# FKCS2050

## Dual N-Ch Fast Switching MOSFETs

Green

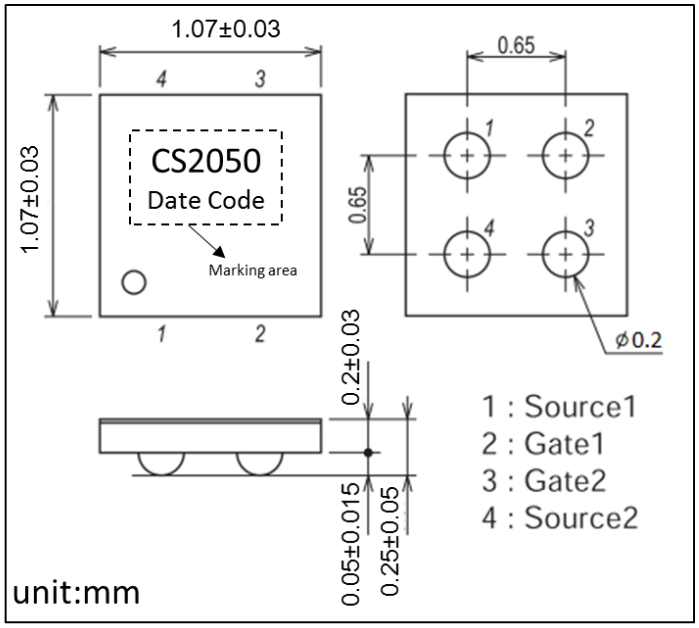
## Features

★ 2.5V Drive
★ Common-drain type
★ ESD Protection

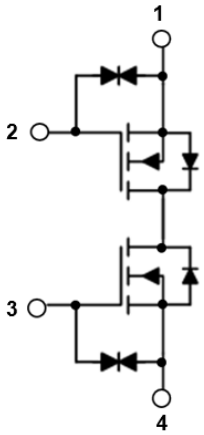
## Product Summary

| $V_{SSS}$ | $R_{SS(ON)}$ Max | $I_S$ Max |
|---|---|---|
| 20V | 36.0mΩ@ 4.5V | 6A |
| | 38.0mΩ@ 4.0V | |
| | 48.0mΩ@ 3.1V | |
| | 55.0mΩ@ 2.5V | |

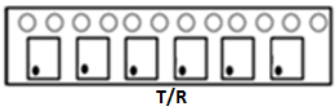
## WLCSP Package Dimensions




## Electrical Connection




## Taping Type: T/R




## Absolute Maximum Ratings ($T_A$=25℃)

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{SSS}$ | Source to Source Voltage | 20 | V |
| $V_{GSS}$ | Gate to Source Voltage | ±12 | V |
| $I_S$ | Continuous Source Current[1] | 6 | A |
| $I_{SP}$ | Pulsed Source Current[2] | 60 | A |
| $P_T$ | Total Power Dissipation[1] | 1.6 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |

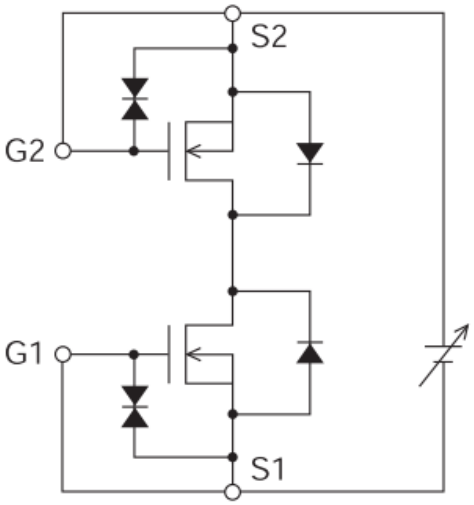
## Electrical Characteristics at $T_A$=25˚C

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{SSS}$ | Source-Source Breakdown Voltage | $V_{GS}$=0V , $I_S$=250uA | 20 | --- | --- | V |
| $R_{SS(ON)}$ | Static Source-Source On-State Resistance | $V_{GS}$=4.5V , $I_S$=1.5A | 23 | 32 | 36 | mΩ |
| | | $V_{GS}$=4.0V , $I_S$=1.5A | 25 | 33 | 38 | |
| | | $V_{GS}$=3.7V , $I_S$=1.5A | 26 | 34 | 41 | |
| | | $V_{GS}$=3.1V , $I_S$=1.5A | 27 | 36 | 48 | |
| | | $V_{GS}$=2.5V , $I_S$=1.5A | 31 | 42 | 55 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{SS}$=$V_{GS}$ , $I_S$ =250uA | 0.5 | 0.65 | 1.2 | V |
| $I_{SSS}$ | Zero Gate Voltage Source Current | $V_{SS}$=20V , $V_{GS}$=0V | --- | --- | 1 | uA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±8V , $V_{SS}$=0V | --- | --- | ±10 | uA |
| Gfs | Forward Transconductance | $V_{SS}$=10V , $I_D$=3.0A | --- | 5.2 | --- | S |
| $Q_g$ | Total Gate Charge[3] | $V_{SS}$=15V , $V_{GS}$=4.5V , $I_S$=6A | --- | 10.4 | --- | nC |
| $T_{d(on)}$ | Turn-On Delay Time[3] | $V_{DD}$=10V , $V_{GS}$=4.5V , $R_G$=3.3Ω , $I_S$=3A | --- | 3.2 | --- | ns |
| $T_r$ | Rise Time[3] | | --- | 9.8 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time[3] | | --- | 31 | --- | |
| $T_f$ | Fall Time[3] | | --- | 3.6 | --- | |
| $V_{FSS}$ | Forward Source-Source Voltage | $V_{GS}$=0V , $I_S$=1.5A | --- | 0.72 | 1.1 | V |

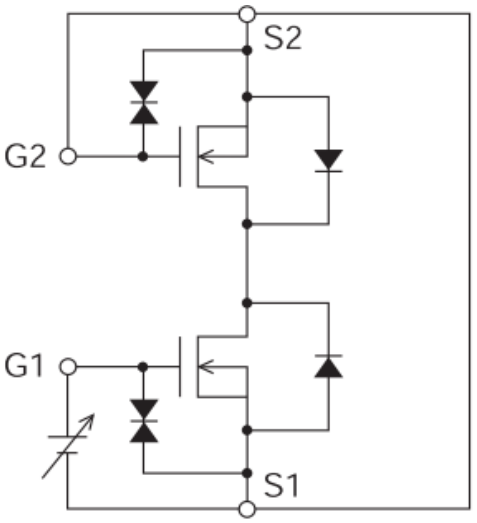
Note :
1.The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 10us , duty cycle ≦ 1%
3.Guaranteed by design, not subject to production testing.

## Test circuits are example of measuring FET1 sides

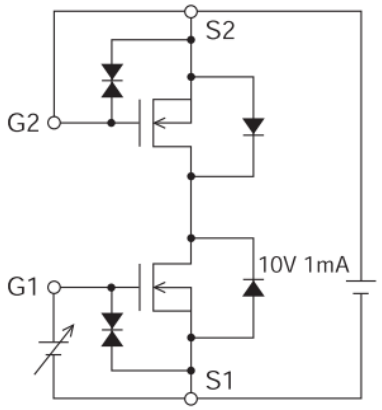
### Test Circuit 1 $V_{SSS}$ / $I_{SSS}$



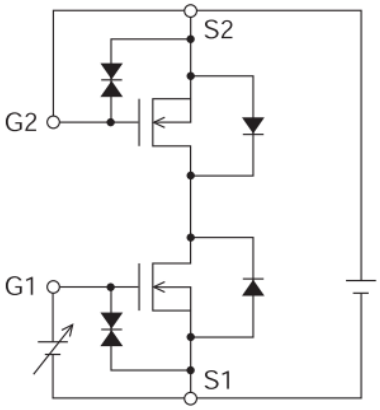

### Test Circuit 2 $I_{GSS}$(+) / (-)



## Test Circuit 3 $V_{GS(off)}$

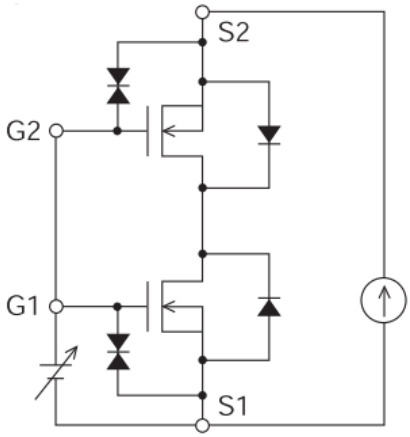



## Test Circuit 4 Gfs

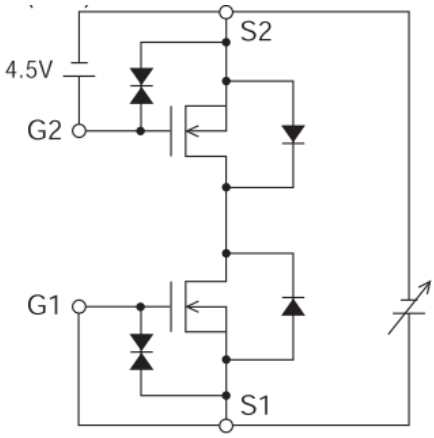



* Note: Connect the mesurement terminal reversely if you want to measure the FET2 side.

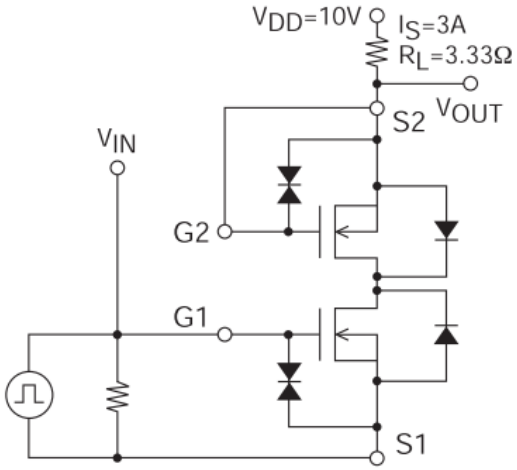
## Test Circuit 5 $R_{SS(ON)}$



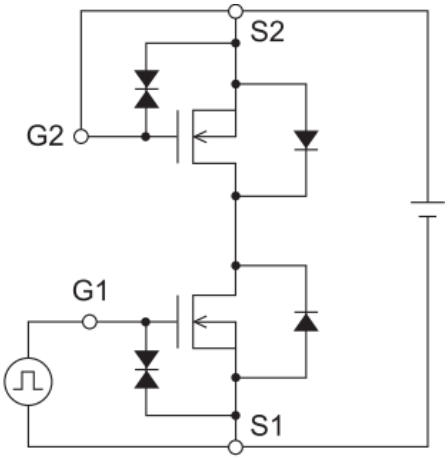

## Test Circuit 6 $V_{F(S-S)}$




## Test Circuit 7 Td(on), Tr, Td(off), Tf




## Test Circuit 8 Qg




* Note: Connect the mesurement terminal reversely if you want to measure the FET2 side.

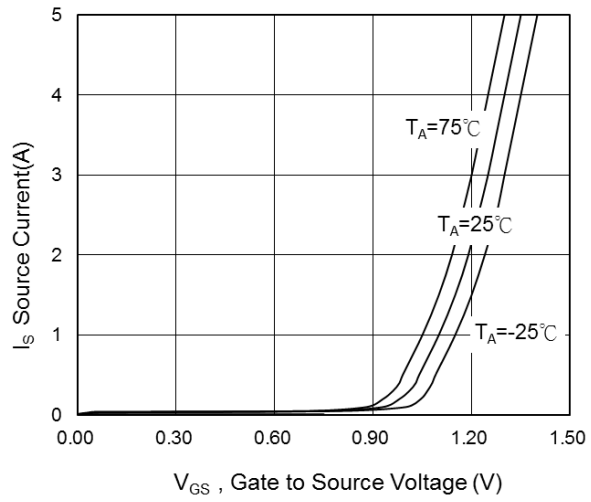



**Fig.1 $I_S$ - $V_{GS}$**

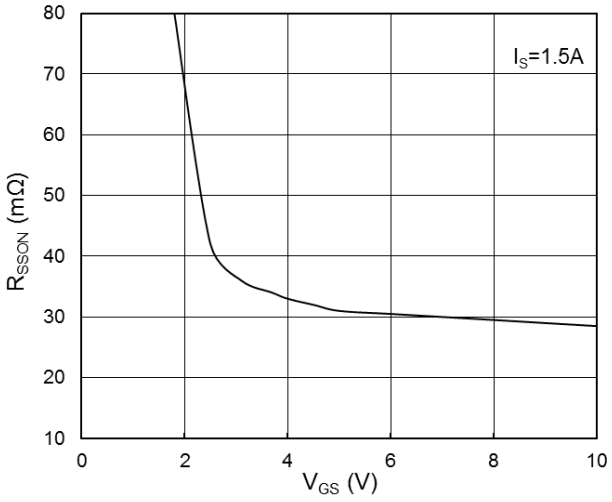



**Fig.2 $R_{SS(ON)}$ - $V_{GS}$**

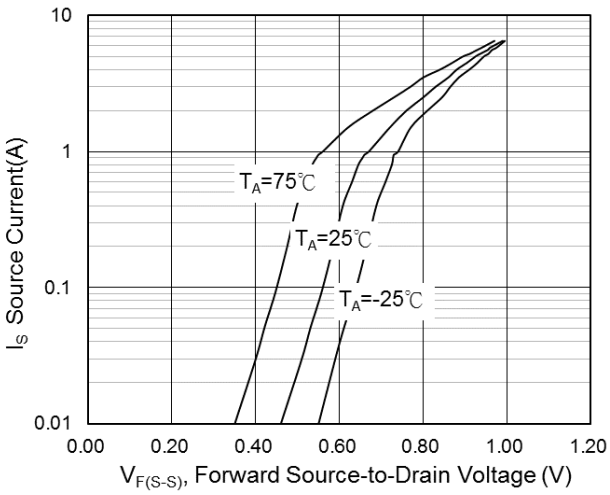



**Fig.3 $I_S$ – $V_{F(S-S)}$**

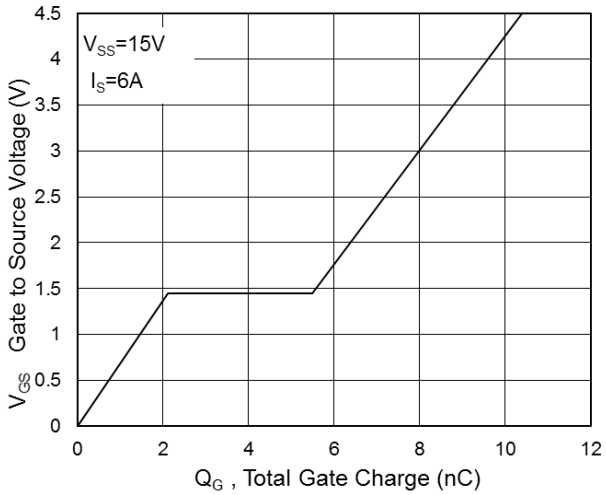



**Fig.4 $V_{GS}$ - Qg**

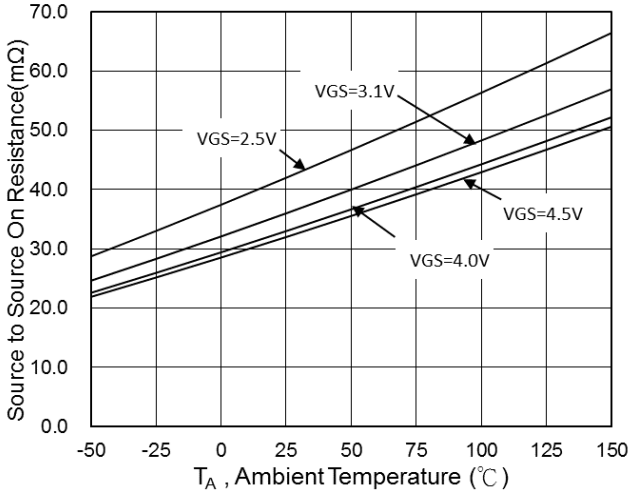



**Fig.5 $R_{SS(ON)}$ - $T_A$**

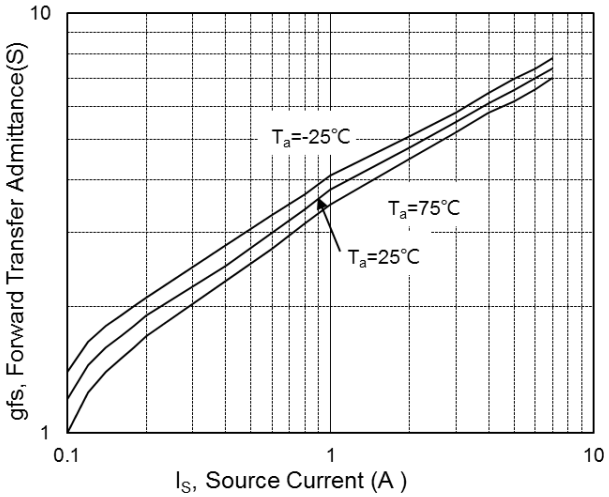



**Fig.6 gfs vs $I_S$**

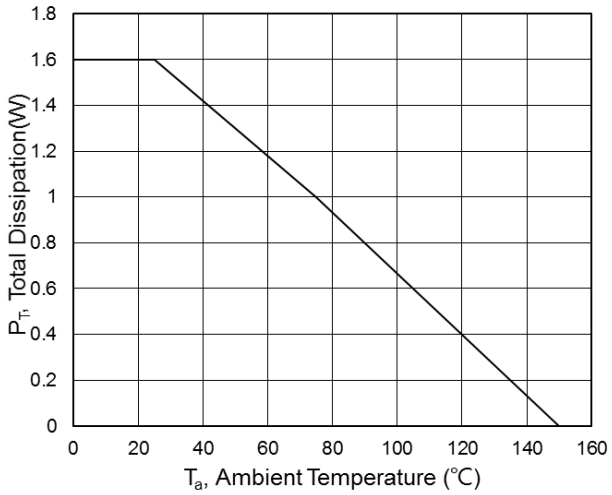



**Fig.7 $P_T$ – $T_A$**

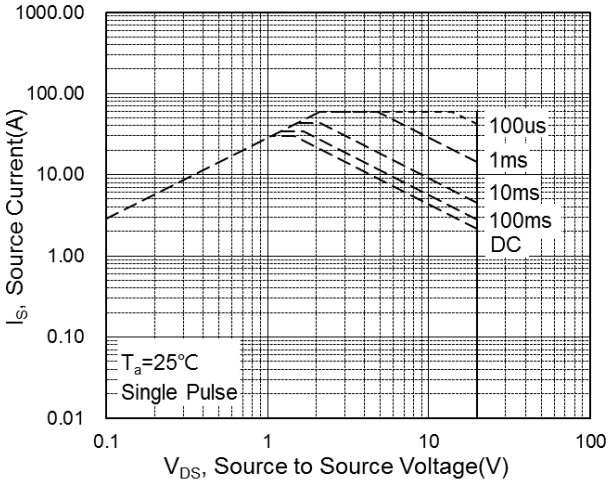



**Fig.8 Safe Operating Area**