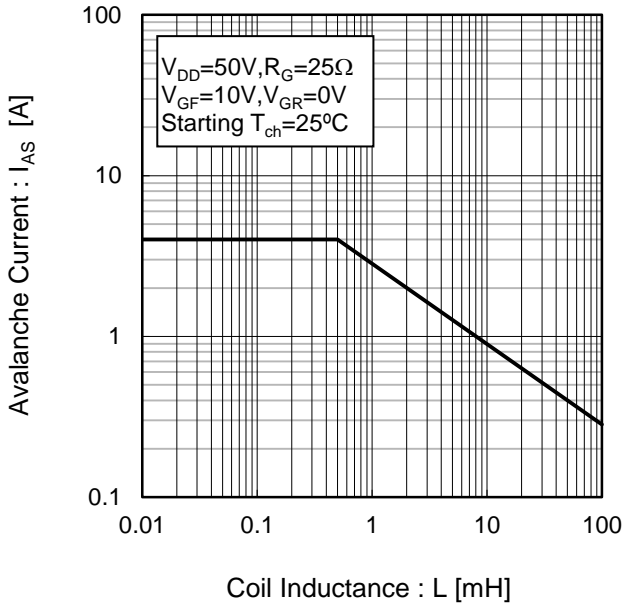


Fig.5 Avalanche Energy Derating Curve vs Junction Temperature

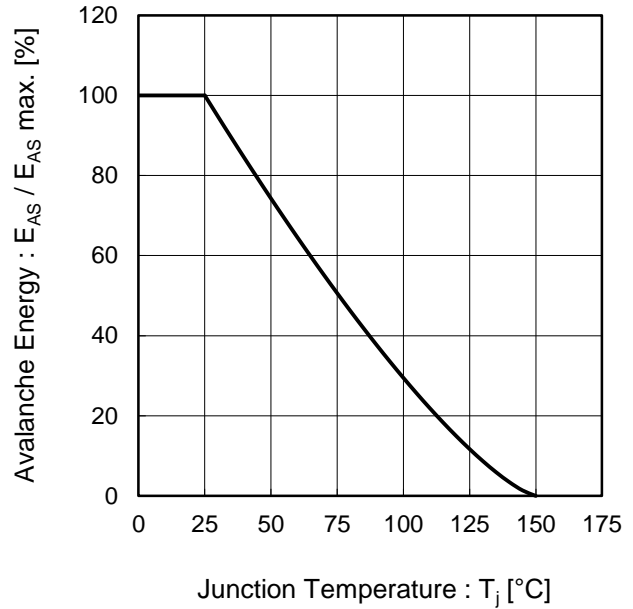


Fig.6 Typical Output Characteristics(I)

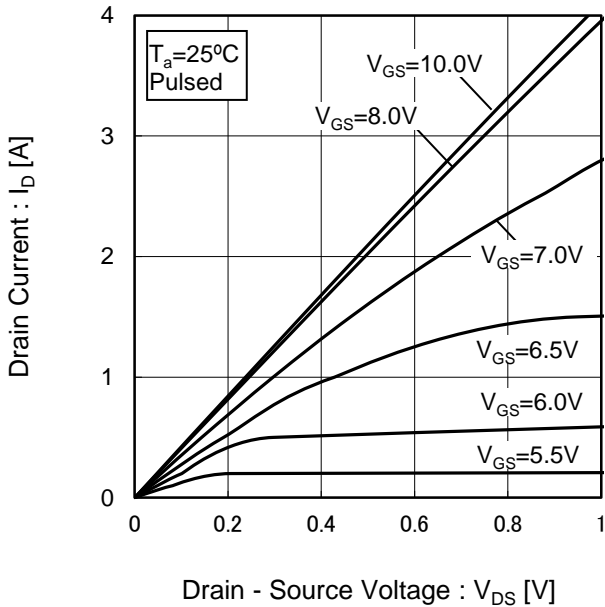
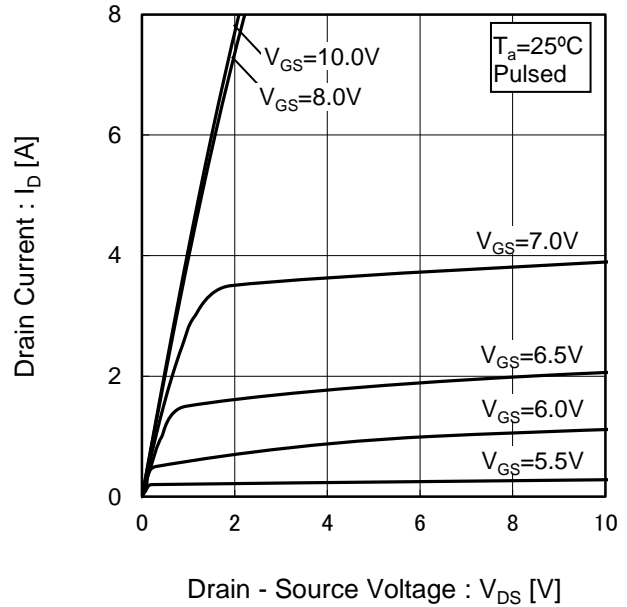


Fig.7 Typical Output Characteristics(II)



●Electrical characteristic curves

Fig.8 Breakdown Voltage vs. Junction Temperature

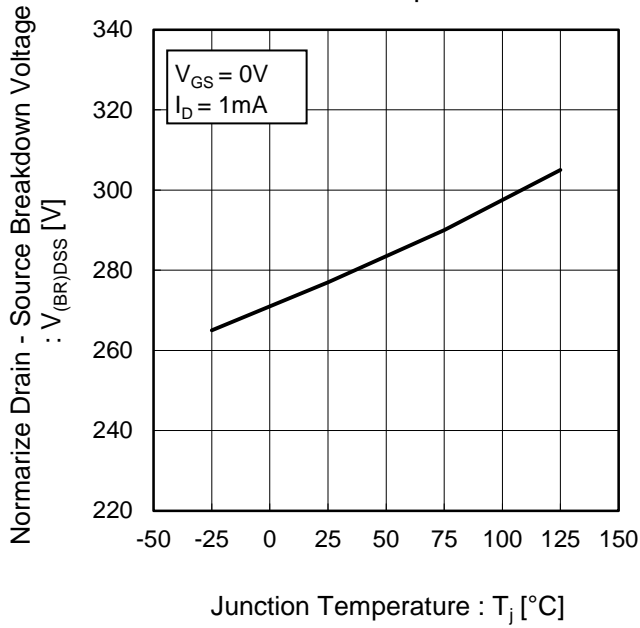


Fig.9 Typical Transfer Characteristics

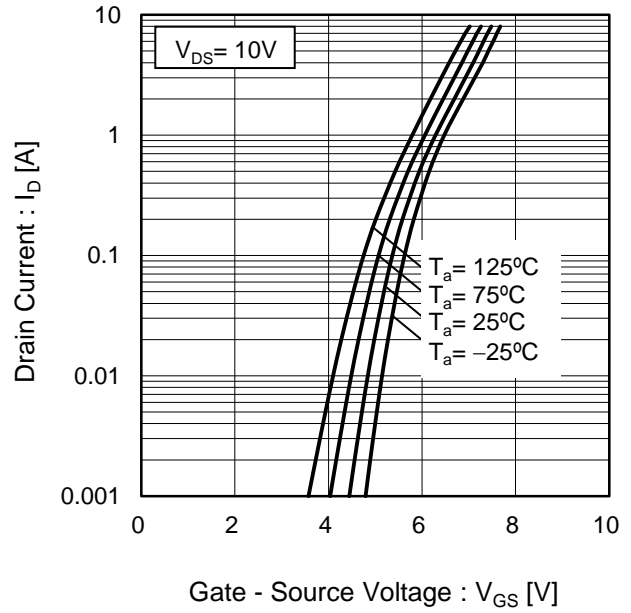


Fig.10 Gate Threshold Voltage vs. Junction Temperature

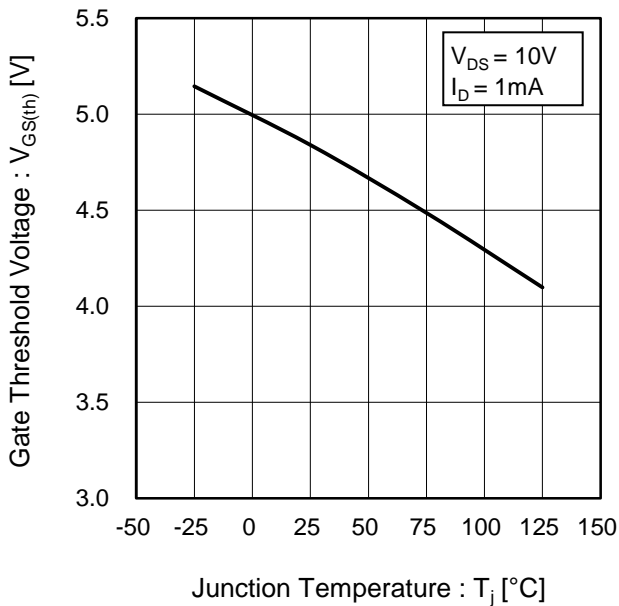
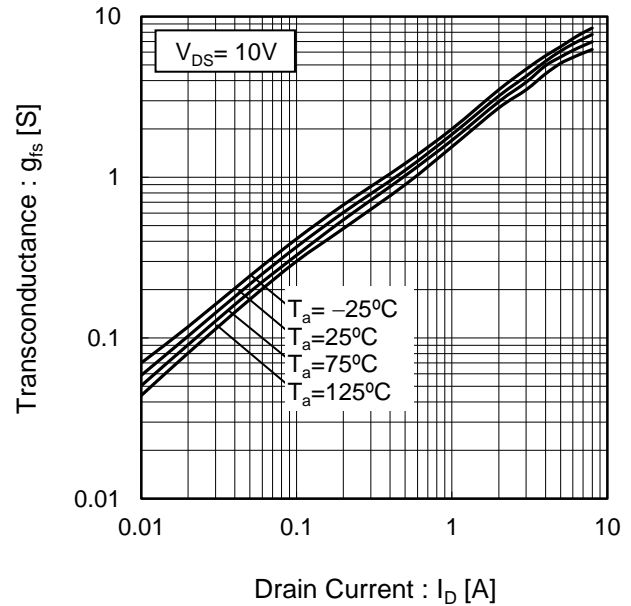


Fig.11 Transconductance vs. Drain Current



●Electrical characteristic curves

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

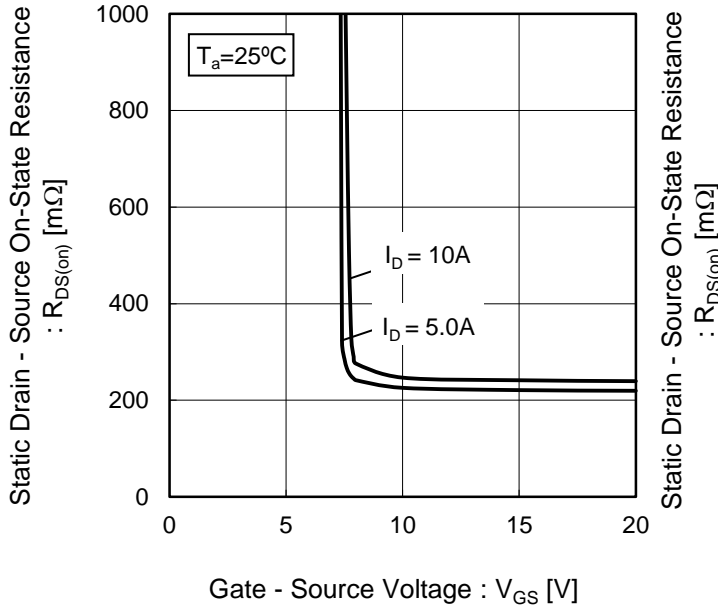


Fig.13 Static Drain - Source On - State Resistance vs. Drain Current(I)

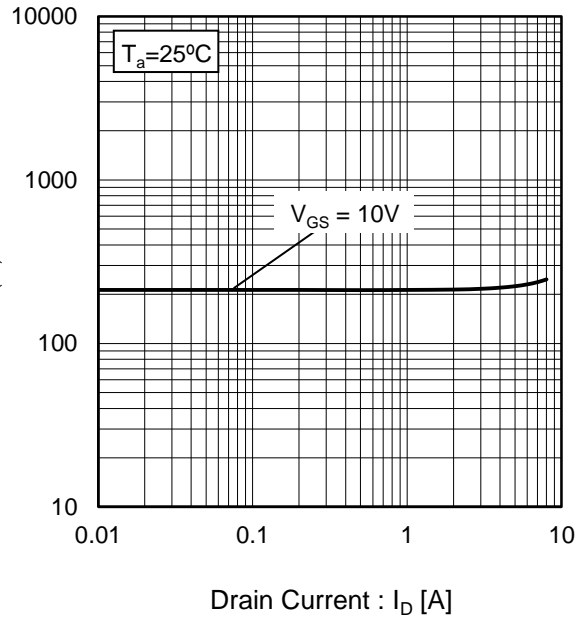
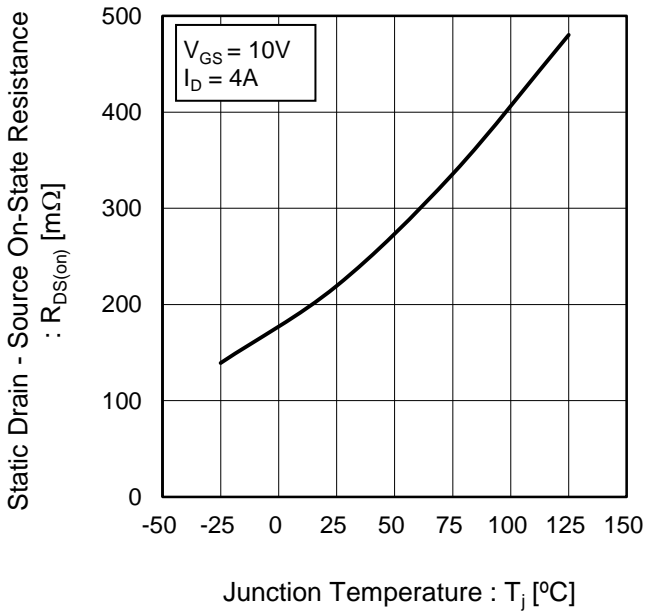


Fig.14 Static Drain - Source On - State Resistance vs. Junction Temperature



●Electrical characteristic curves

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

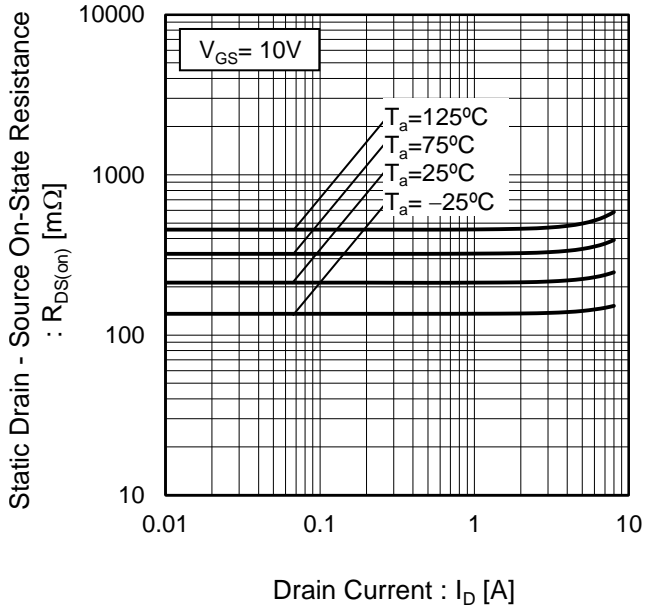
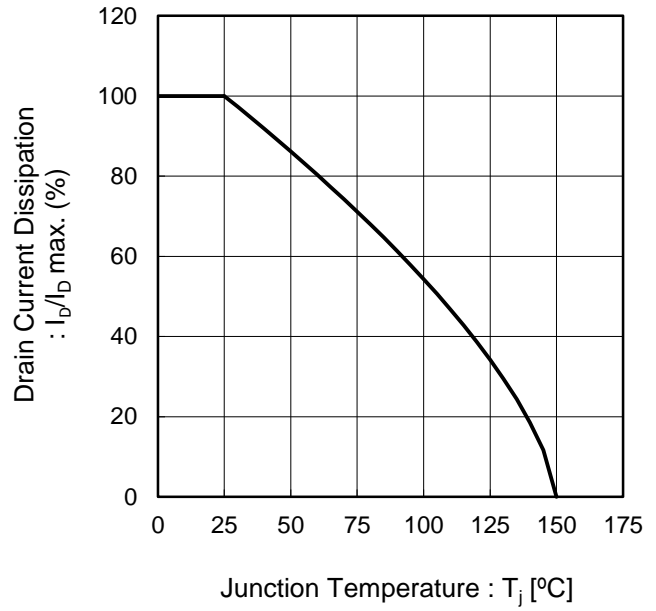


Fig.16 Drain Current Derating Curve



●Electrical characteristic curves

Fig.17 Typical Capacitance vs. Drain - Source Voltage

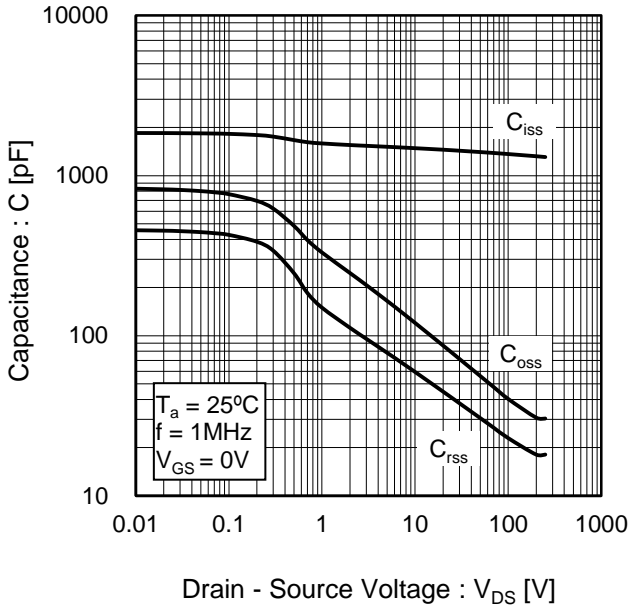


Fig.18 Switching Characteristics

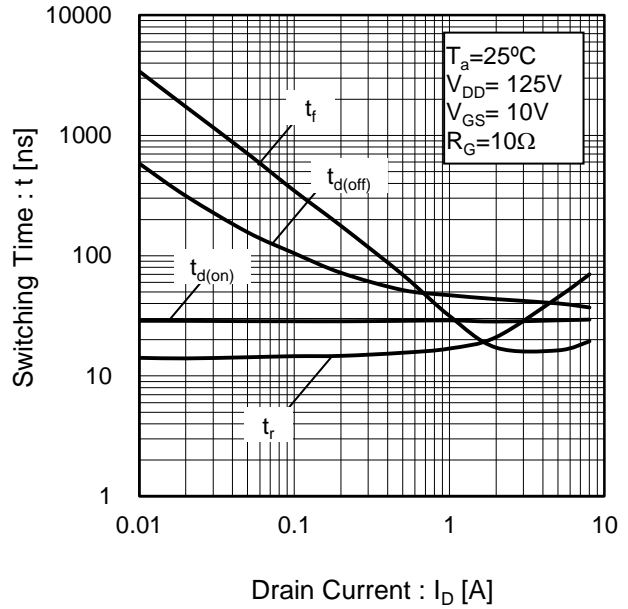
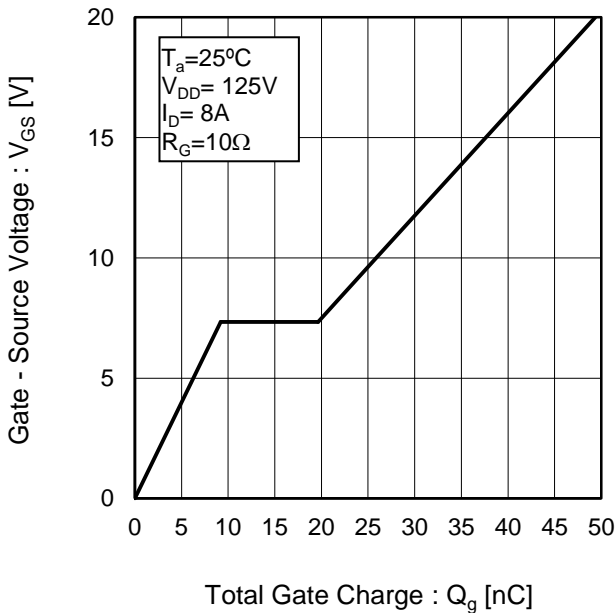


Fig.19 Dynamic Input Characteristics



●Electrical characteristic curves

Fig.20 Source Current vs. Source - Drain Voltage

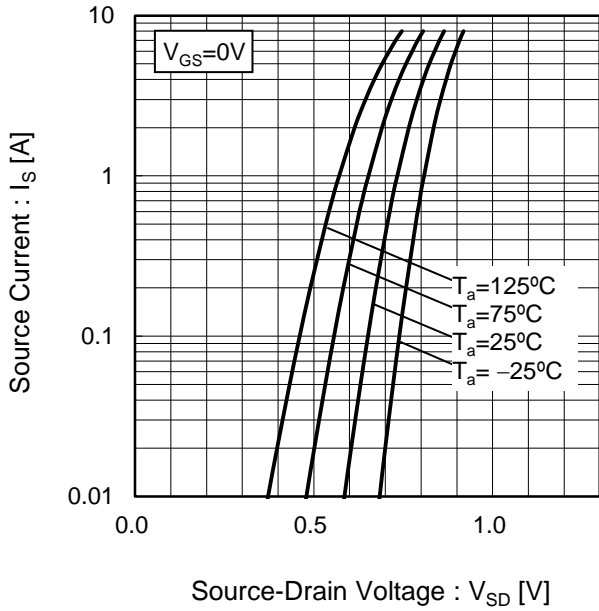
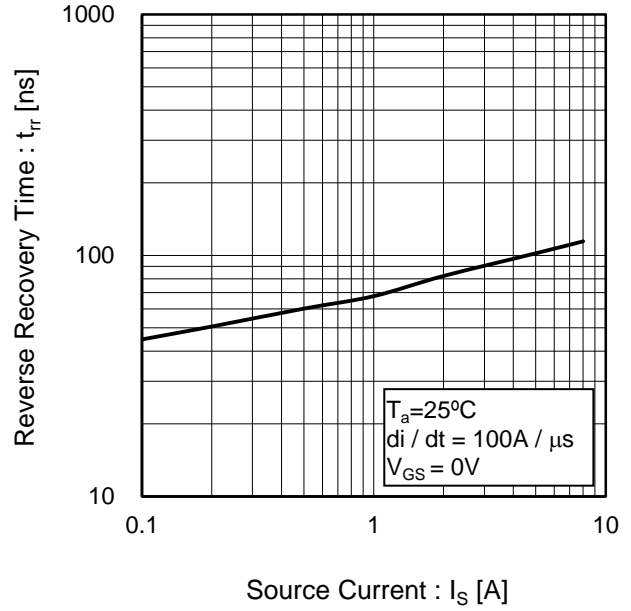


Fig.21 Reverse Recovery Time vs. Source Current



●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

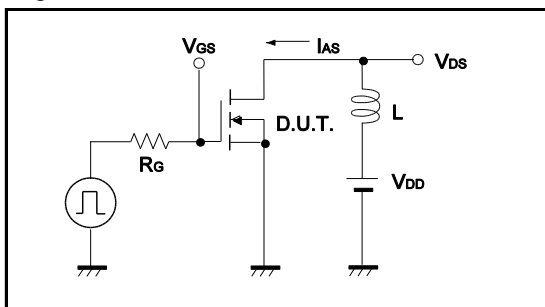
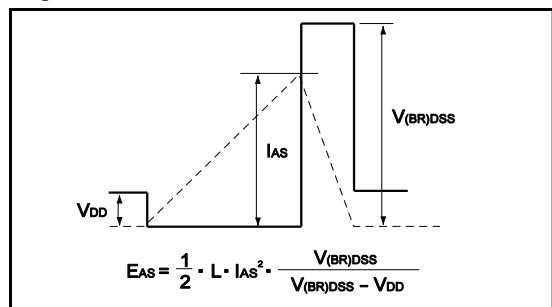
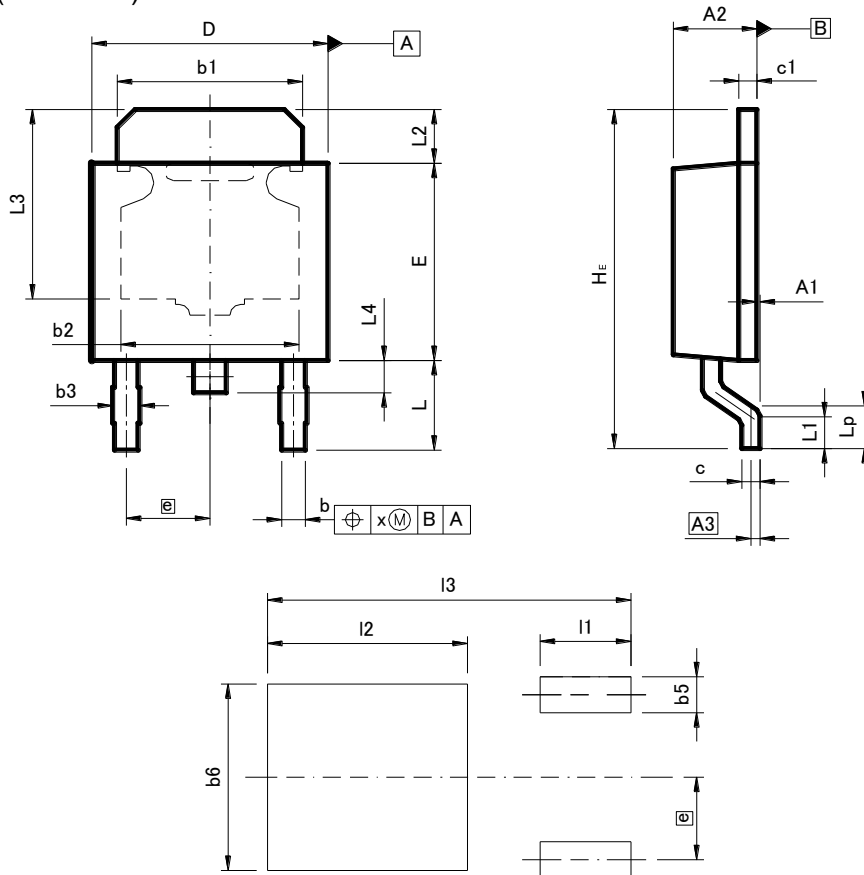


Fig.3-2 Avalanche Waveform



●Dimensions (Unit : mm)

CPT3



| DIM | MILIMETERS | | INCHES | |
|-----|------------|-------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A1 | 0.00 | 0.15 | 0 | 0.006 |
| A2 | 2.20 | 2.50 | 0.087 | 0.098 |
| A3 | 0.25 | | 0.01 | |
| b | 0.55 | 0.75 | 0.022 | 0.03 |
| b1 | 5.00 | 5.30 | 0.197 | 0.209 |
| b2 | 5.00 | | 0.20 | |
| b3 | 0.75 | | 0.03 | |
| c | 0.40 | 0.60 | 0.016 | 0.024 |
| c1 | 0.40 | 0.60 | 0.016 | 0.024 |
| D | 6.30 | 6.70 | 0.248 | 0.264 |
| E | 5.40 | 5.80 | 0.213 | 0.228 |
| e | 2.30 | | 0.09 | |
| HE | 9.00 | 10.00 | 0.354 | 0.394 |
| L | 2.20 | 2.80 | 0.087 | 0.11 |
| L1 | 0.80 | 1.40 | 0.031 | 0.055 |
| L2 | 1.20 | 1.80 | 0.047 | 0.071 |
| L3 | 5.30 | | 0.209 | |
| L4 | 0.90 | | 0.035 | |
| Lp | 1.00 | 1.60 | 0.039 | 0.063 |
| x | - | 0.25 | - | 0.01 |

| DIM | MILIMETERS | | INCHES | |
|-----|------------|-------|--------|-------|
| | MIN | MAX | MIN | MAX |
| b5 | - | 1.00 | - | 0.04 |
| b6 | - | 5.20 | - | 0.205 |
| I1 | - | 2.50 | - | 0.098 |
| I2 | - | 5.50 | - | 0.217 |
| I3 | - | 10.00 | - | 0.394 |

Dimension in mm/inches

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