

### Dual N-channel Power MOSFET 12V, 4.0mohm, 17.0A

#### Product Summary

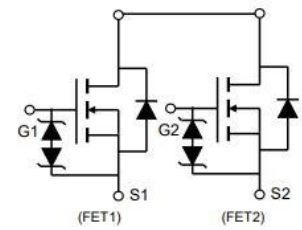
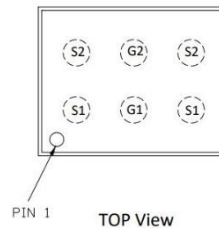
| VSSS | VGSS        | RSS(ON) TYP/MAX                                                                                                           | IS MAX |
|------|-------------|---------------------------------------------------------------------------------------------------------------------------|--------|
| 12V  | $\pm 10.5V$ | 4.0/5.1m $\Omega$ @VGS=4.5V<br>4.3/5.5m $\Omega$ @VGS=3.8V<br>4.8/6.8m $\Omega$ @VGS=3.1V<br>5.9/10.0m $\Omega$ @VGS=2.5V | 17.0A  |

#### Marking Symbol Code

❖ Laser Marking Device Code: O



GS: Gostone  
O: Marking Device Code (fixed)  
D: Factory Code  
Y: Year Code  
W: Week Code  
L: LOT Code  
○: Pin#1 Identifier



#### Features

- ❖ CSP (Chip Size Package)
- ❖ Halogen-Free / RoHS Compliant
- ❖ 2.5V Drive Low Source-Source On-State Resistance
- ❖ Gate Resistor Installed Common-Drain Type MOSFET
- ❖ ESD Protection Diode Installed (Gate-Source)

#### Application

- ❖ Battery Protection Switch
- ❖ Mobile Device Battery Charging and Discharging

#### Ordering Information:

| Part Number | Case             | Packaging  |
|-------------|------------------|------------|
| GTD1203A    | WLCSP2.14X1.67_6 | 8,000/Reel |

#### Absolute maximum rating@25°C

| Parameters                             | Symbol         | Rating     | Units |
|----------------------------------------|----------------|------------|-------|
| Source-Source Voltage                  | $V_{SS}$       | 12         | V     |
| Gate-Source Voltage                    | $V_{GS}$       | $\pm 10.5$ | V     |
| Source Current (DC)                    | IS1 *1         | 8.8        | A     |
|                                        | IS2 *2         | 17         | A     |
| Source Current(Pulse)                  | ISP *2*3       | 80         | A     |
| Power Dissipation                      | PD1 *1         | 0.42       | W     |
|                                        | PD2 *2         | 1.47       | W     |
| Junction and Storage Temperature Range | $T_J, T_{STG}$ | -55 to 150 | °C    |

#### Thermal Characteristic

| Characteristic     | Symbol        | Rating | Unit |
|--------------------|---------------|--------|------|
| Thermal Resistance | $R_{th}^{*1}$ | 297    | °C/W |
|                    | $R_{th}^{*2}$ | 85     | °C/W |

Note \*1 Mounted on FR4 board (25.4mm x 25.4mm x t1.0mm)  
with minimum copper pad (45.5mm<sup>2</sup>, 36 $\mu$ m thickness copper)

Note \*2 Mounted on FR4 board (25.4mm x 25.4mm x t1.0mm)  
with maximum copper pad (615.5mm<sup>2</sup>, 36 $\mu$ m thickness copper)

Note \*3 t=10 $\mu$ s, duty cycle  $\leq 1\%$

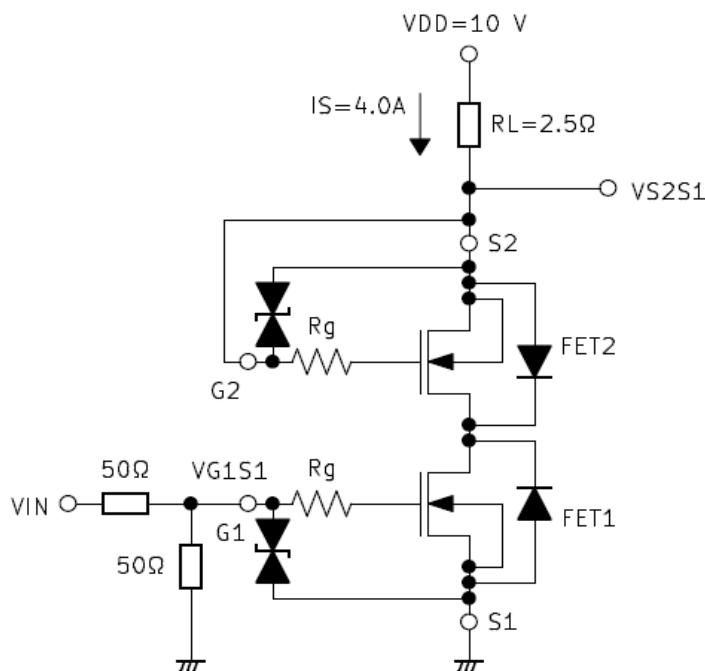
**Electrical Characteristics (TJ=25°C unless otherwise noted)**

| Parameter                         | Symbol                                       | Conditions                                                                       | Min                      | Typ                      | Max                       | Unit |
|-----------------------------------|----------------------------------------------|----------------------------------------------------------------------------------|--------------------------|--------------------------|---------------------------|------|
| Source-Source Breakdown Voltage   | VSSS                                         | IS=1mA, VGS=0V                                                                   | 12.0                     |                          |                           | V    |
| Zero Gate Voltage Source Current  | ISSS                                         | VSS=12V, VGS=0V                                                                  |                          |                          | 1.0                       | μA   |
| Gate-Source Leakage Current       | IGSS1<br>IGSS2                               | VGS=±8V, VSS=0V<br>VGS=±5V, VSS=0V                                               |                          |                          | ±10<br>±1.0               | μA   |
| Gate-Source Threshold Voltage     | Vth                                          | VSS=6.0V, IS=1.0mA                                                               | 0.4                      | 0.9                      | 1.4                       | V    |
| Source-Source On-State Resistance | RSS(on)1<br>RSS(on)2<br>RSS(on)3<br>RSS(on)4 | IS=4.0A, VGS=4.5V<br>IS=4.0A, VGS=3.8V<br>IS=4.0A, VGS=3.1V<br>IS=4.0A, VGS=2.5V | 3.0<br>3.2<br>3.5<br>3.8 | 4.0<br>4.3<br>4.8<br>5.9 | 5.1<br>5.5<br>6.8<br>10.0 | mΩ   |
| Body Diode Forward Voltage        | VF(S-S)                                      | IF=4.0A, VGS=0V                                                                  |                          | 0.7                      | 1.2                       | V    |
| Input Capacitance *1              | Ciss                                         |                                                                                  |                          | 3,390                    |                           | pF   |
| Output Capacitance *1             | Coss                                         | VSS=10V, VGS=0V, f=1kHz                                                          |                          | 320                      |                           | pF   |
| Reverse Transfer Capacitance *1   | Crss                                         |                                                                                  |                          | 250                      |                           | pF   |
| Turn-On Delay Time *1 *2          | td(on)                                       | VDD=10V, VGS=0 to 4.0V,<br>IS=4.0A                                               |                          | 3.0                      |                           | μs   |
| Rise Time *1 *2                   | tr                                           |                                                                                  |                          | 3.6                      |                           | μs   |
| Turn-Off Delay Time *1 *2         | td(off)                                      | VDD=10V, VGS=4.0 to 0V,<br>IS=4.0A                                               |                          | 5.0                      |                           | μs   |
| Fall Time *1 *2                   | tf                                           |                                                                                  |                          | 6.3                      |                           | μs   |
| Total Gate Charge *1              | Qg                                           | VDD=10V, VGS=0 to 4.0V,<br>IS=4.0A                                               |                          | 26.0                     |                           | nC   |
| Gate-Source Charge *1             | Qgs                                          |                                                                                  |                          | 6.5                      |                           | nC   |
| Gate-Drain Charge *1              | Qgd                                          |                                                                                  |                          | 7.0                      |                           | nC   |
| Gate Resistance *1                | Rg                                           | f=1MHz                                                                           |                          | 2,000                    |                           | Ω    |

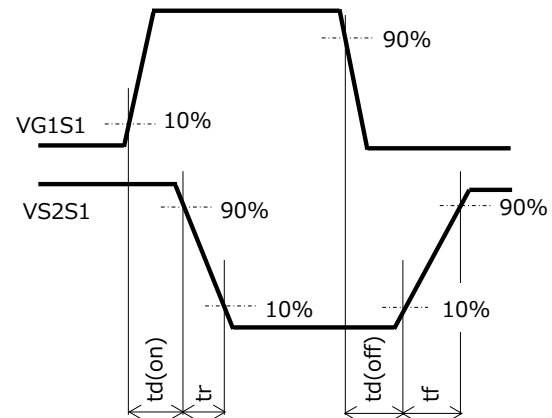
Note \*1 Guaranteed by Design

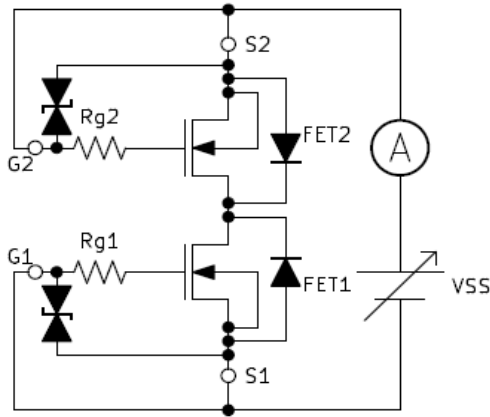
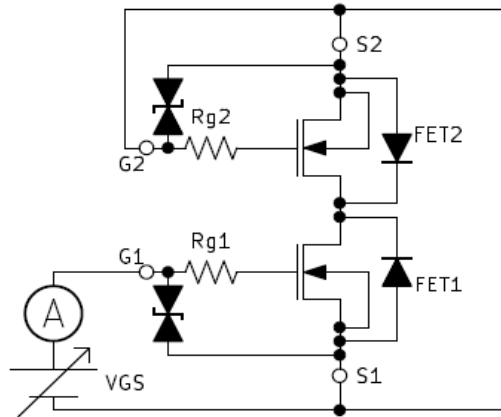
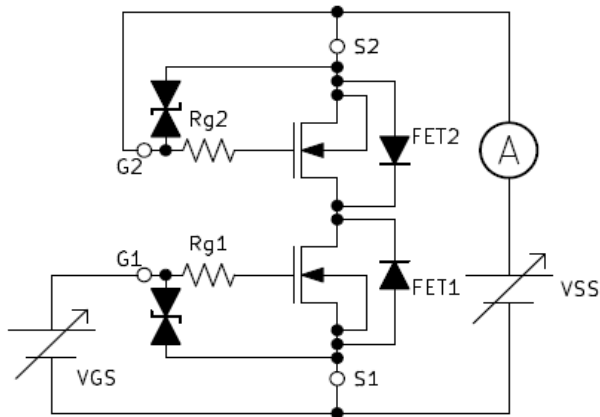
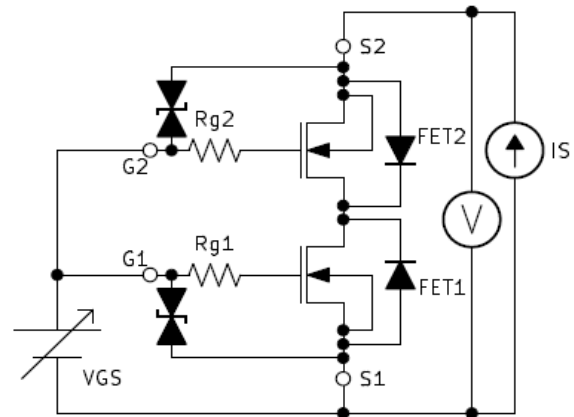
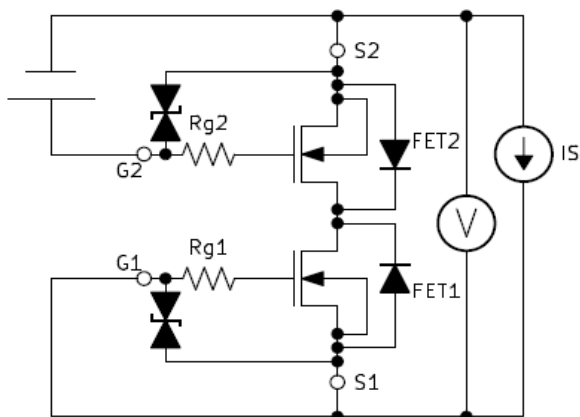
Note \*2 Measurement Circuit for Switching Characteristics

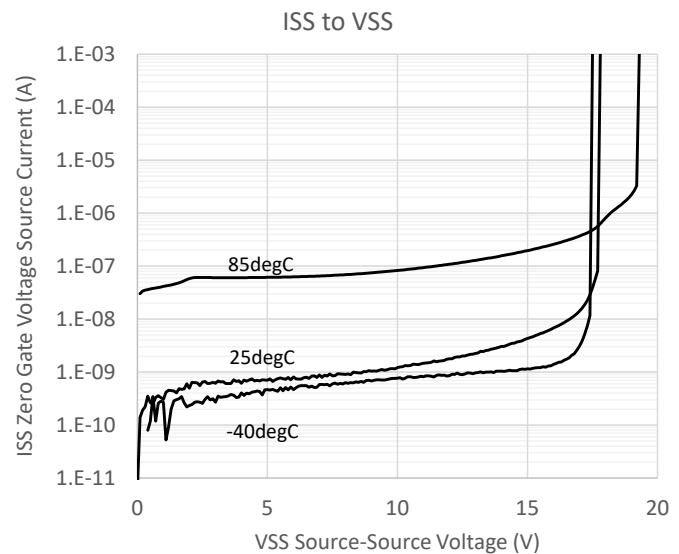
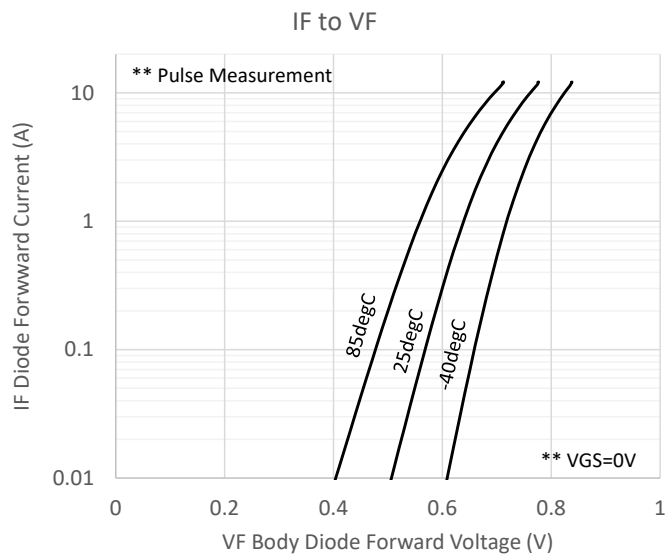
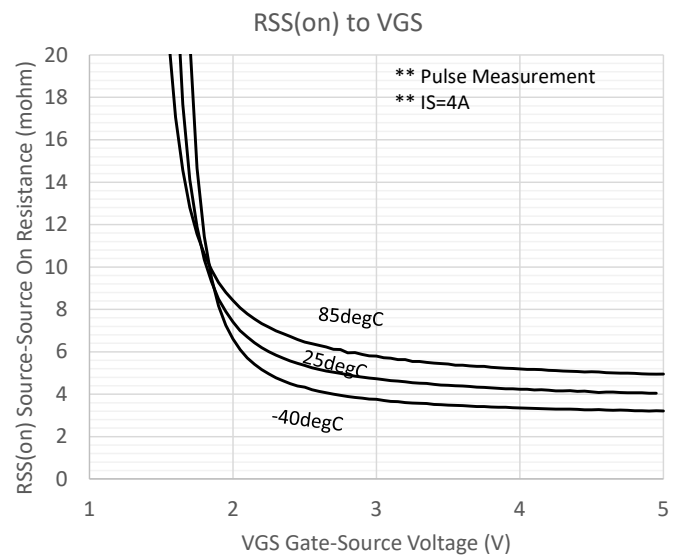
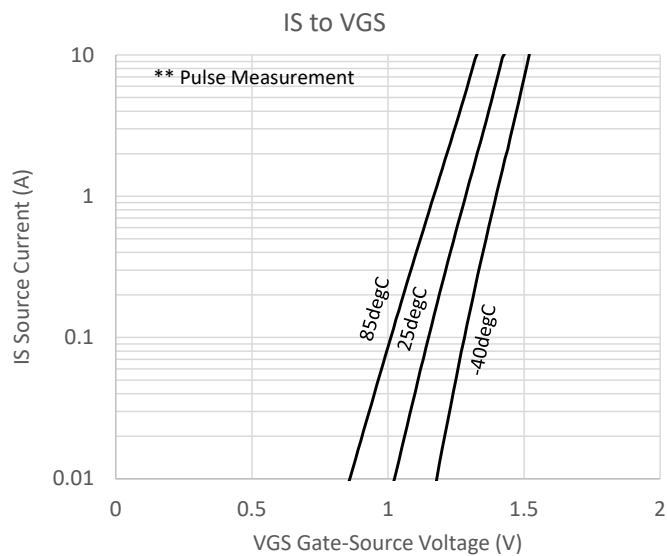
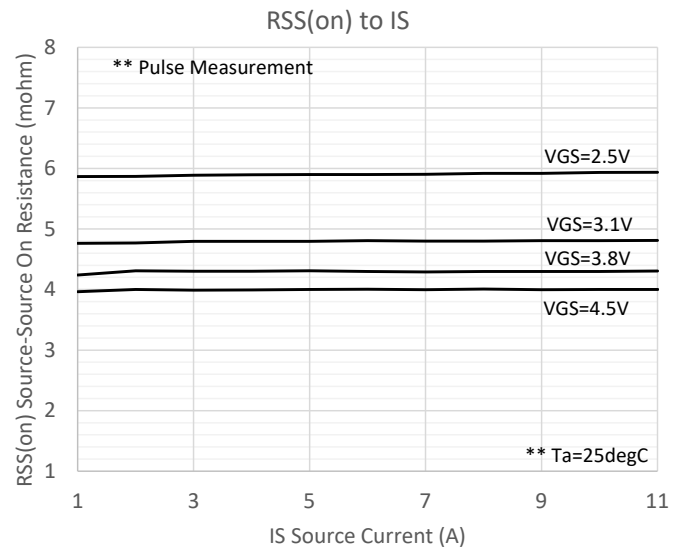
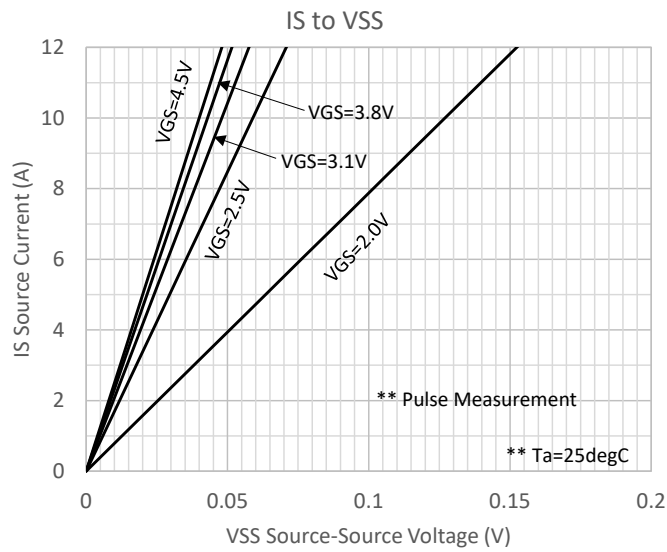
- FET1 Measurement Circuit for Switching Characteristics td(on), tr, td(off), tf  
(FET2: Gate-Source Short)

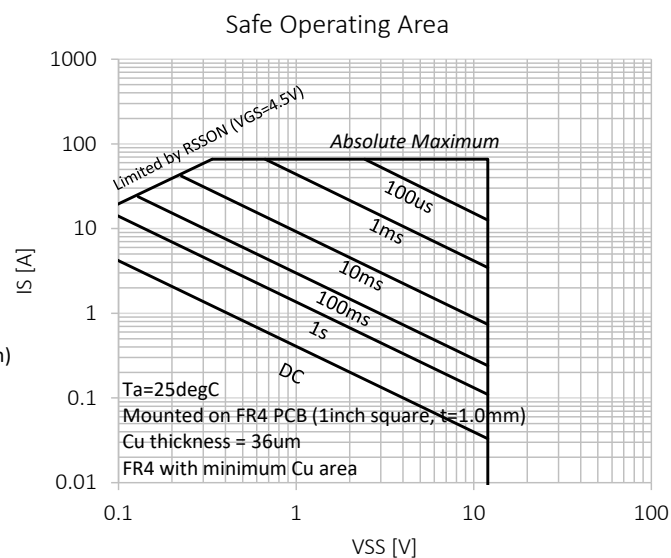
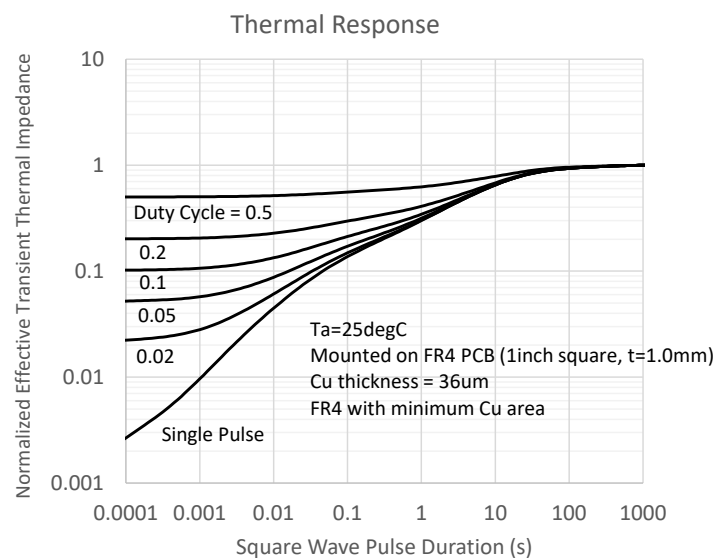
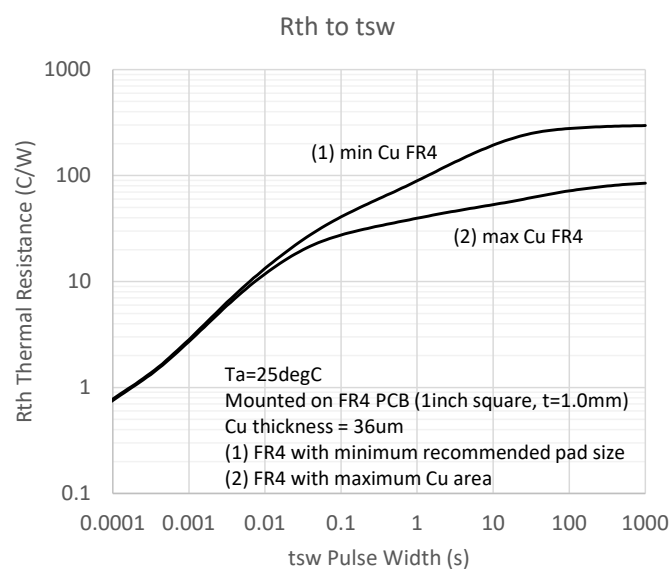
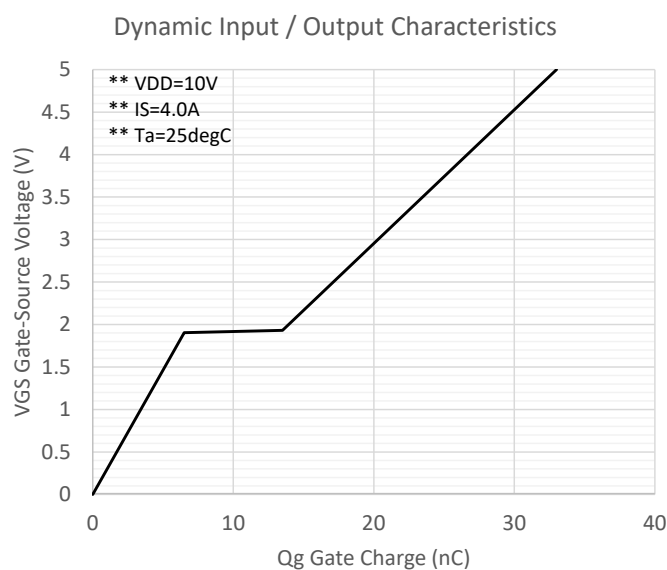
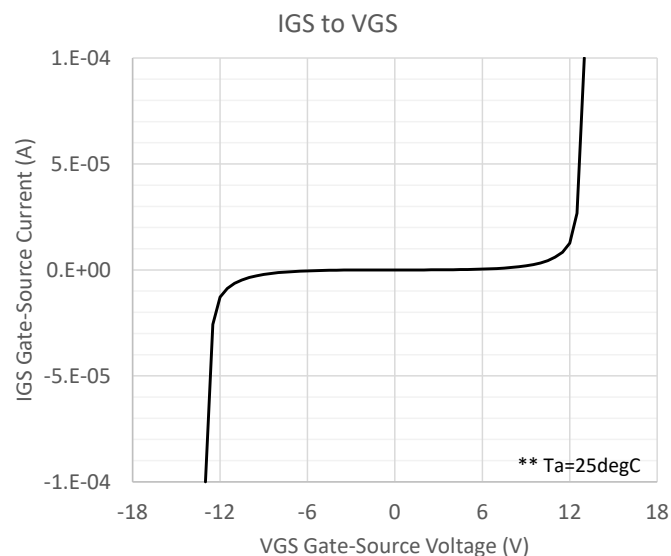
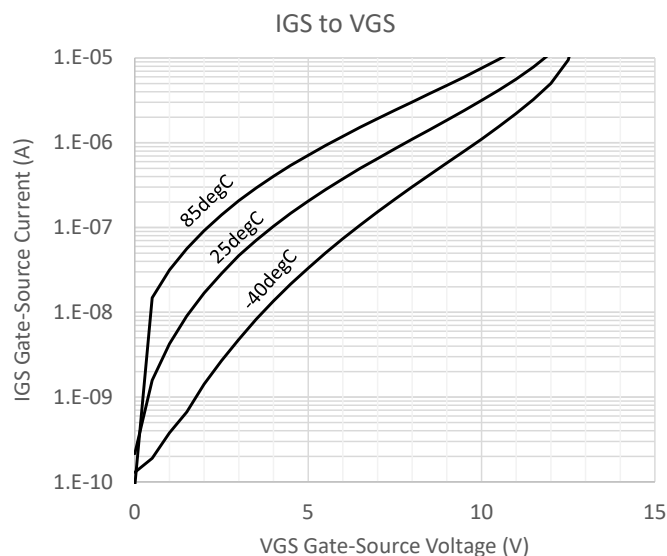


(Definition of Switching Measurement Detection)



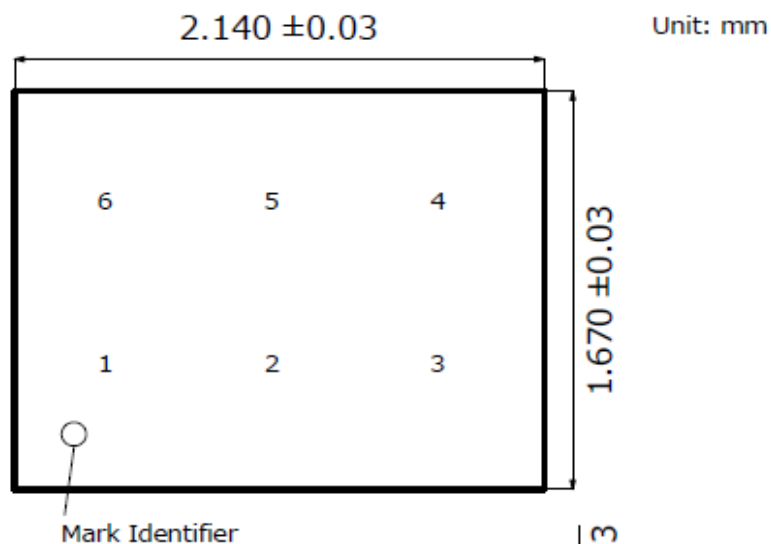
**Test circuits for FET1**
**Test Circuit 1**  
**VSSS/ISS**

**Test Circuit 2**  
**IGSS1/2**

**Test Circuit 3**  
**Vth**

**Test Circuit 4**  
**RSS(on)**

**Test Circuit 5**  
**VF(S-S)**


**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**


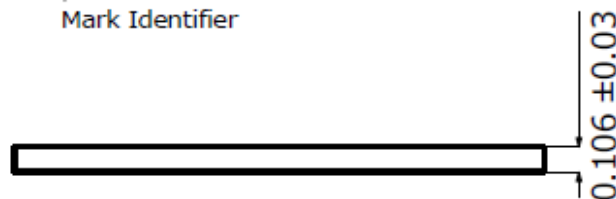
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**


Outline Drawing CSP2.14\*1.67-6L

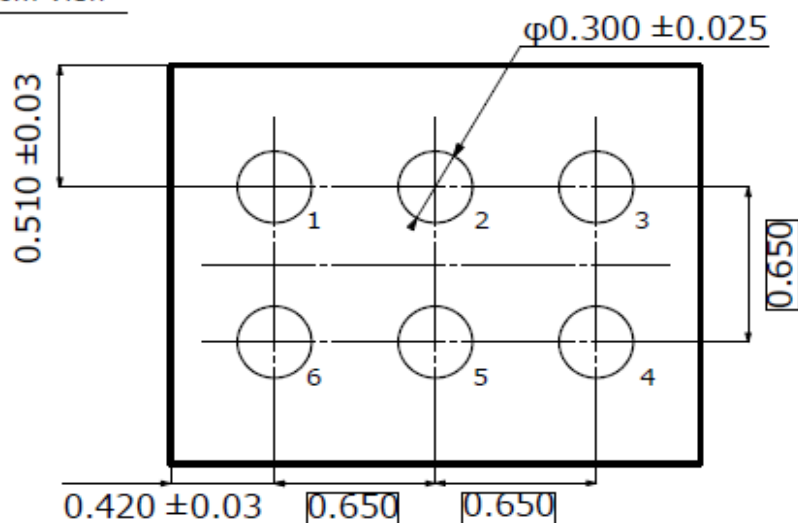
Top View



Front View

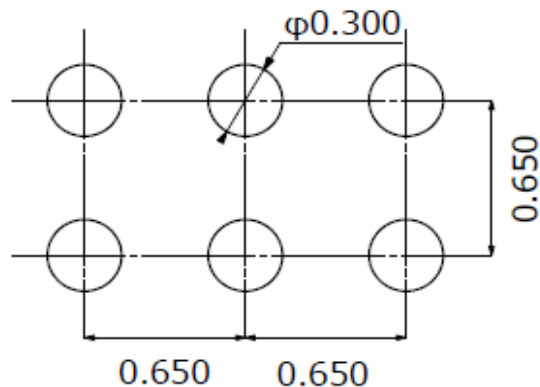


Bottom View



(Reference) Board Land & Stencil Mask Pattern

Unit: mm



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