

10V Drive Nch MOSFET

R5016ANX

●Structure

Silicon N-channel MOSFET

●Features

- 1) Low on-resistance.
- 2) Fast switching speed.
- 3) Wide SOA (safe operating area).
- 4) Gate-source voltage (V_{GS}) guaranteed to be $\pm 30V$.
- 5) Drive circuits can be simple.
- 6) Parallel use is easy.

●Applications

Switching

●Packaging specifications

| | | |
|----------|------------------------------|------|
| | Package | Bulk |
| | Code | - |
| Type | Basic ordering unit (pieces) | 500 |
| R5016ANX | | ○ |

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

| Parameter | Symbol | Limits | Unit | |
|--|-------------|-------------|------------|---|
| Drain-source voltage | V_{DS} | 500 | V | |
| Gate-source voltage | V_{GS} | ± 30 | V | |
| Drain current | Continuous | I_D *3 | ± 16 | A |
| | Pulsed | I_{DP} *1 | ± 64 | A |
| Source current (Body Diode) | Continuous | I_S *3 | 16 | A |
| | Pulsed | I_{SP} *1 | 64 | A |
| Avalanche Current | I_{AS} *2 | 8 | A | |
| Avalanche Energy | E_{AS} *2 | 18 | mJ | |
| Total power dissipation ($T_c=25^\circ C$) | P_D | 50 | W | |
| Channel temperature | T_{ch} | 150 | $^\circ C$ | |
| Range of storage temperature | T_{stg} | -55 to +150 | $^\circ C$ | |

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

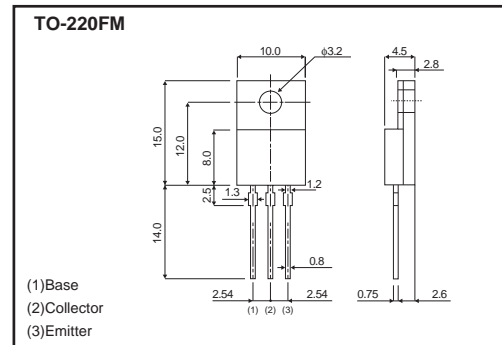
*2 $L = 500 \mu H$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting, $T_{ch} = 25^\circ C$

*3 Limited only by maximum temperature allowed

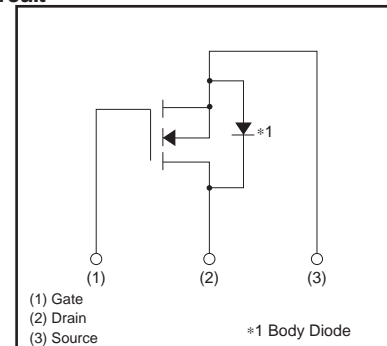
●Thermal resistance

| Parameter | Symbol | Limits | Unit |
|-----------------|----------------|--------|--------------|
| Channel to case | $R_{th(ch-c)}$ | 2.5 | $^\circ C/W$ |

●Dimensions (Unit : mm)



●Inner circuit



Transistors

●Electrical characteristics (Ta=25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|-----------------------|------|------|------|------|---|
| Gate-source leakage | I _{GSS} | – | – | ±100 | nA | V _{GS} =±30V, V _{DS} =0V |
| Drain-source breakdown voltage | V _{(BR)DSS} | 500 | – | – | V | I _D =1mA, V _{GS} =0V |
| Zero gate voltage drain current | I _{DSS} | – | – | 100 | μA | V _{DS} =500V, V _{GS} =0V |
| Gate threshold voltage | V _{GS(th)} | 2.5 | – | 4.5 | V | V _{DS} =10V, I _D =1mA |
| Static drain-source on-state resistance | R _{DS(on)} * | – | 0.21 | 0.27 | Ω | I _D =8A, V _{GS} =10V |
| Forward transfer admittance | Y _{fs} * | 6.0 | – | – | S | I _D =8A, V _{DS} =10V |
| Input capacitance | C _{iss} | – | 1800 | – | pF | V _{DS} =25V |
| Output capacitance | C _{oss} | – | 750 | – | pF | V _{GS} =0V |
| Reverse transfer capacitance | C _{rss} | – | 55 | – | pF | f=1MHz |
| Turn-on delay time | t _{d(on)} * | – | 40 | – | ns | I _D =8A, V _{DD} ≒250V |
| Rise time | t _r * | – | 50 | – | ns | V _{GS} =10V |
| Turn-off delay time | t _{d(off)} * | – | 150 | – | ns | R _L =31.3Ω |
| Fall time | t _f * | – | 55 | – | ns | R _G =10Ω |
| Total gate charge | Q _g * | – | 50 | – | nC | V _{DD} ≒250V |
| Gate-source charge | Q _{gs} * | – | 9.5 | – | nC | I _D =16A |
| Gate-drain charge | Q _{gd} * | – | 21 | – | nC | V _{GS} =10V R _L =15.6Ω / R _G =10Ω |

* Pulsed

●Body diode characteristics (Source-drain) (Ta=25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|-----------------|-------------------|------|------|------|------|---|
| Forward voltage | V _{SD} * | – | – | 1.5 | V | I _S = 16A, V _{GS} =0V |

* Pulsed

Transistors

●Electrical characteristics curves

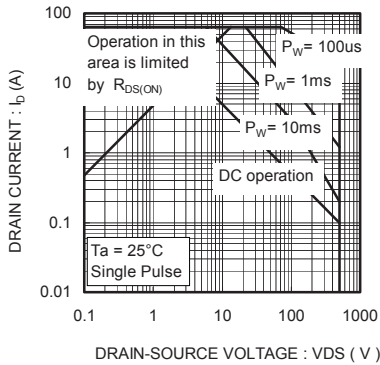


Fig.1 Maximum Safe Operating Area

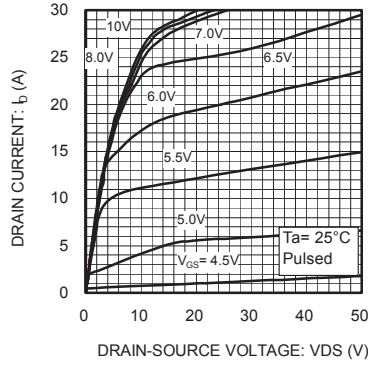


Fig.2 Typical Output Characteristics (I)

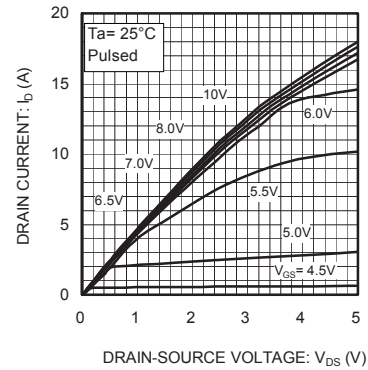


Fig.3 Typical Output Characteristics (II)

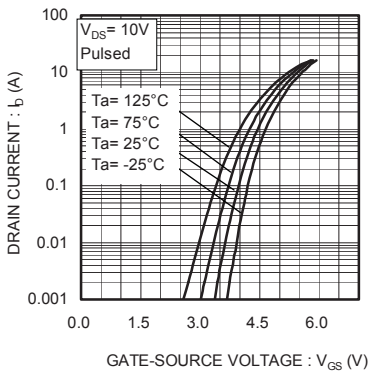


Fig.4 Typical Transfer Characteristics

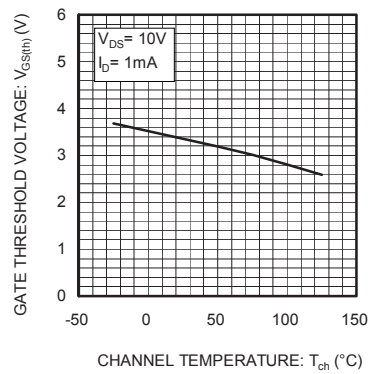


Fig.5 Gate Threshold Voltage vs. Channel Temperature

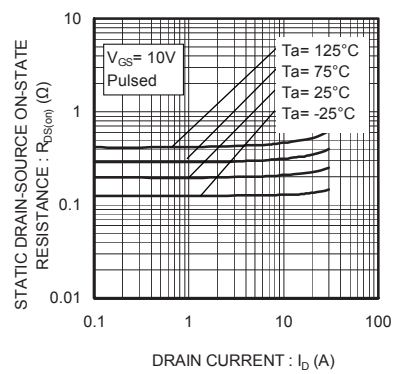


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

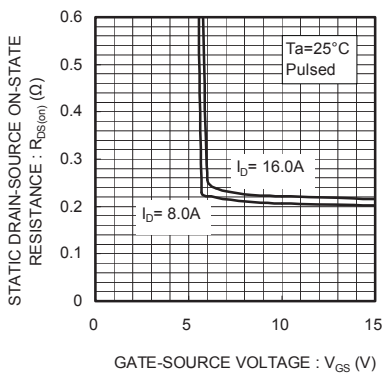


Fig.7 Static Drain-Source On-State Resistance vs. Gate Source

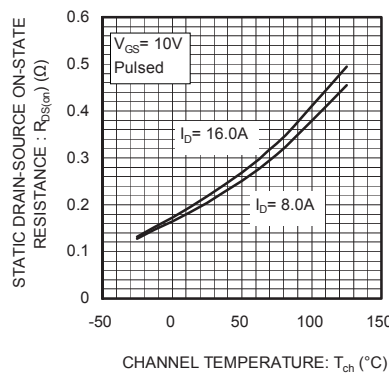


Fig.8 Static Drain-Source On-State Resistance vs. Channel

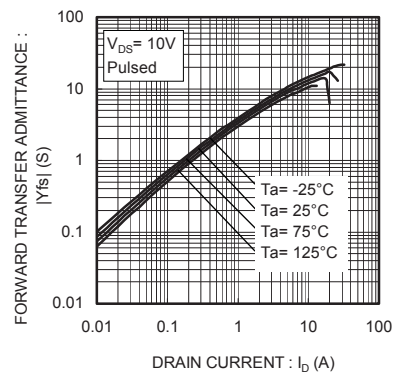


Fig.9 Forward Transfer Admittance vs. Drain Current

Transistors

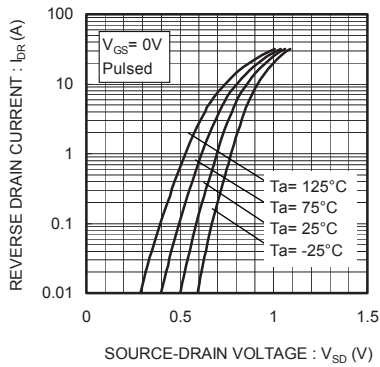


Fig.10 Reverse Drain Current vs. Source-Drain Voltage

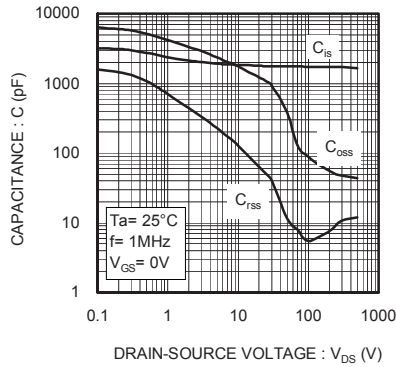


Fig.11 Typical Capacitance vs. Drain-Source Voltage

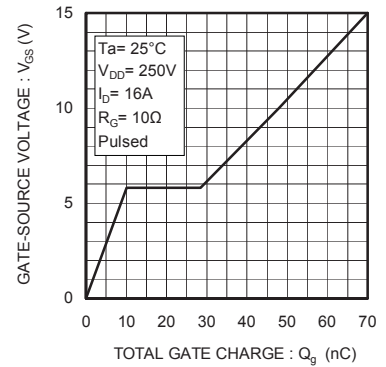


Fig.12 Dynamic Input Characteristics

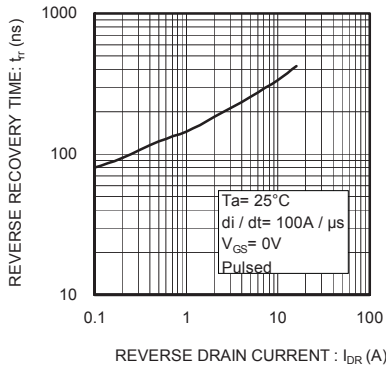


Fig.13 Reverse Recovery Time vs. Reverse Drain Current

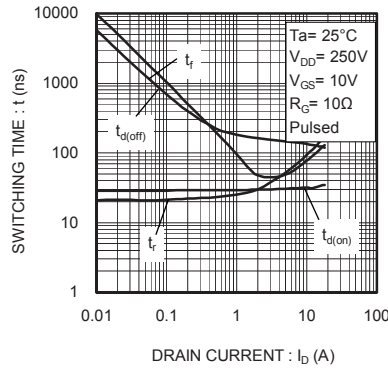


Fig.14 Switching Characteristics

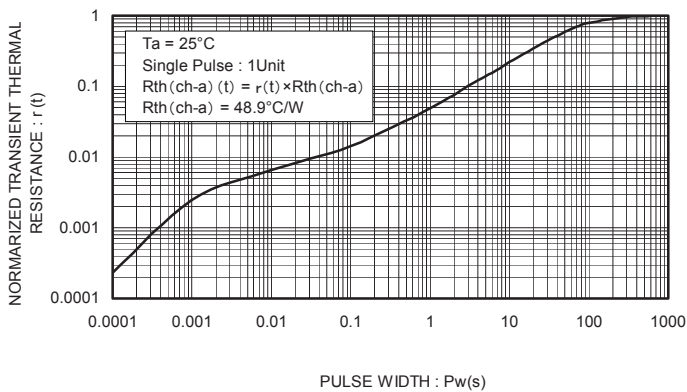


Fig.15 Normalized Transient Thermal Resistance vs. Pulse Width

Transistors

●Switching characteristics measurement circuit

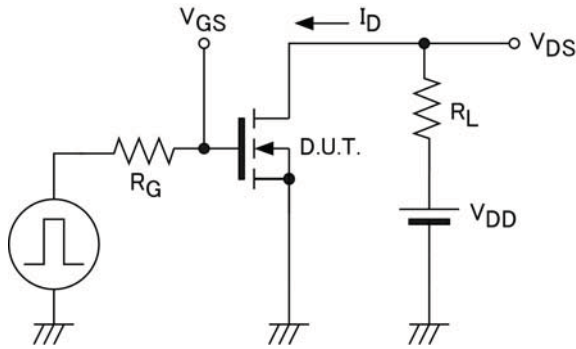


Fig.1 Switching time measurement circuit

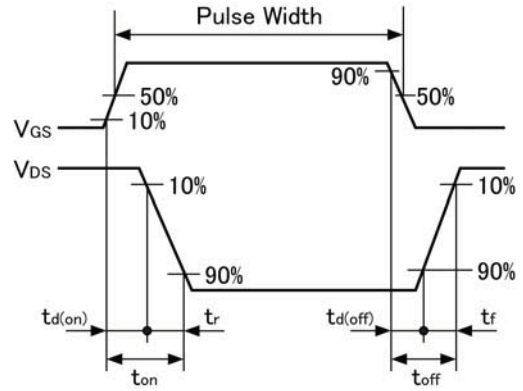


Fig.2 Switching waveforms

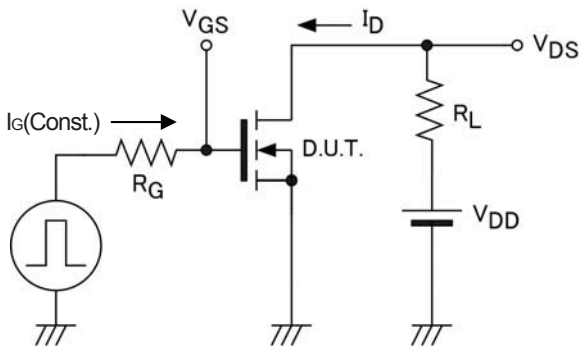


Fig.3 Gate charge measurement circuit

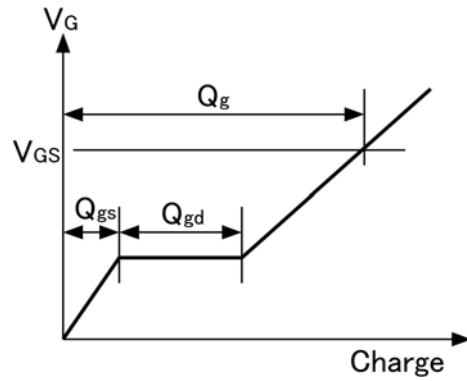


Fig.4 Gate charge waveform

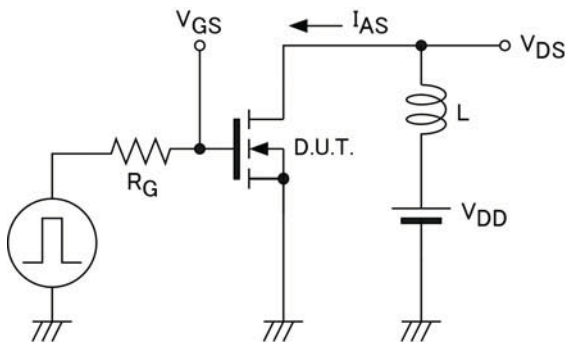


Fig.5 Avalanche measurement circuit

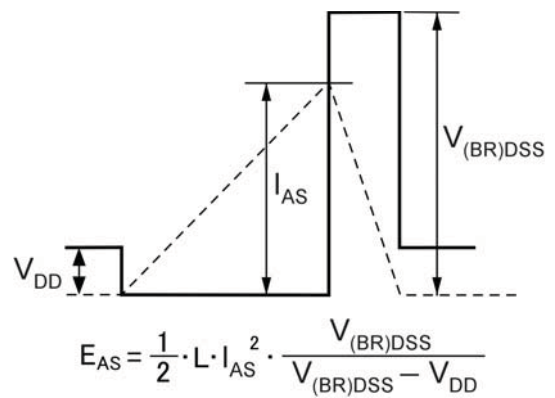


Fig.6 Avalanche waveform

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