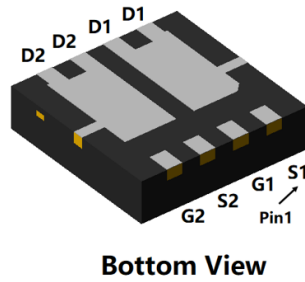
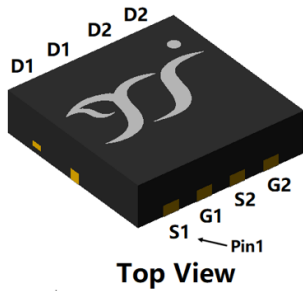
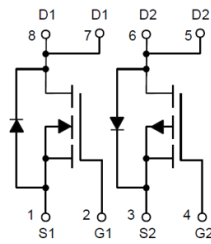


N-Channel and P-Channel Complementary MOSFET



DFN3333-8L



Product Summary

NMOS

- V_{DS} 30V
- I_D 20A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<20m\Omega$
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) $<30m\Omega$

PMOS

- V_{DS} -30V
- I_D -20A
- $R_{DS(ON)}$ (at $V_{GS}=-10V$) $<18m\Omega$
- $R_{DS(ON)}$ (at $V_{GS}=-4.5V$) $<25m\Omega$
- 100% EAS Tested

General Description

- Trench Power LV MOSFET technology
- Excellent package for heat dissipation
- Moisture Sensitivity Level 3
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply

■ Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

| Parameter | | Symbol | NMOS | PMOS | Unit |
|--|-------------------|----------------|----------|----------|------------|
| Drain-source Voltage | | V_{DS} | 30 | -30 | V |
| Gate-source Voltage | | V_{GS} | ± 20 | ± 20 | V |
| Drain Current | $T_A=25^\circ C$ | I_D | 6.5 | 7.5 | A |
| | $T_A=100^\circ C$ | | 4 | 4.7 | |
| | $T_C=25^\circ C$ | | 20 | -20 | |
| | $T_C=100^\circ C$ | | 12 | -12 | |
| Pulsed Drain Current ^A | | I_{DM} | 60 | -80 | A |
| Avalanche energy ^B | | EAS | 25 | 81 | mJ |
| Total Power Dissipation ^C | $T_A=25^\circ C$ | P_D | 2 | 2 | W |
| | $T_A=100^\circ C$ | | 0.8 | 0.8 | |
| | $T_C=25^\circ C$ | | 27 | 22 | |
| | $T_C=100^\circ C$ | | 11 | 9 | |
| Junction and Storage Temperature Range | | T_J, T_{STG} | -55~+150 | -55~+150 | $^\circ C$ |

■ Thermal resistance

| Parameter | | Symbol | NMOS | | PMOS | | Units |
|---|--------------|-----------------|------|------|------|------|--------------|
| | | | Typ | Max | Typ | Max | |
| Thermal Resistance Junction-to-Ambient ^D | Steady-State | $R_{\theta JA}$ | 50 | 62.5 | 50 | 62.5 | $^\circ C/W$ |
| Thermal Resistance Junction-to-Case | Steady-State | $R_{\theta JC}$ | 3.5 | 4.5 | 4.5 | 5.5 | |

■ Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|----------|----------------------|-------------------------|----------------------------|---------------|
| YJQ20NP03A | F1 | Q20NP03A | 5000 | 10000 | 100000 | 13" reel |



YJQ20NP03A

■ NMOS Electrical Characteristics (T_J=25°C unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---------------------------------------|---------------------|---|-----|------|------|-------|
| Static Parameter | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =250μA | 30 | - | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =30V, V _{GS} =0V | - | - | 1 | μA |
| | | V _{DS} =30V, V _{GS} =0V, T _J =150°C | - | - | 100 | |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} = ±20V, V _{DS} =0V | - | - | ±100 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D =250μA | 1.0 | 1.5 | 2.5 | V |
| Static Drain-Source On-Resistance | R _{DS(on)} | V _{GS} =10V, I _D =20A | - | 14 | 20 | mΩ |
| | | V _{GS} =4.5V, I _D =10A | - | 22 | 30 | |
| Diode Forward Voltage | V _{SD} | I _S =20A, V _{GS} =0V | - | 0.85 | 1.2 | V |
| Gate resistance | R _G | f=1MHz | - | 2 | - | Ω |
| Maximum Body-Diode Continuous Current | I _S | | - | - | 20 | A |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =15V, V _{GS} =0V, f=1MHz | - | 380 | - | pF |
| Output Capacitance | C _{oss} | | - | 75 | - | |
| Reverse Transfer Capacitance | C _{rss} | | - | 60 | - | |
| Switching Parameters | | | | | | |
| Total Gate Charge | Q _g | V _{GS} =10V, V _{DS} =15V, I _D =10A | - | 12.5 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 2.8 | - | |
| Gate-Drain Charge | Q _{gd} | | - | 2.5 | - | |
| Reverse Recovery Charge | Q _{rr} | I _F =10A, di/dt=350A/us | - | 1.7 | - | nC |
| Reverse Recovery Time | t _{rr} | | - | 18 | - | ns |
| Turn-on Delay Time | t _{D(on)} | V _{GS} =10V, V _{DD} =15V, I _D =10A R _{GEN} =3Ω | - | 5 | - | ns |
| Turn-on Rise Time | t _r | | - | 31 | - | |
| Turn-off Delay Time | t _{D(off)} | | - | 15 | - | |
| Turn-off fall Time | t _f | | - | 23 | - | |



YJQ20NP03A

■ PMOS Electrical Characteristics (T_J=25°C unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---------------------------------------|---------------------|--|------|-------|------|-------|
| Static Parameter | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} = 0V, I _D =-250μA | -30 | - | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =-30V, V _{GS} =0V | - | - | -1 | μA |
| | | V _{DS} =-30V, V _{GS} =0V, T _J =150°C | - | - | -100 | |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} = ±20V, V _{DS} =0V | - | - | ±100 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D =-250μA | -1.0 | -1.5 | -2.5 | V |
| Static Drain-Source On-Resistance | R _{DS(on)} | V _{GS} =-10V, I _D =-20A | - | 13.5 | 18 | mΩ |
| | | V _{GS} =-4.5V, I _D =-10A | - | 19 | 25 | |
| Diode Forward Voltage | V _{SD} | I _S =-20A, V _{GS} =0V | - | -0.85 | -1.2 | V |
| Gate resistance | R _G | f=1MHz | - | 15 | - | Ω |
| Maximum Body-Diode Continuous Current | I _S | | - | - | -20 | A |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =-15V, V _{GS} =0V, f=1MHz | - | 1220 | - | pF |
| Output Capacitance | C _{oss} | | - | 170 | - | |
| Reverse Transfer Capacitance | C _{rss} | | - | 160 | - | |
| Switching Parameters | | | | | | |
| Total Gate Charge | Q _g | V _{GS} =-10V, V _{DS} =-15V, I _D =-10A | - | 24 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 2 | - | |
| Gate-Drain Charge | Q _{gd} | | - | 6 | - | |
| Reverse Recovery Charge | Q _{rr} | I _F =-10A, di/dt=100A/us | - | 11 | - | nC |
| Reverse Recovery Time | t _{rr} | | - | 35 | - | ns |
| Turn-on Delay Time | t _{D(on)} | V _{GS} =-10V, V _{DD} =-15V, I _D =-10A R _{GEN} =2.5Ω | - | 11 | - | ns |
| Turn-on Rise Time | t _r | | - | 4 | - | |
| Turn-off Delay Time | t _{D(off)} | | - | 70 | - | |
| Turn-off fall Time | t _f | | - | 50 | - | |

A. Repetitive rating; pulse width limited by max. junction temperature.

B. NMOS: T_J=25°C, V_{DD}=30V, V_{GS}=10V, R_G=25Ω, L=2mH, I_{AS}=5A.

PMOS: T_J=25°C, V_{DD}=-30V, V_{GS}=-10V, R_G=25Ω, L=2mH, I_{AS}=-9A.

C. P_d is based on max. junction temperature, using junction-case thermal resistance.

D. The value of R_{θJA} is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in the still air environment with T_A =25°C.

The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.



YJQ20NP03A

■ NMOS Typical Electrical and Thermal Characteristics Diagrams

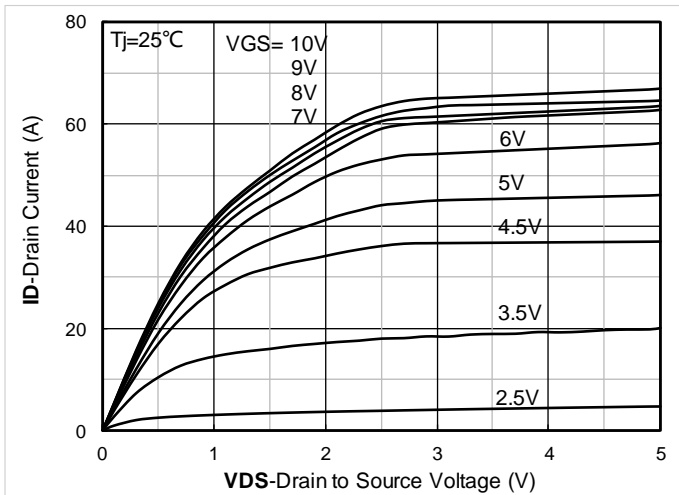


Figure 1. Output Characteristics

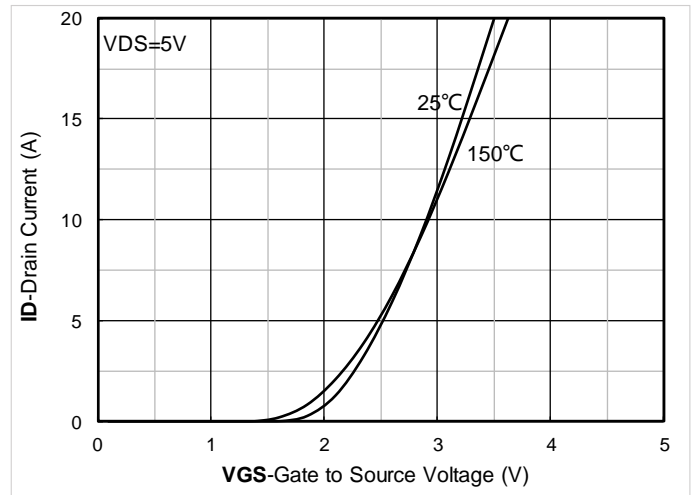


Figure 2. Transfer Characteristics

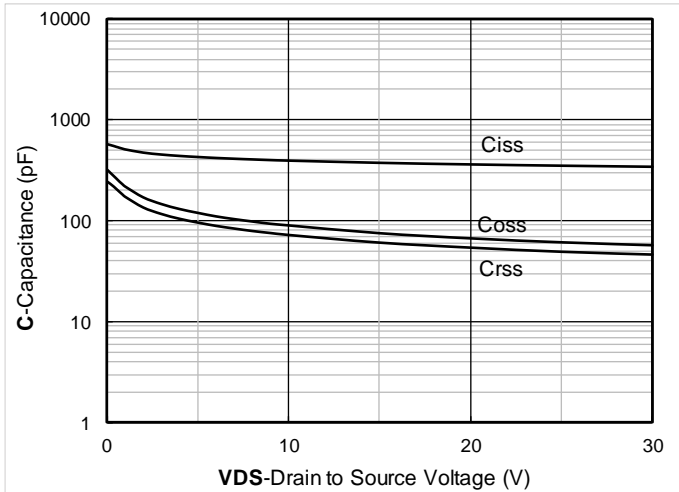


Figure 3. Capacitance Characteristics

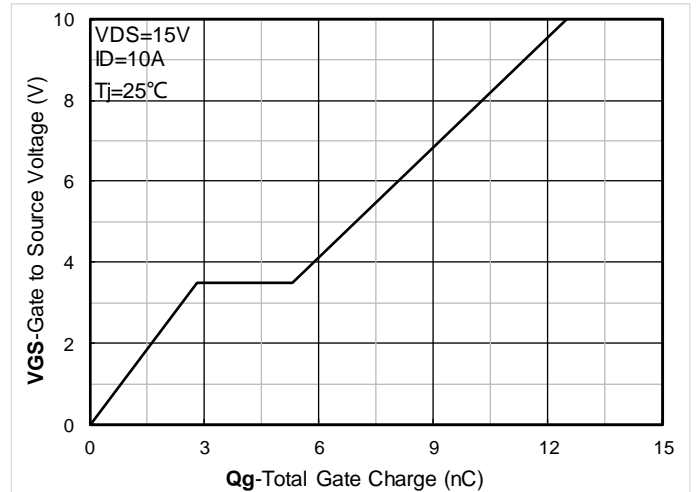


Figure 4. Gate Charge

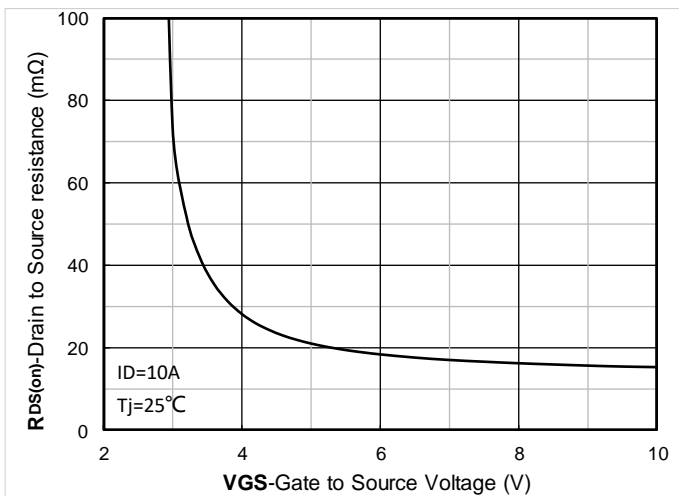


Figure 5. On-Resistance vs Gate to Source Voltage

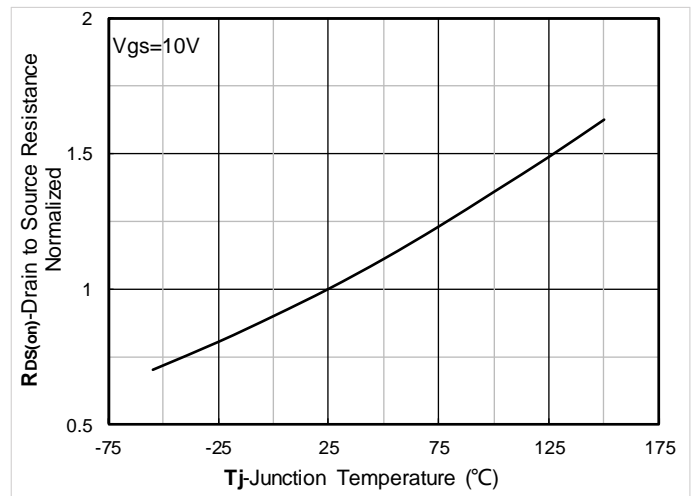


Figure 6. Normalized On- Resistance



YJQ20NP03A

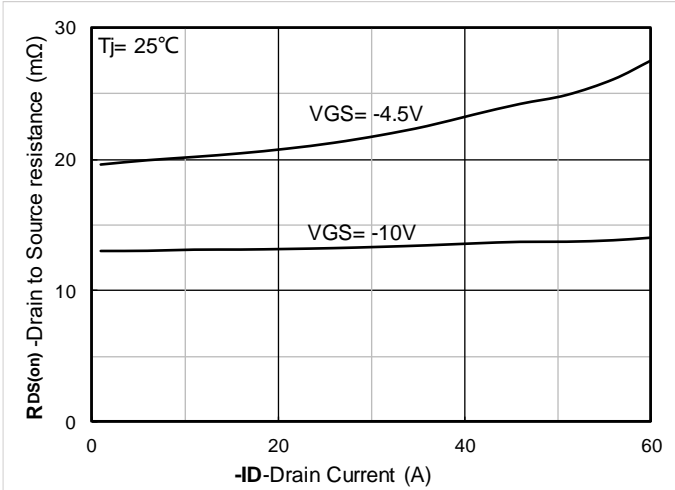


Figure 7. RDS(on) VS Drain Current

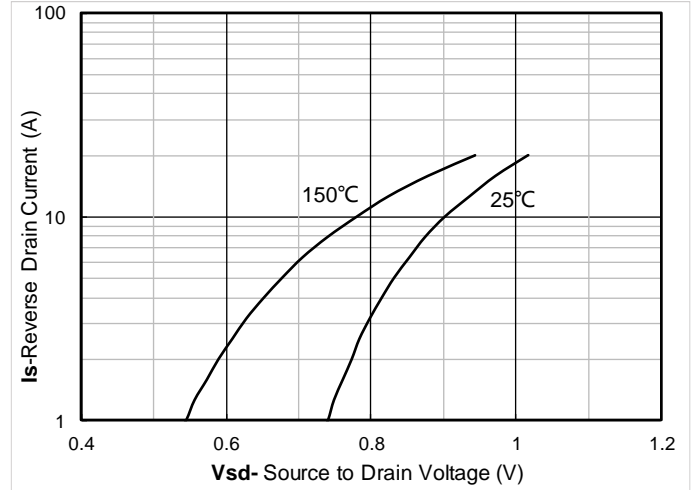


Figure 8. Forward characteristics of reverse diode

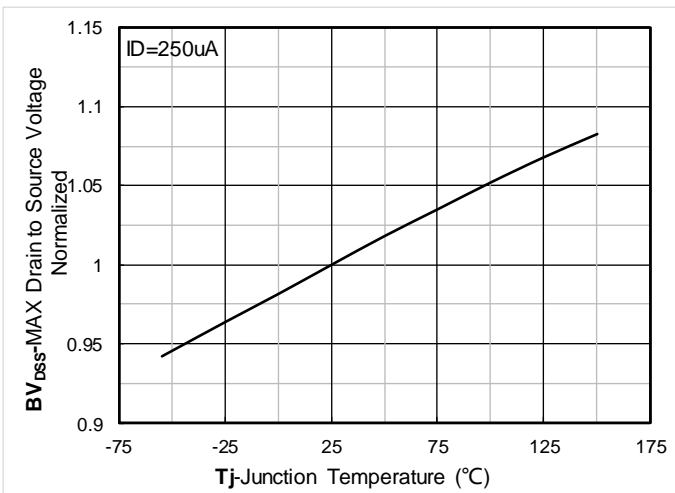


Figure 9. Normalized breakdown voltage

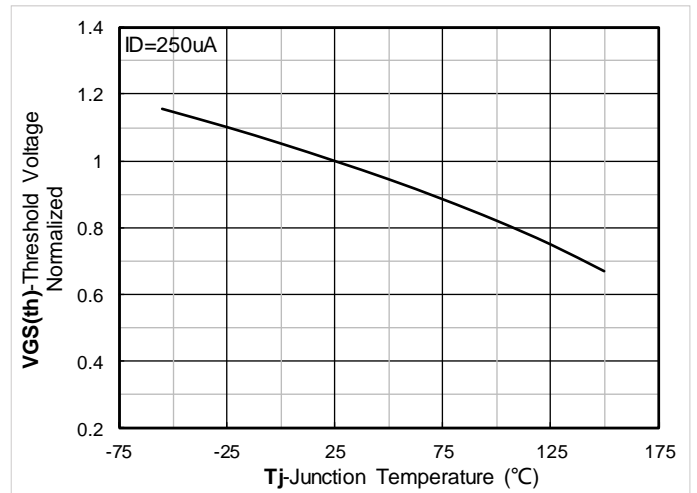


Figure 10. Normalized Threshold voltage

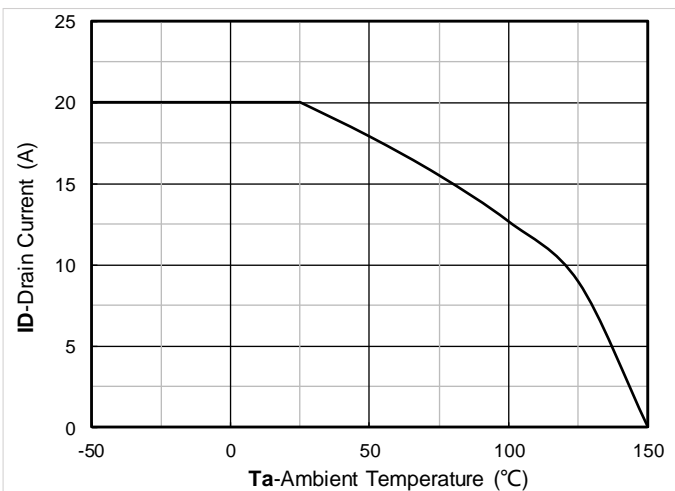


Figure 11. Current dissipation

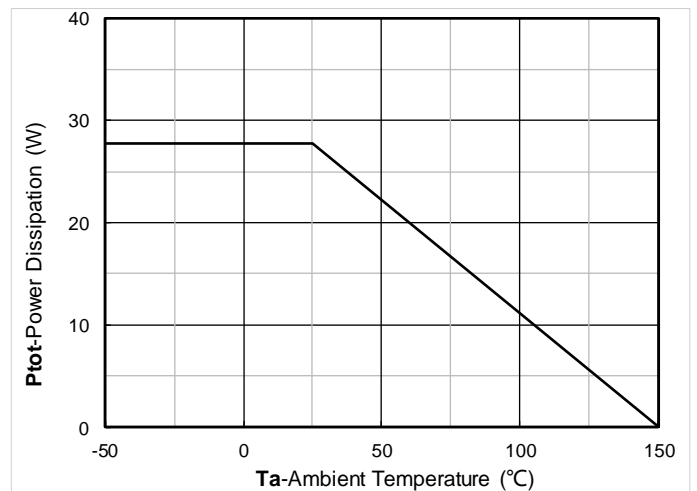


Figure 12. Power dissipation



YJQ20NP03A

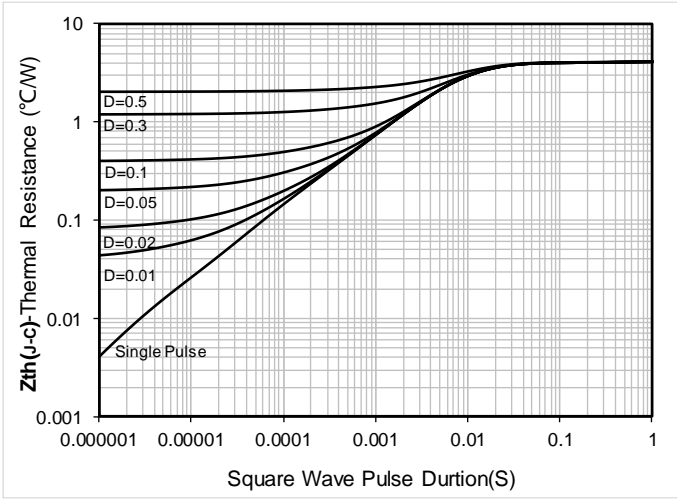


Figure 13. Maximum Transient Thermal Impedance

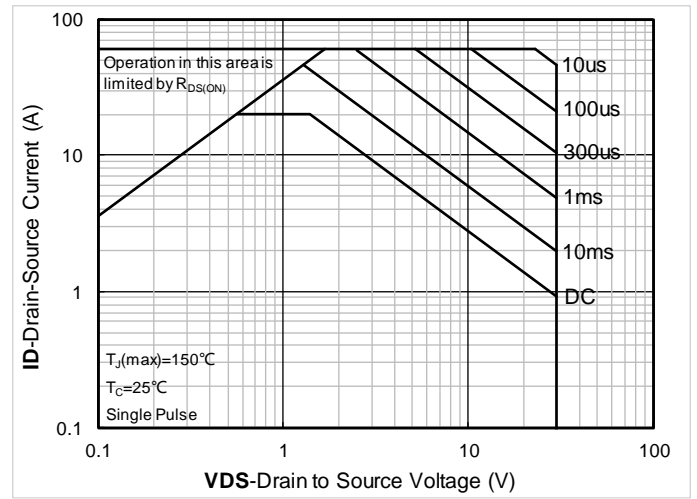


Figure 14. Safe Operation Area

PMOS Typical Electrical and Thermal Characteristics Diagrams

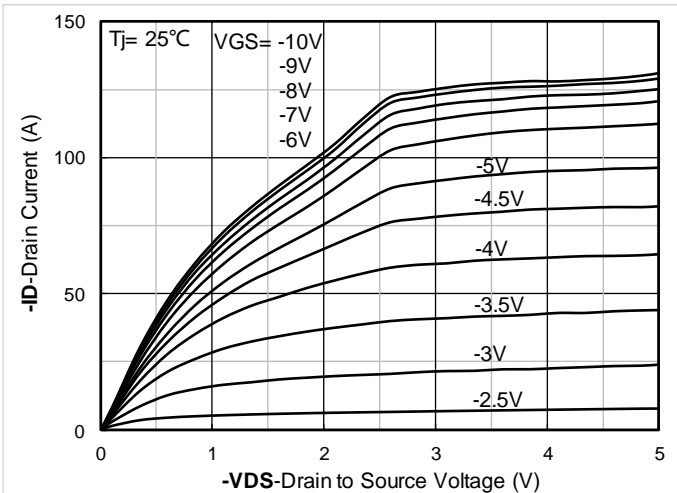


Figure 1. Output Characteristics

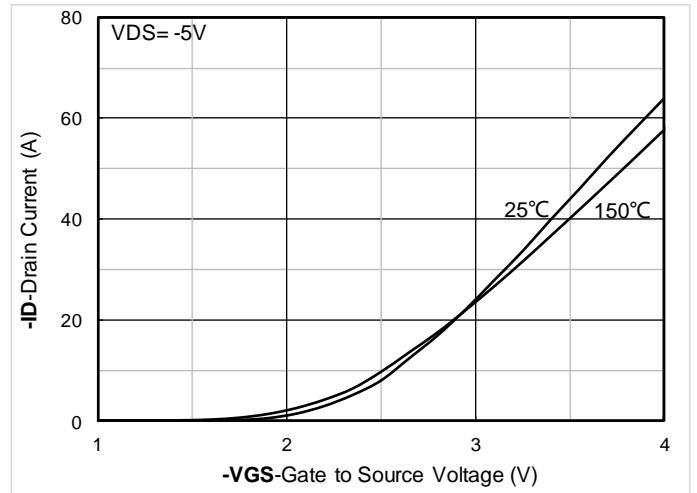


Figure 2. Transfer Characteristics

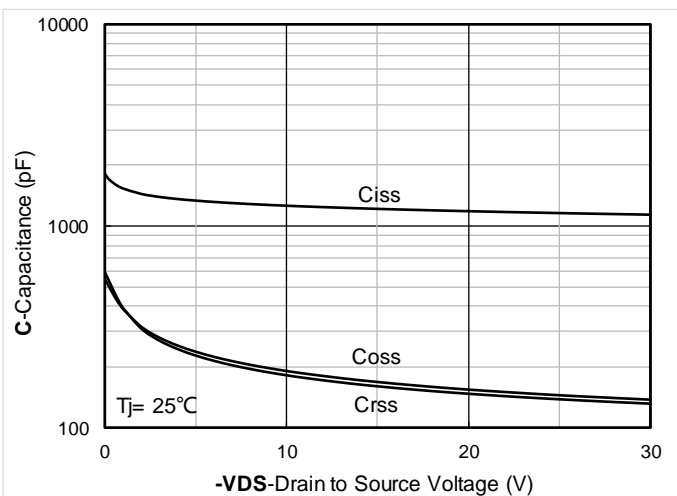


Figure 3. Capacitance Characteristics

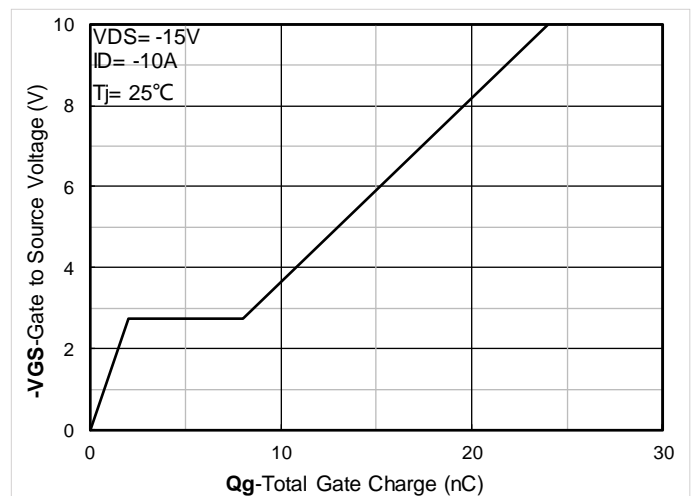


Figure 4. Gate Charge



YJQ20NP03A

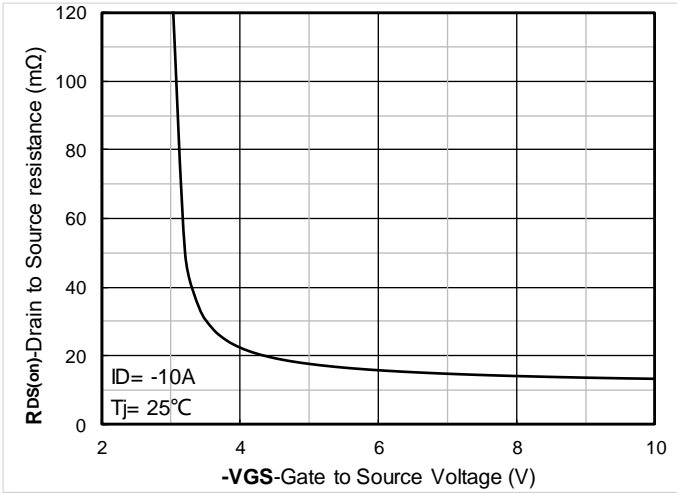


Figure 5. On-Resistance vs Gate to Source Voltage

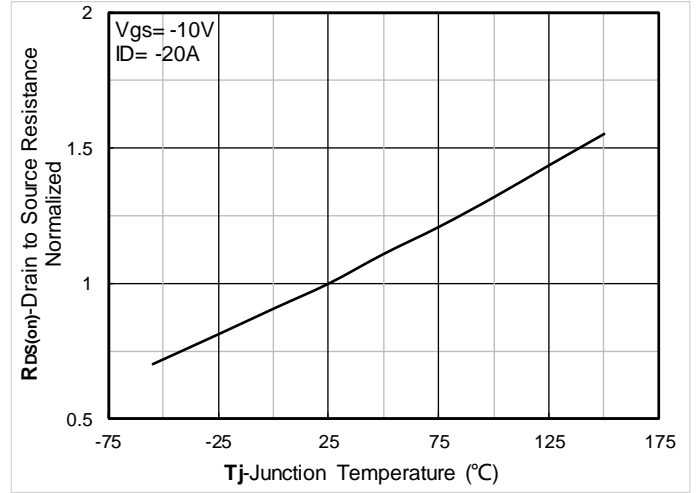


Figure 6. Normalized On-Resistance

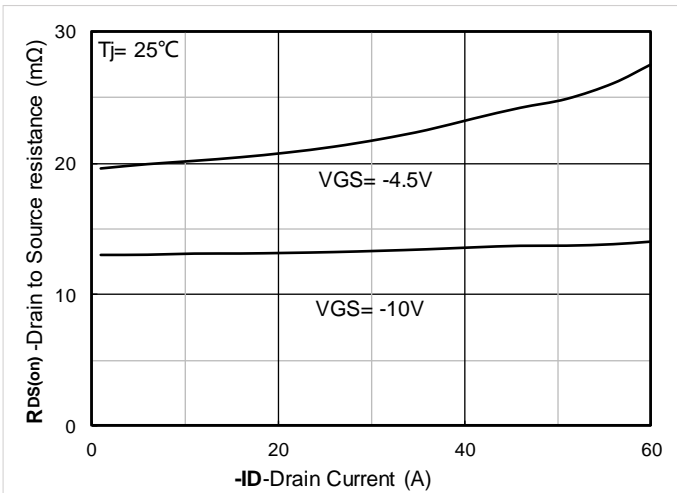


Figure 7. RDS(on) VS Drain Current

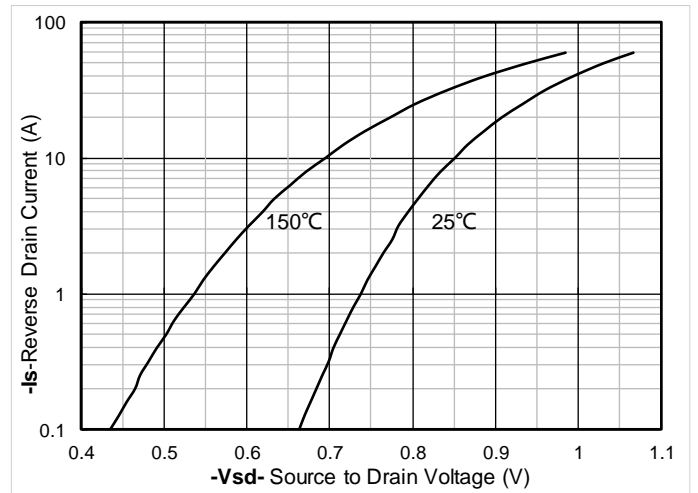


Figure 8. Forward characteristics of reverse diode

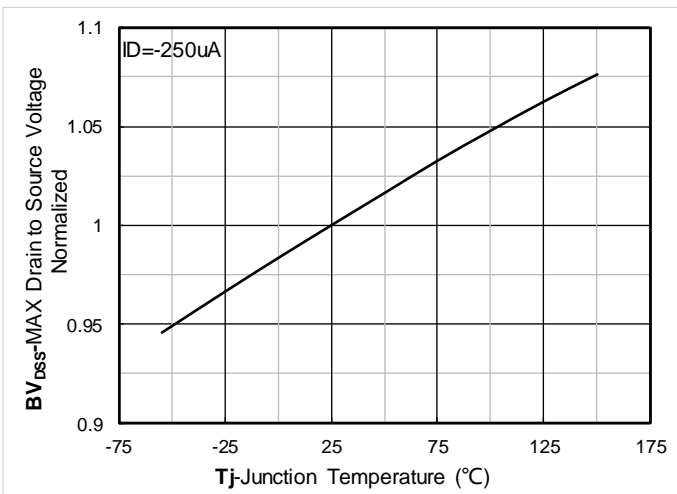


Figure 9. Normalized breakdown voltage

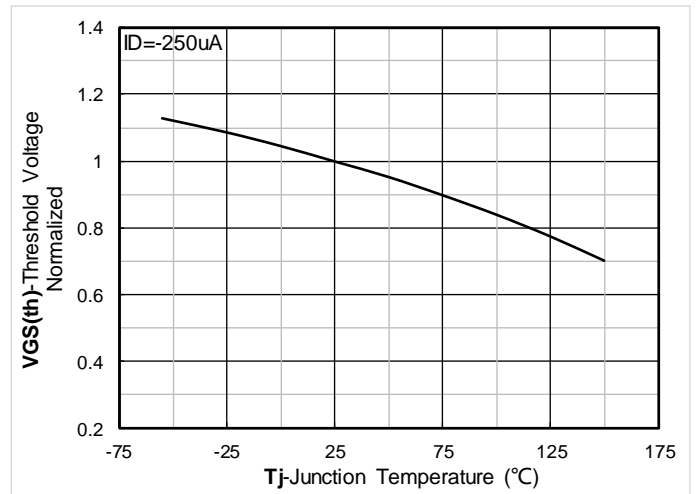


Figure 10. Normalized Threshold voltage



YJQ20NP03A

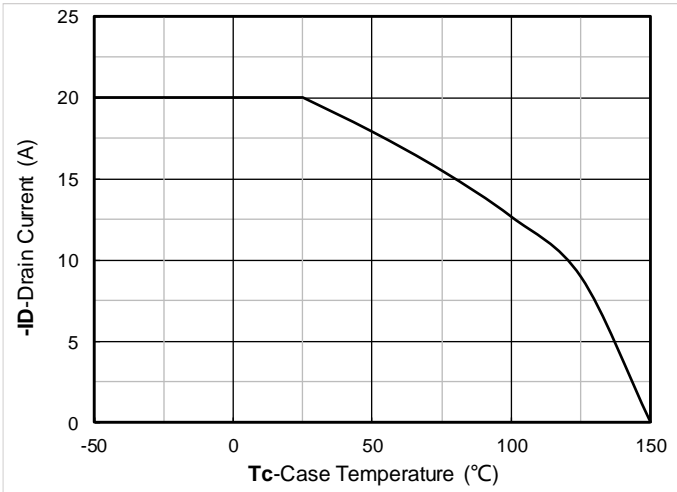


Figure 11. Current dissipation

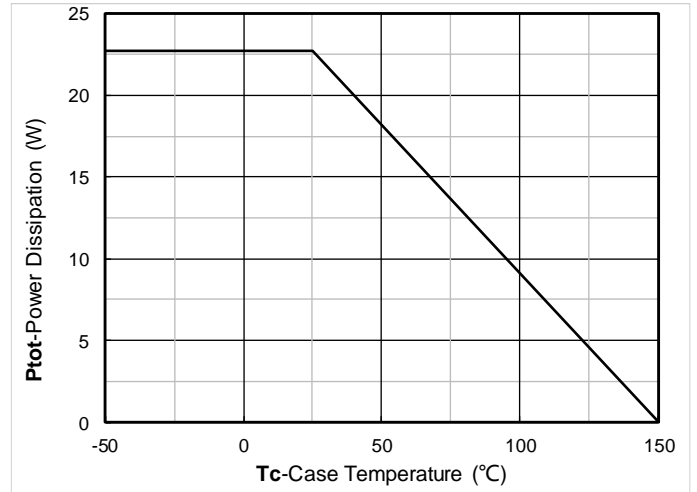


Figure 12. Power dissipation

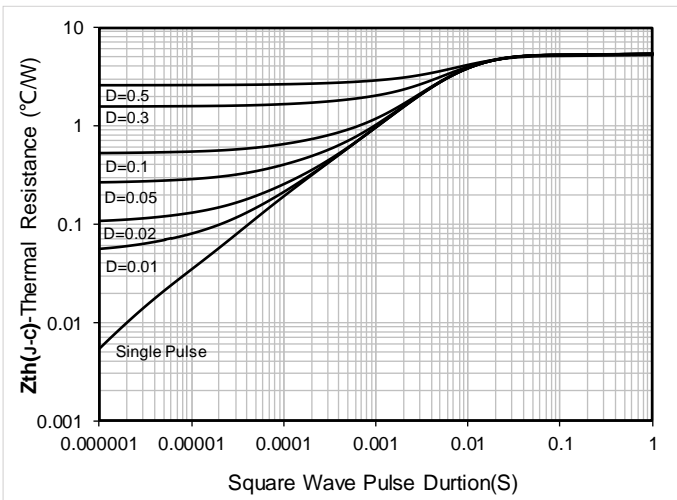


Figure 13. Maximum Transient Thermal Impedance

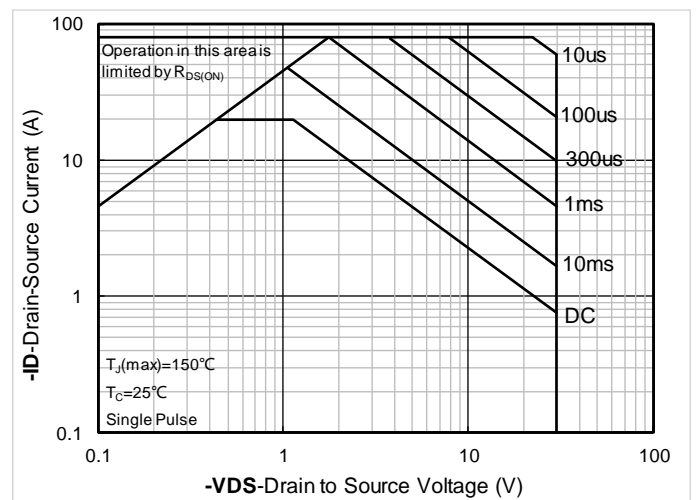
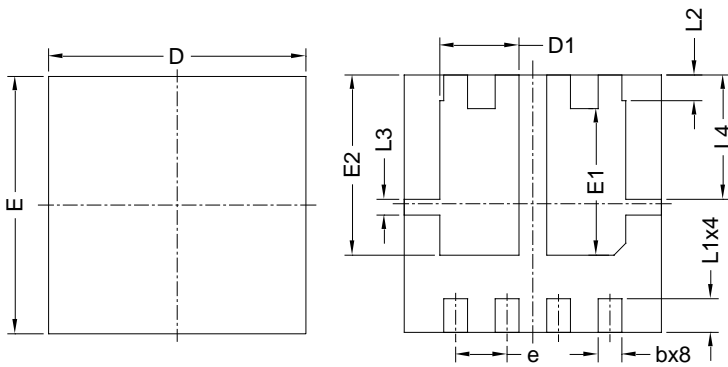


Figure 14. Safe Operation Area



YJQ20NP03A

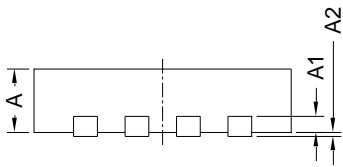
DFN3333-8L-B-0.8MM Package information



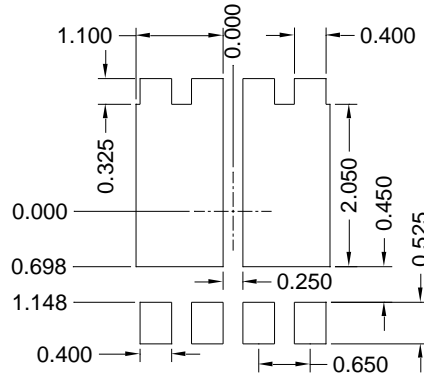
Top View
正面视图

Bottom View
背面视图

| SYMBOL | MILLIMETER | | |
|--------|------------|-------|-------|
| | MIN | NOM | MAX |
| D | 3.15 | 3.25 | 3.35 |
| E | 3.15 | 3.25 | 3.35 |
| A | 0.70 | 0.80 | 0.90 |
| A1 | 0.20 BSC | | |
| A2 | | | 0.10 |
| D1 | 0.90 | 1.00 | 1.10 |
| E1 | 1.75 | 1.85 | 1.95 |
| E2 | 2.175 | 2.275 | 2.375 |
| L1 | 0.325 | 0.425 | 0.525 |
| L2 | 0.325 BSC | | |
| L3 | 0.200 BSC | | |
| L4 | 1.570 BSC | | |
| b | 0.20 | 0.30 | 0.40 |
| e | 0.65 BSC | | |



Side View
侧面视图



Suggested Solder Pad Layout
Top View

Note:

1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.10 mm.
3. The pad layout is for reference purposes only.



YJQ20NP03A

Disclaimer

The information presented in this document is for reference only. Yangzhou Yangjie Electronic Technology Co., Ltd. reserves the right to make changes without notice for the specification of the products displayed herein to improve reliability, function or design or otherwise.

The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), Yangjie or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale.

This publication supersedes & replaces all information previously supplied. For additional information, please visit our website <http://www.21yangjie.com> , or consult your nearest Yangjie's sales office for further assistance.