

| | |
|--------------------|-------|
| V_{DSS} | 30V |
| $R_{DS(on)(Max.)}$ | 1.7mΩ |
| I_D | ±35A |
| P_D | 3W |

●Features

- 1) Low on - resistance.
- 2) High Power small mold Package (HSOP8).
- 3) Pb-free lead plating ; RoHS compliant.
- 4) Halogen Free.

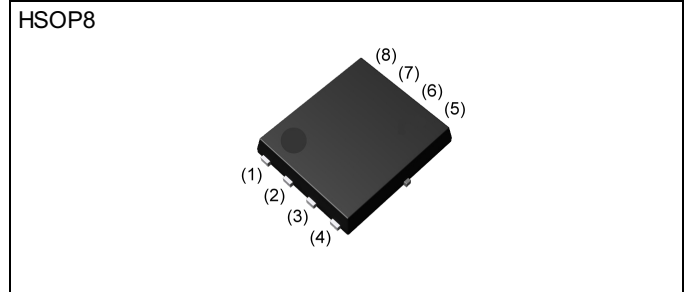
●Application

Switching

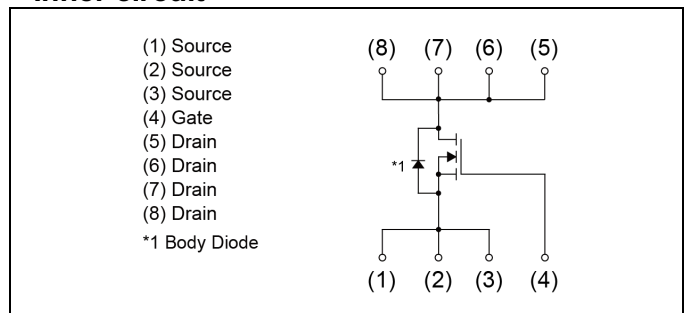
●Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Value | Unit |
|------------------------------|--------------------|-------------|------|
| Drain - Source voltage | V_{DSS} | 30 | V |
| Continuous drain current | I_D | ±35 | A |
| Pulsed drain current | $I_{D,pulse}^{*1}$ | ±140 | A |
| Gate - Source voltage | V_{GSS} | ±20 | V |
| Power dissipation | P_D^{*2} | 3 | W |
| | P_D^{*3} | 35 | W |
| Junction temperature | T_j | 150 | °C |
| Range of storage temperature | T_{stg} | -55 to +150 | °C |

●Outline



●Inner circuit



●Packaging specifications

| Type | Packing | Embossed Tape |
|------|---------------------------|---------------|
| | Reel size (mm) | 330 |
| | Tape width (mm) | 12 |
| | Basic ordering unit (pcs) | 2500 |
| | Taping code | TB |
| | Marking | RS1E350BN |

● Thermal resistance

| Parameter | Symbol | Values | | | Unit |
|--|-----------------|--------|------|------|------|
| | | Min. | Typ. | Max. | |
| Thermal resistance, junction - ambient | R_{thJA}^{*2} | - | 41.7 | - | °C/W |
| Thermal resistance, junction - case | R_{thJC}^{*3} | - | 3.57 | - | °C/W |

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

| Parameter | Symbol | Conditions | Values | | | Unit |
|--|---|---|--------|------|-----------|---------------|
| | | | Min. | Typ. | Max. | |
| Drain - Source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 1mA$ | 30 | - | - | V |
| Breakdown voltage temperature coefficient | $\frac{\Delta V_{(BR)DSS}}{\Delta T_j}$ | $I_D = 1mA$ referenced to 25°C | - | 21 | - | mV/°C |
| Zero gate voltage drain current | I_{DSS} | $V_{DS} = 30V, V_{GS} = 0V$ | - | - | 1 | μA |
| Gate - Source leakage current | I_{GSS} | $V_{GS} = \pm 16V, V_{DS} = 0V$ | - | - | ± 100 | nA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS} = 10V, I_D = 1mA$ | 1.0 | - | 2.5 | V |
| Gate threshold voltage temperature coefficient | $\frac{\Delta V_{GS(th)}}{\Delta T_j}$ | $I_D = 1mA$ referenced to 25°C | - | -3 | - | mV/°C |
| Static drain - source on - state resistance | $R_{DS(on)}^{*4}$ | $V_{GS} = 10V, I_D = 35A$ | - | 1.2 | 1.7 | m Ω |
| | | $V_{GS} = 4.5V, I_D = 35A$ | - | 1.8 | 2.5 | |
| Forward Transfer Admittance | $ Y_{fs} ^{*4}$ | $V_{DS} = 5V, I_D = 35A$ | 30 | - | - | S |

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

*2 MOUNTED ON 40mm×40mm Cu BOARD

*3 $T_c = 25^\circ\text{C}$

*4 Pulsed

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

| Parameter | Symbol | Conditions | Values | | | Unit |
|------------------------------|-------------------|------------------------------------|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Input capacitance | C_{iss} | $V_{GS} = 0V$ | - | 7900 | - | pF |
| Output capacitance | C_{oss} | $V_{DS} = 15V$ | - | 940 | - | |
| Reverse transfer capacitance | C_{rss} | $f = 1\text{MHz}$ | - | 750 | - | |
| Turn - on delay time | $t_{d(on)}^{*4}$ | $V_{DD} \approx 15V, V_{GS} = 10V$ | - | 45 | - | ns |
| Rise time | t_r^{*4} | $I_D = 17.5A$ | - | 215 | - | |
| Turn - off delay time | $t_{d(off)}^{*4}$ | $R_L \approx 0.86\Omega$ | - | 235 | - | |
| Fall time | t_f^{*4} | $R_G = 10\Omega$ | - | 105 | - | |

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

| Parameter | Symbol | Conditions | Values | | | Unit | |
|----------------------|---------------|-------------------------------------|-----------------|------|------|------|----|
| | | | Min. | Typ. | Max. | | |
| Total gate charge | Q_g^{*4} | $V_{DD} \approx 15V$ $I_D = 35A$ | $V_{GS} = 10V$ | - | 185 | - | nC |
| Gate - Source charge | Q_{gs}^{*4} | | $V_{GS} = 4.5V$ | - | 95 | - | |
| Gate - Drain charge | Q_{gd}^{*4} | | | - | 30 | - | |
| | | | | - | 40 | - | |

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

| Parameter | Symbol | Conditions | Values | | | Unit |
|---------------------------------------|---------------|---------------------------|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Body diode continuous forward current | I_S | $T_a = 25^\circ\text{C}$ | - | - | 2.5 | A |
| Body diode pulse current | I_{SP}^{*1} | | - | - | 140 | A |
| Forward voltage | V_{SD}^{*4} | $V_{GS} = 0V, I_S = 2.5A$ | - | - | 1.2 | V |

● Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve



Fig.2 Maximum Safe Operating Area

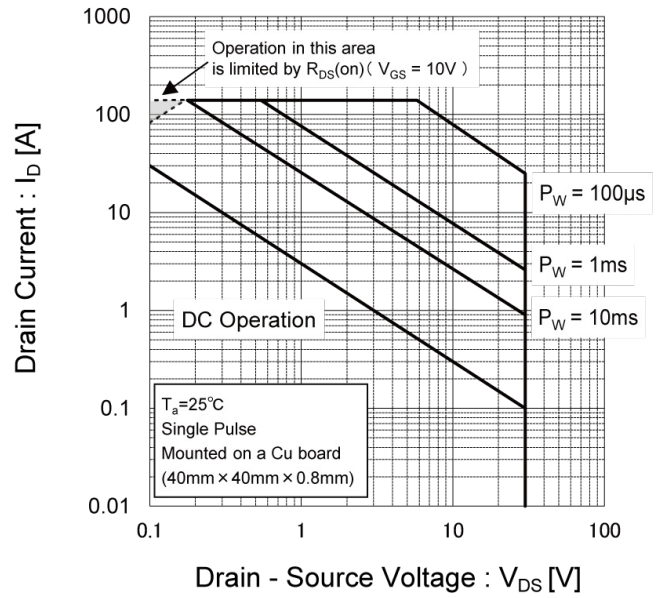


Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width

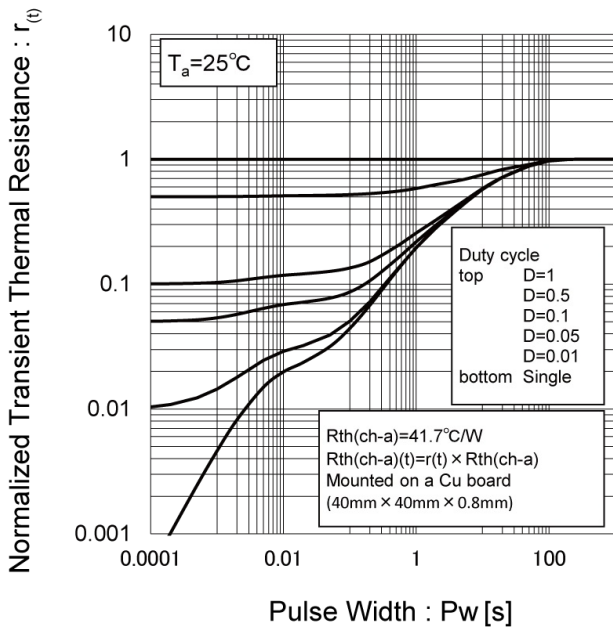
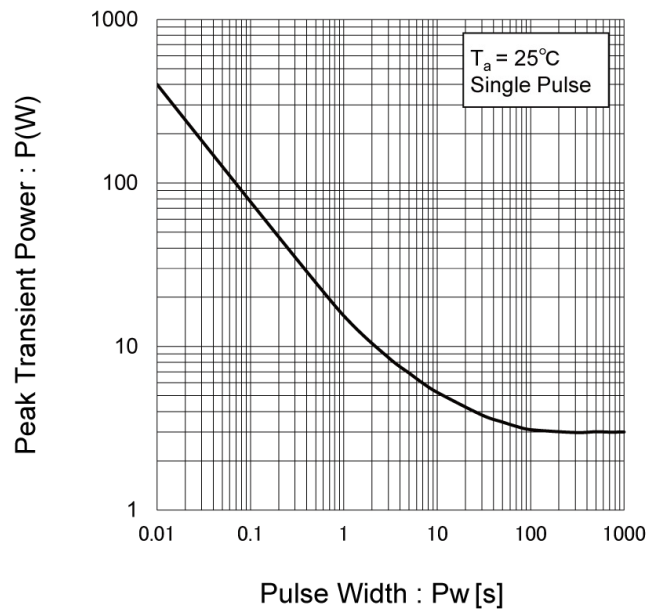


Fig.4 Single Pulse Maximum Power dissipation



● Electrical characteristic curves

Fig.5 Typical Output Characteristics(I)

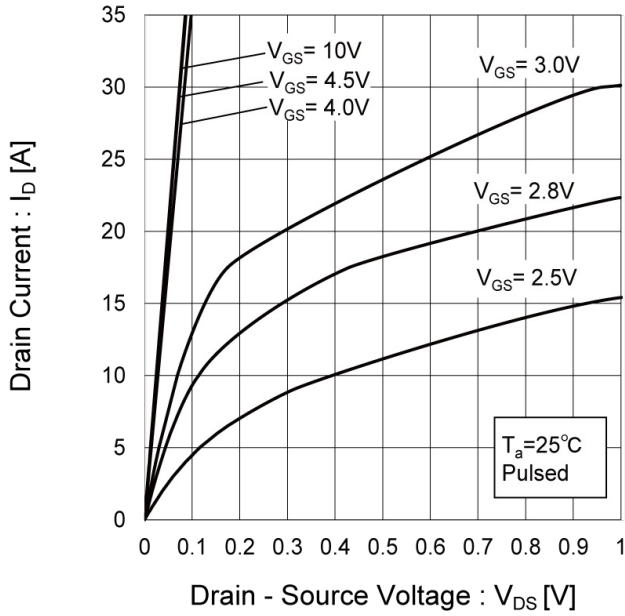


Fig.6 Typical Output Characteristics(II)

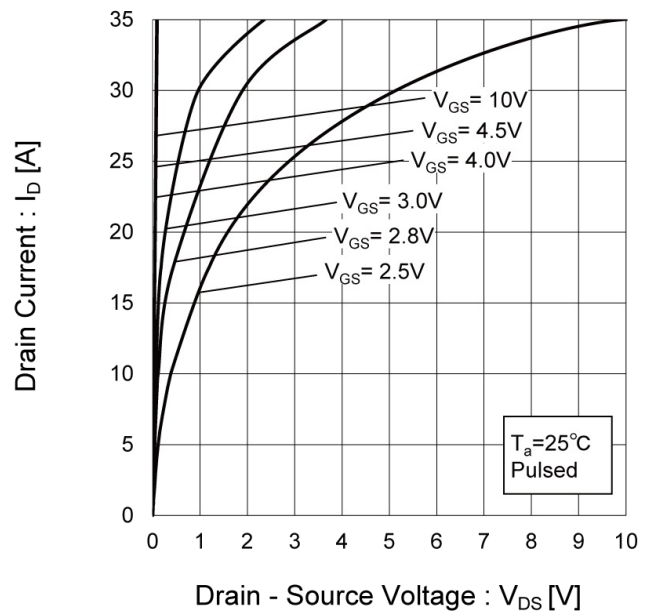
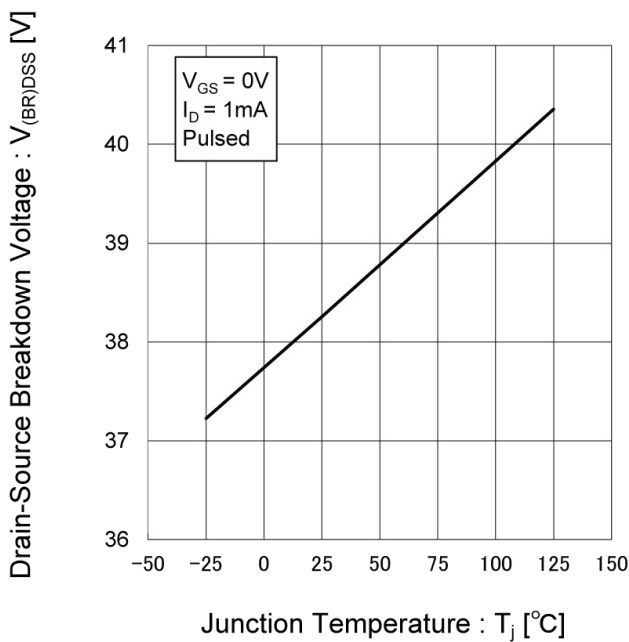


Fig.7 Breakdown Voltage vs. Junction Temperature



●Electrical characteristic curves

Fig.8 Typical Transfer Characteristics

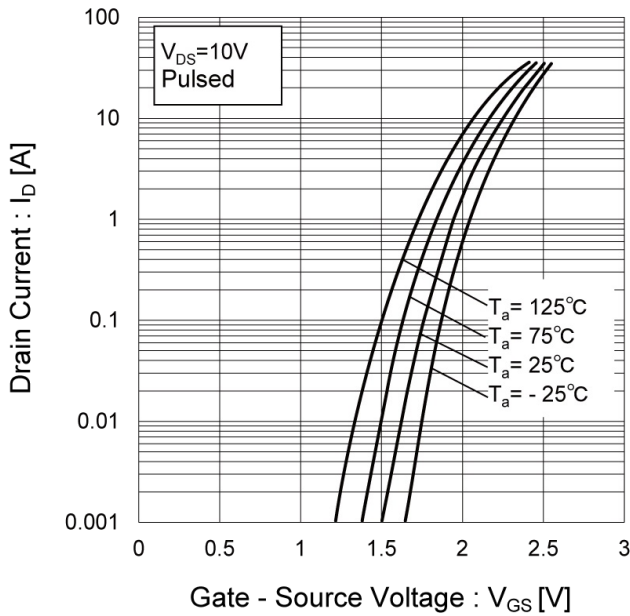


Fig.9 Gate Threshold Voltage vs. Junction Temperature

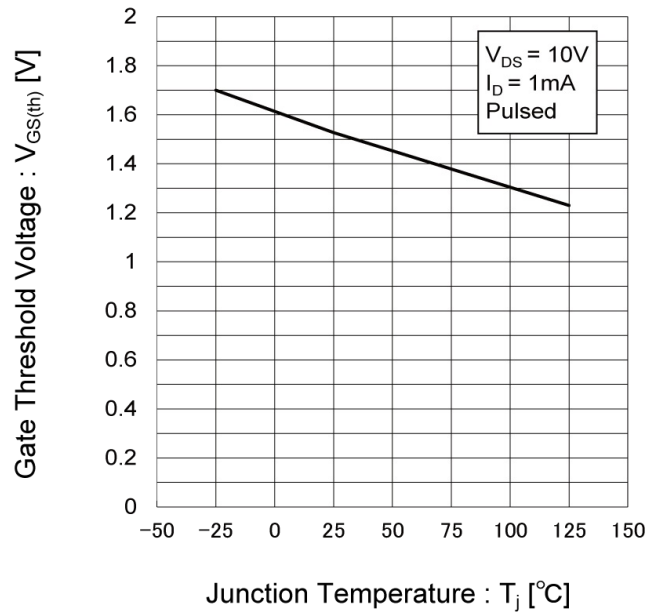
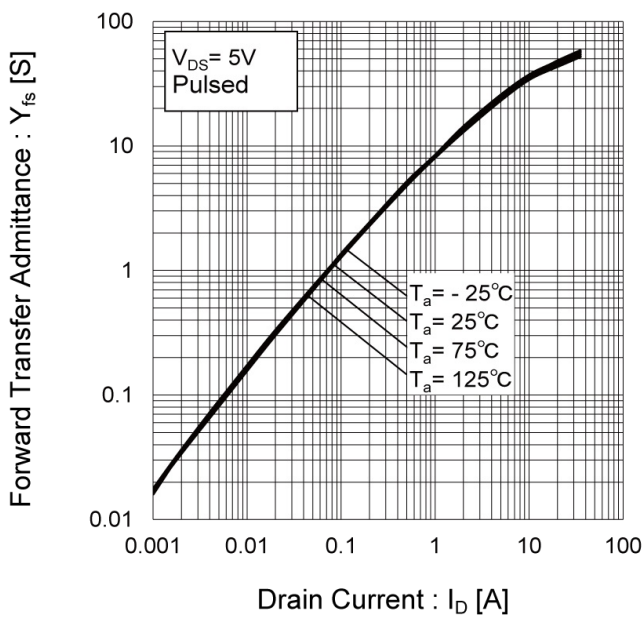


Fig.10 Transconductance vs. Drain Current



● Electrical characteristic curves

Fig.11 Drain Current Derating Curve



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

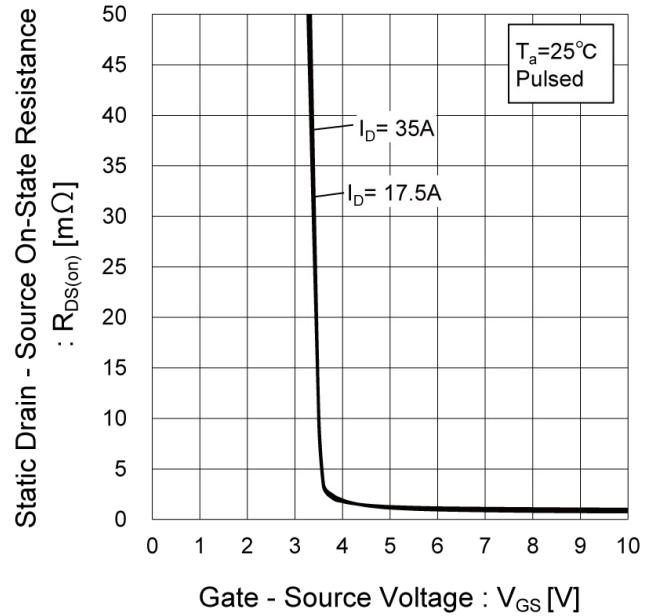
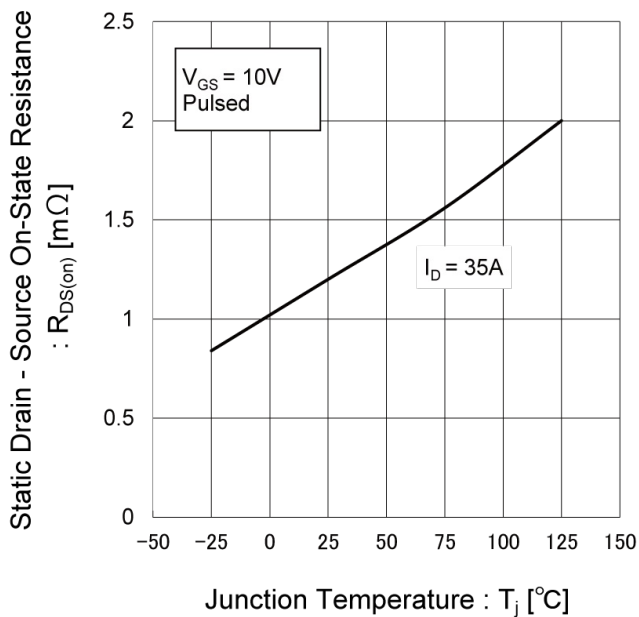


Fig.13 Static Drain - Source On - State Resistance vs. Junction Temperature



● Electrical characteristic curves

Fig.14 Static Drain - Source On - State Resistance vs. Drain Current(I)

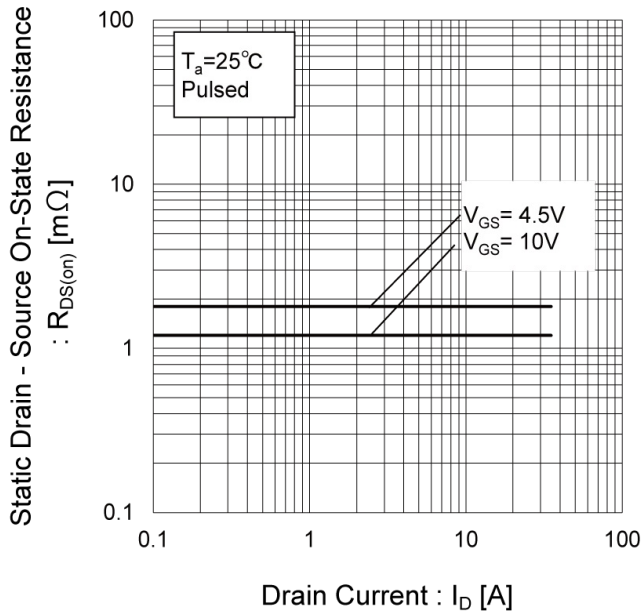


Fig.15 Static Drain - Source On - State Resistance vs. Drain Current(II)

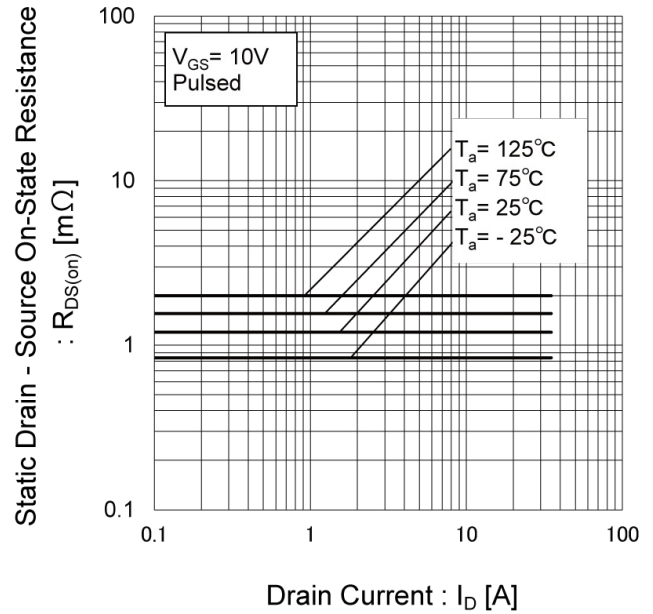
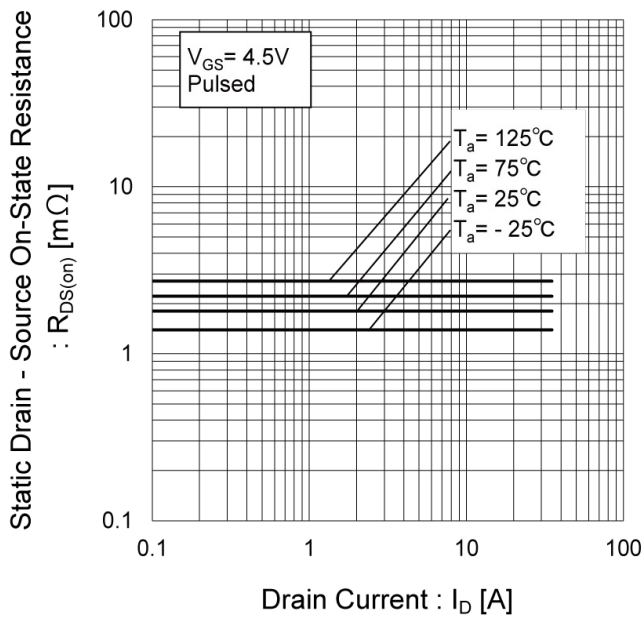


Fig.16 Static Drain - Source On - State Resistance vs. Drain Current(III)



●Electrical characteristic curves

Fig.17 Typical Capacitance vs. Drain - Source Voltage

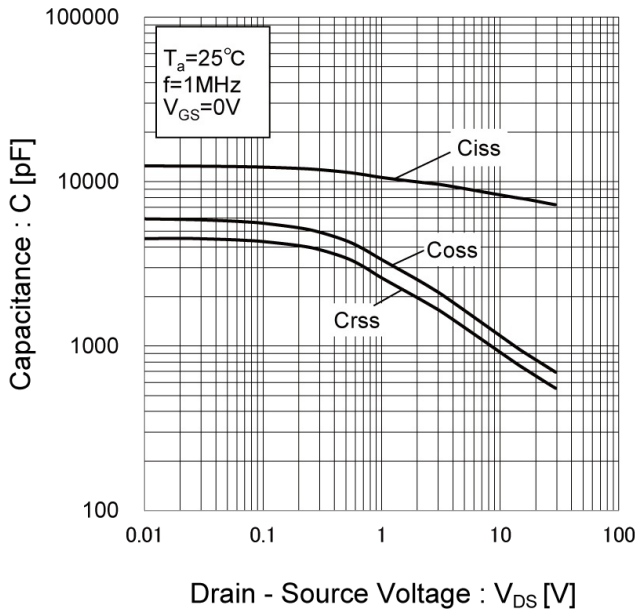


Fig.18 Switching Characteristics

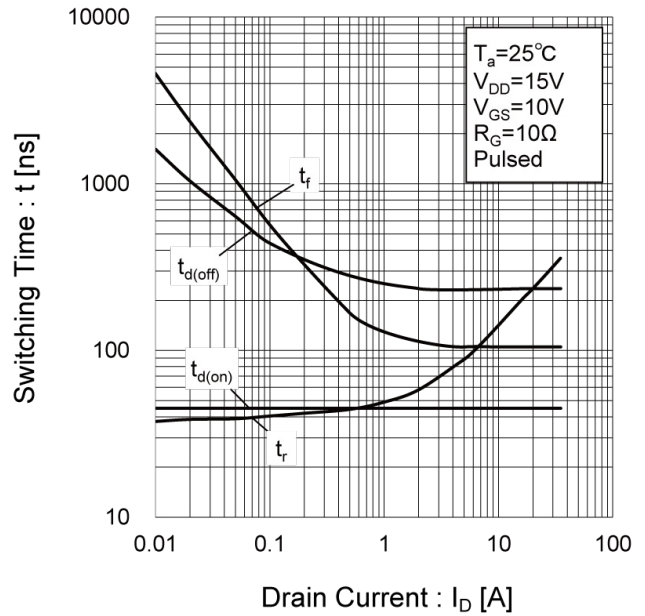


Fig.19 Dynamic Input Characteristics

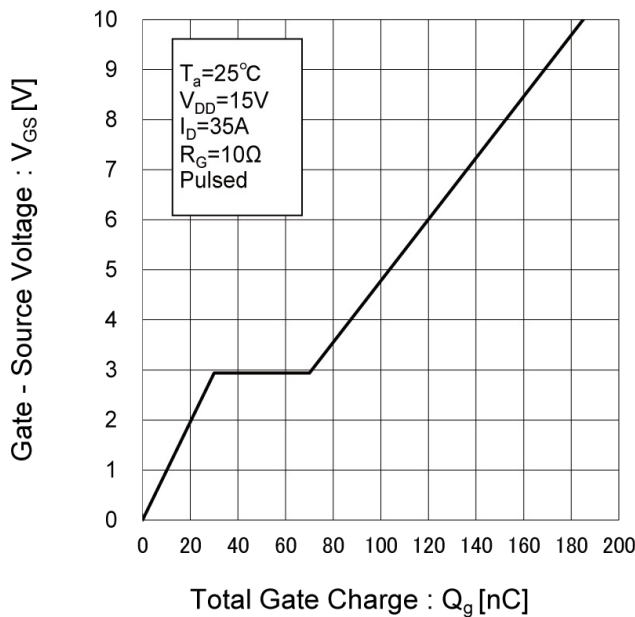
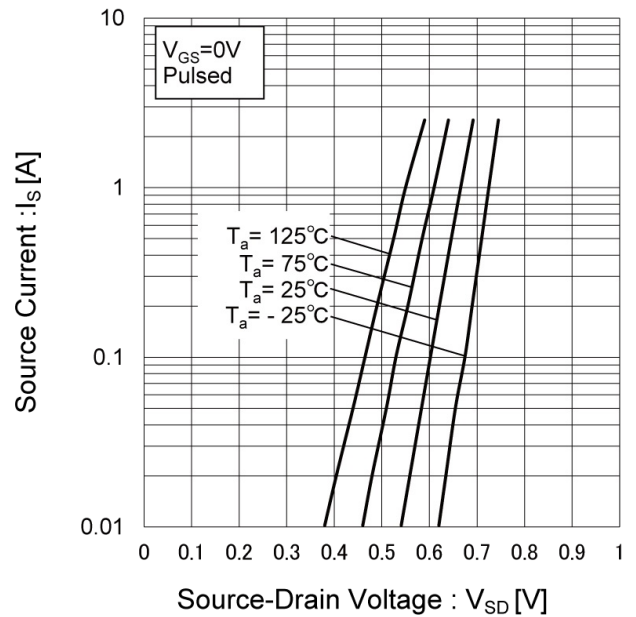


Fig.20 Source Current vs. Source Drain Voltage



● 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

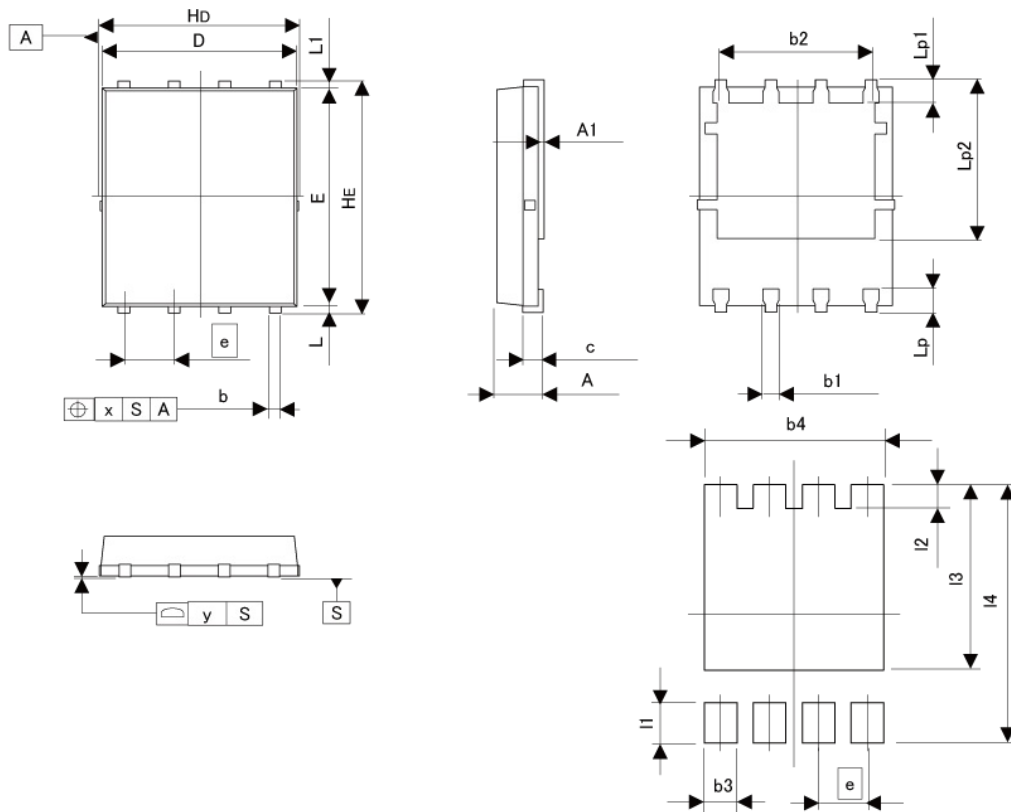


● Notice

This product might cause chip aging and breakdown under the large electrified environment. Please consider to design ESD protection circuit.

●Dimensions

HSOP8 (5 x 6)



Pattern of terminal position areas
[Not a pattern of soldering pads]

| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.90 | 1.10 | 0.035 | 0.043 |
| A1 | 0.00 | 0.05 | 0.000 | 0.002 |
| b | 0.24 | 0.42 | 0.009 | 0.017 |
| b1 | 0.29 | 0.49 | 0.011 | 0.019 |
| b2 | 3.81 | 4.21 | 0.150 | 0.166 |
| c | 0.20 | 0.30 | 0.008 | 0.012 |
| D | 4.80 | 5.00 | 0.189 | 0.197 |
| E | 5.60 | 5.80 | 0.220 | 0.228 |
| e | 1.27 | | 0.050 | |
| Hd | 4.90 | 5.10 | 0.193 | 0.201 |
| HE | 5.90 | 6.10 | 0.232 | 0.240 |
| L | 0.07 | 0.25 | 0.003 | 0.010 |
| L1 | 0.07 | 0.25 | 0.003 | 0.010 |
| Lp | 0.50 | 0.70 | 0.020 | 0.028 |
| Lp1 | 0.52 | 0.72 | 0.020 | 0.028 |
| Lp2 | 3.92 | 4.32 | 0.154 | 0.170 |
| x | - | 0.10 | - | 0.004 |
| y | - | 0.10 | - | 0.004 |

| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| b3 | - | 0.59 | - | 0.023 |
| b4 | - | 4.21 | - | 0.166 |
| I1 | - | 0.80 | - | 0.031 |
| I2 | - | 0.82 | - | 0.032 |
| I3 | - | 4.32 | - | 0.170 |
| I4 | - | 6.10 | - | 0.240 |

Dimension in mm/inches

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