

MOSFET Silicon N-Channel MOS



1. Applications

Single-ended flyback or two-transistor forward topologies.
PC power, PD Adaptor, LCD & PDP TV and LED lighting.

2. Features

Low drain-source on-resistance: $R_{DS(ON)} = 240m\Omega$ (typ.)
Easy to control Gate switching
Enhancement mode: $V_{th} = 2.8$ to 4.2 V

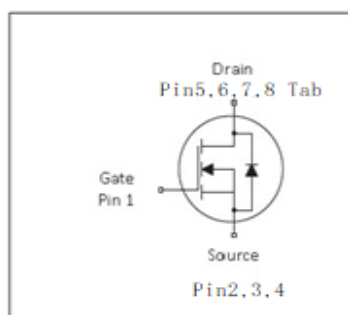
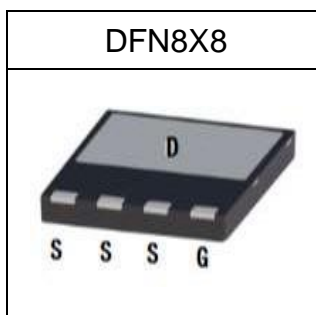
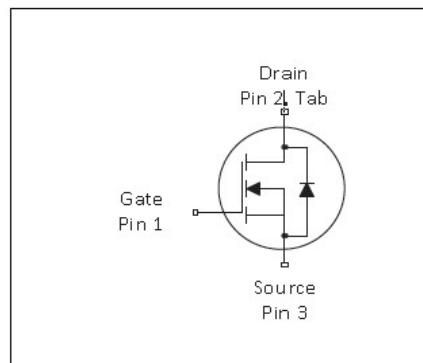
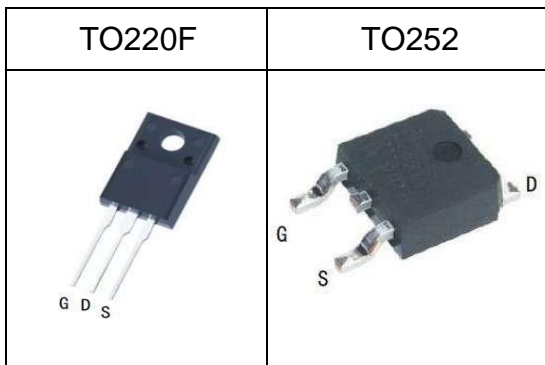


Table 1 Key Performance Parameters

| Parameter | Value | Unit |
|----------------------|-------|------------|
| $V_{DS} @ T_{j,max}$ | 700 | V |
| $R_{DS(on),max}$ | 280 | m Ω |
| $Q_{g,typ}$ | 19.4 | nC |
| $I_{D,pulse}$ | 45 | A |
| Body diode dv/dt | 50 | V/ns |

3. Packaging and Internal Circuit

| Part Name | Package | Marking |
|------------|---------|------------|
| ASA65R280E | TO220F | ASA65R280E |
| ASD65R280E | TO252 | ASD65R280E |
| ASM65R280E | DFN8X8 | ASM65R280E |



Released

1 Maximum ratings

at $T_j = 25^\circ\text{C}$, unless otherwise specified

Table 2 Maximum ratings

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|--|---------------|--------|------|------|------------------|--|
| | | Min. | Typ. | Max. | | |
| Continuous drain current ¹⁾ | I_D | | - | 15 | A | $T_C=25^\circ\text{C}$ |
| Pulsed drain current ²⁾ | $I_{D,pulse}$ | - | - | 45 | A | $T_C=25^\circ\text{C}$ |
| Avalanche energy, single pulse | E_{AS} | - | - | 120 | mJ | $T_C=25^\circ\text{C}, V_{DD}=50\text{V}, I_{av}=4.9\text{A}, L=10\text{mH}, R_G=25\Omega$ |
| Avalanche current, single pulse | I_{AR} | - | - | 4.9 | A | $T_C=25^\circ\text{C}, V_{DD}=50\text{V}, L=10\text{mH}, R_G=25\Omega$ |
| MOSFET dv/dt ruggedness | dv/dt | - | - | 50 | V/ns | $V_{DS}=0\dots400\text{V}$ |
| Gate source voltage (static) | V_{GS} | -20 | - | 20 | V | static; |
| Gate source voltage (dynamic) | V_{GS} | -30 | - | 30 | V | AC ($f>1\text{ Hz}$) |
| Power dissipation (TO220F) | P_{tot} | - | - | 33 | W | $T_C=25^\circ\text{C}$ |
| Power dissipation (TO252&DFN8X8) | P_{tot} | - | - | 126 | W | $T_C=25^\circ\text{C}$ |
| Storage temperature | T_{stg} | -55 | - | 150 | $^\circ\text{C}$ | |
| Operating junction temperature | T_j | -55 | - | 150 | $^\circ\text{C}$ | |
| Soldering Temperature Distance of 1.6mm from case for 10s | T_L | | | 260 | $^\circ\text{C}$ | |
| Reverse diode dv/dt ³⁾ | dv/dt | - | - | 15 | V/ns | $V_{DS}=0\dots400\text{V}, I_{SD}\leq 58\text{A}, T_j=25^\circ\text{C}$ |

Released

¹⁾Limited by $T_{j,max}$. Maximum Duty Cycle $D = 0.50$

²⁾ Pulse width t_p limited by $T_{j,max}$

³⁾ Identical low side and high side switch with identical R_G

2 Thermal characteristics

Thermal characteristics (T0220F)

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|--|------------|--------|------|------|------|----------------------------------|
| | | Min. | Typ. | Max. | | |
| Thermal resistance, junction - case | R_{thJC} | - | - | 3.8 | °C/W | - |
| Thermal resistance, junction - ambient | R_{thJA} | - | - | 80 | °C/W | device on PCB, minimal footprint |

Thermal characteristics (T0252&DFN8X8)

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|--|------------|--------|------|------|------|----------------------------------|
| | | Min. | Typ. | Max. | | |
| Thermal resistance, junction - case | R_{thJC} | - | - | 0.99 | °C/W | - |
| Thermal resistance, junction - ambient | R_{thJA} | - | - | 62 | °C/W | device on PCB, minimal footprint |

Released

3 Electrical characteristics

at $T_j=25^{\circ}\text{C}$, unless otherwise specified

Table 4 Static characteristics

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|----------------------------------|---------------|--------|------|------|------------|--|
| | | Min. | Typ. | Max. | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 650 | - | - | V | $V_{GS}=0V, I_D=250\mu A$ |
| Gate threshold voltage | $V_{(GS)th}$ | 2.8 | 3.5 | 4.2 | V | $V_{DS}=V_{GS}, I_D=250\mu A$ |
| Zero gate voltage drain current | I_{DSS} | - | - | 1 | μA | $V_{DS}=650V, V_{GS}=0V, T_j=25^{\circ}\text{C}$ |
| Gate-source leakage current | I_{GSS} | - | - | 100 | nA | $V_{GS}=30V, V_{DS}=0V$ |
| Drain-source on-state resistance | $R_{DS(on)}$ | - | 240 | 280 | m Ω | $V_{GS}=10V, I_D=5.5A, T_j=25^{\circ}\text{C}$ |
| Gate resistance (Intrinsic) | R_G | - | 4.0 | - | Ω | $f=1\text{MHz}$, open drain |

Table 5 Dynamic characteristics

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|------------------------------|--------------|--------|-------|------|------|--|
| | | Min. | Typ. | Max. | | |
| Input capacitance | C_{iss} | - | 953.8 | - | pF | $V_{GS}=0V, V_{DS}=50V, f=1\text{MHz}$ |
| Output capacitance | C_{oss} | - | 40.67 | - | pF | $V_{GS}=0V, V_{DS}=50V, f=1\text{MHz}$ |
| Reverse transfer capacitance | C_{rss} | - | 1.21 | - | pF | $V_{GS}=0V, V_{DS}=50, f=1\text{MHz}$ |
| Turn-on delay time | $t_{d(on)}$ | - | 7.7 | - | ns | $V_{DD}=400V, V_{GS}=10V, I_D=8A, R_G=2\Omega$ |
| Rise time | t_r | - | 7.5 | - | ns | $V_{DD}=400V, V_{GS}=10V, I_D=8A, R_G=2\Omega$ |
| Turn-off delay time | $t_{d(off)}$ | - | 24.44 | - | ns | $V_{DD}=400V, V_{GS}=10V, I_D=8A, R_G=2\Omega$ |
| Fall time | t_f | - | 8.4 | - | ns | $V_{DD}=400V, V_{GS}=10V, I_D=8A, R_G=2\Omega$ |

Table 6 Gate charge characteristics

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-----------------------|---------------|--------|------|------|------|--|
| | | Min. | Typ. | Max. | | |
| Gate to source charge | Q_{gs} | - | 4.83 | - | nC | $V_{DD}=400V, I_D=8A, V_{GS}=0$ to 10V |
| Gate to drain charge | Q_{gd} | - | 7.08 | - | nC | $V_{DD}=400V, I_D=8A, V_{GS}=0$ to 10V |
| Gate charge total | Q_g | - | 19.4 | - | nC | $V_{DD}=400V, I_D=8A, V_{GS}=0$ to 10V |
| Gate plateau voltage | $V_{plateau}$ | - | 5.6 | - | V | $V_{DD}=400V, I_D=8A, V_{GS}=0$ to 10V |

Released

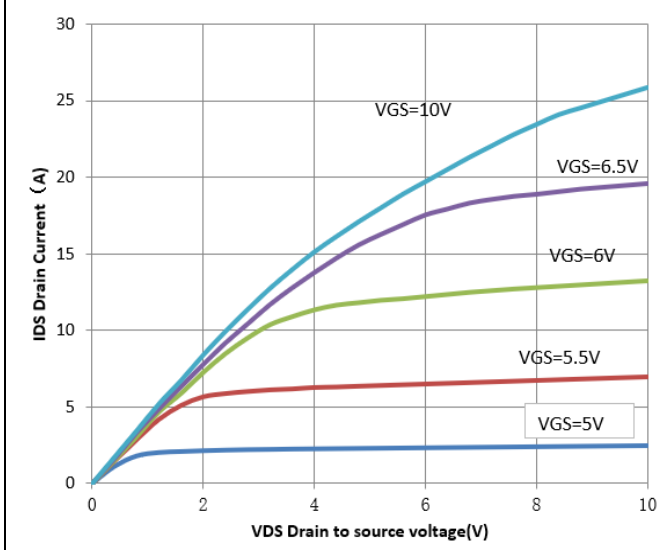
Table 7 Reverse diode characteristics

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-------------------------------|-----------|--------|-------|------|---------|--------------------------------------|
| | | Min. | Typ. | Max. | | |
| Diode forward voltage | V_{SD} | - | 0.73 | - | V | $V_{GS}=0V, I_F=1A, T_J=25^{\circ}C$ |
| Reverse recovery time | t_{rr} | - | 237.7 | - | ns | $V_R=400V, I_F=8A, di/dt=100A/\mu s$ |
| Reverse recovery charge | Q_{rr} | - | 2.604 | - | μC | $V_R=400V, I_F=8A, di/dt=100A/\mu s$ |
| Peak reverse recovery current | I_{rrm} | - | 23.32 | - | A | $V_R=400V, I_F=8A, di/dt=100A/\mu s$ |

Released

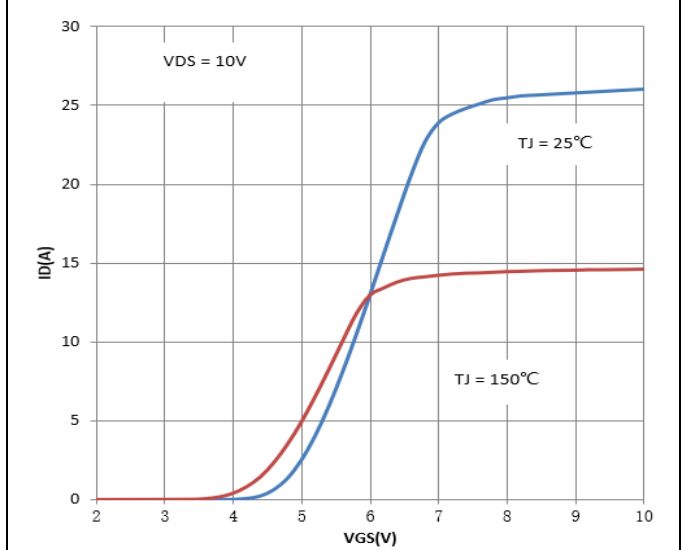
4 Electrical characteristics diagram

Diagram 1: Typ. Output characteristics



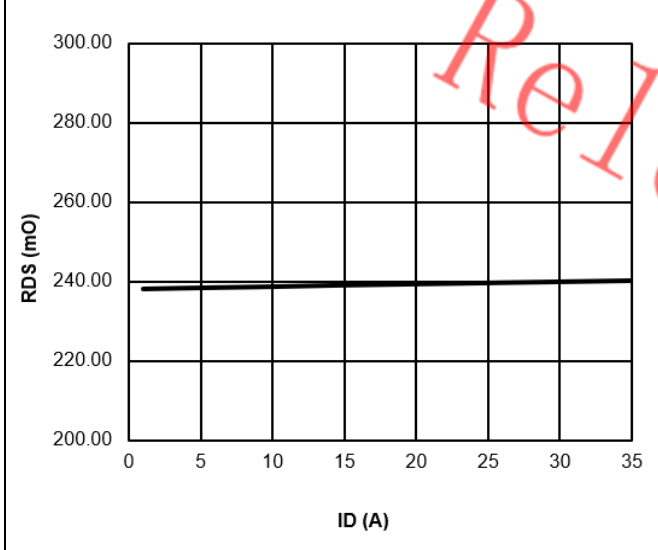
$I_D=f(V_{DS}); T_J=25^\circ\text{C};$ parameter: V_{GS}

Diagram 2: Typ. transfer characteristics



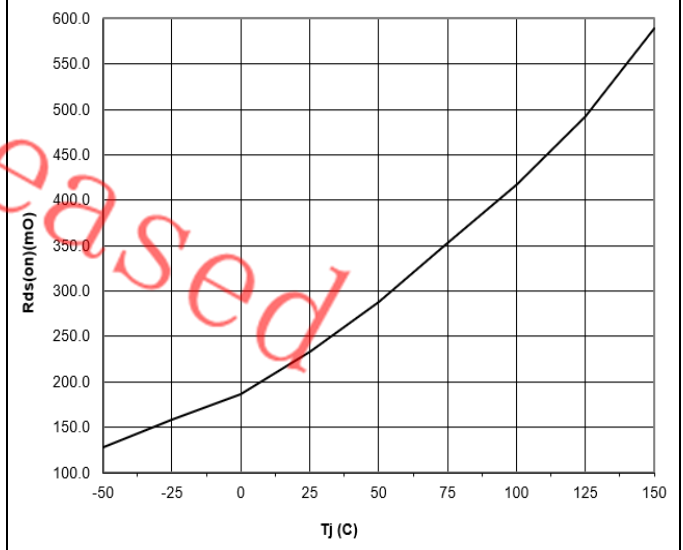
$I_D=f(V_{GS}); V_{DS}=10\text{V};$ parameter: T_J

Diagram 3: Typ. On-Resistance vs. ID



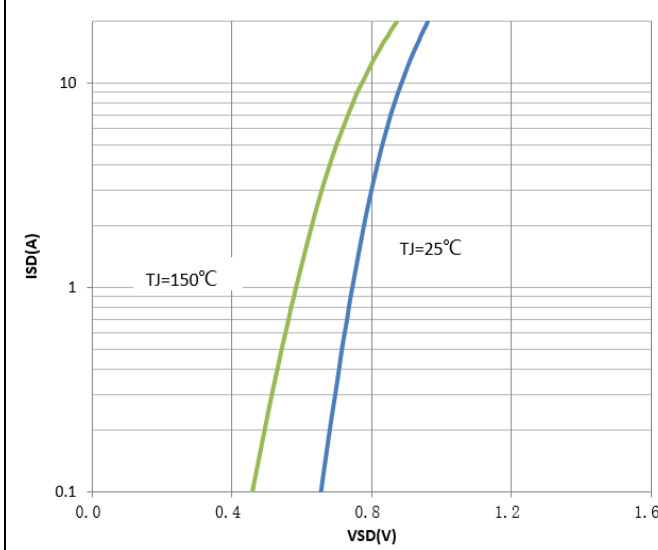
$R_{DS(on)}=f(I_D); T_J=25^\circ\text{C};$ parameter: $V_{GS}=10\text{V}$

Diagram 4: Typ. Rdson – Junction Temperature



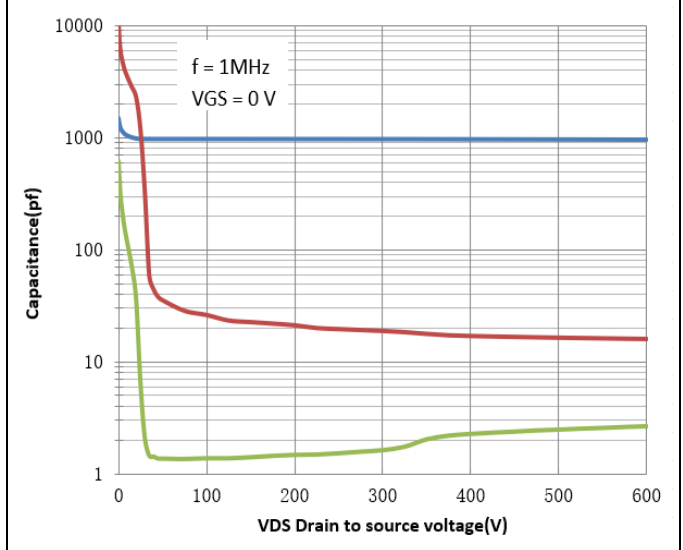
$R_{DS(on)}=f(T_J); V_{GS}=10\text{V}/I_D=5.5\text{A}$

Diagram 5: Typ. Body-Diode Characteristics



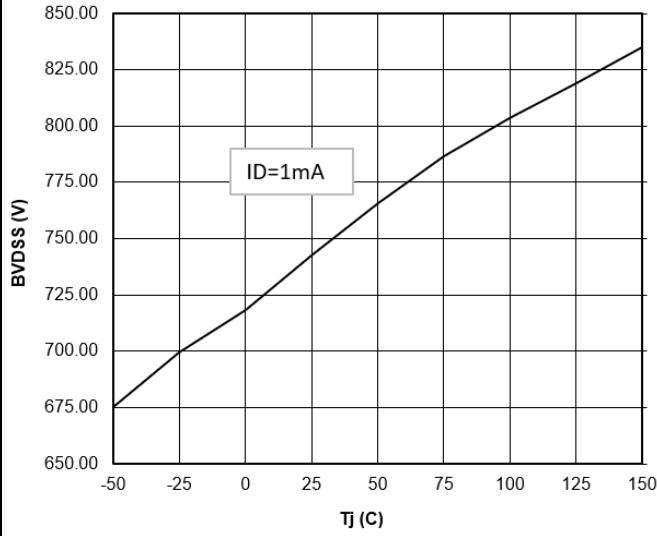
$I_f=f(V_{DS});$ parameter: T_J

Diagram 6: Typ. Capacitance vs. Vds



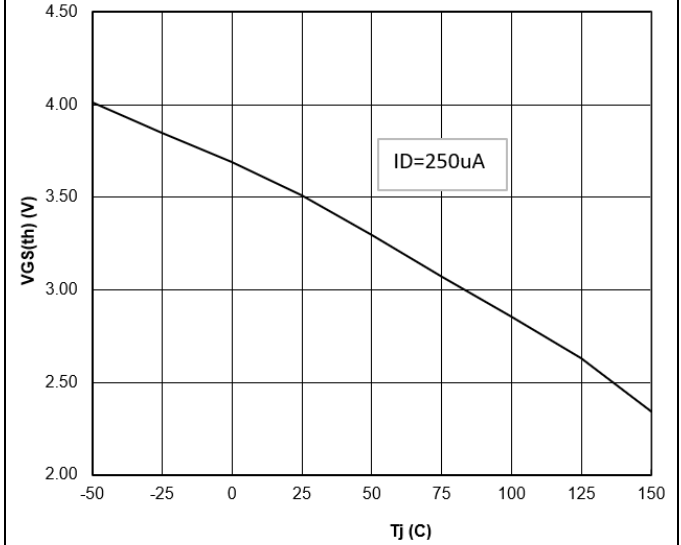
$C=f(V_{DS}); V_{GS}=0\text{V}; f=1\text{MHz}$

Diagram 7: Typ. Drain-source breakdown voltage



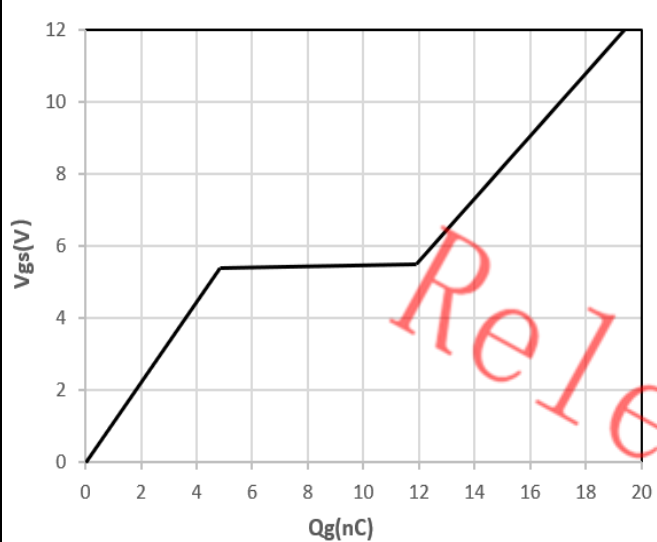
$V_{BR(DSS)}=f(T_j); I_D=1mA$

Diagram 8: Typ. Threshold voltage



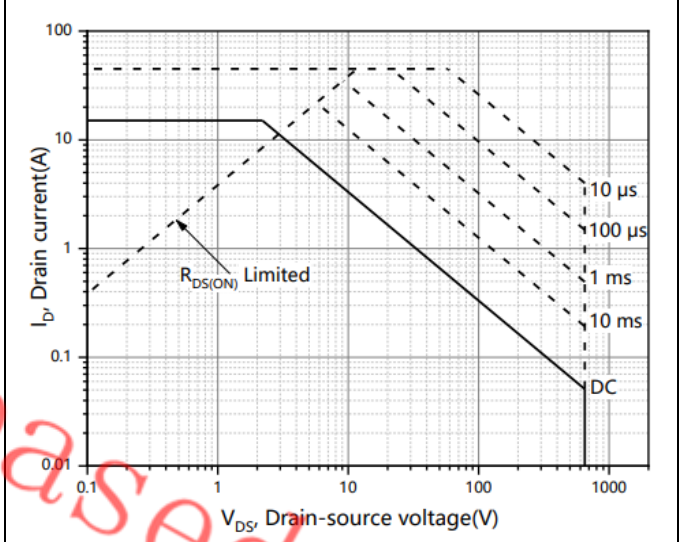
$V_{th}=f(T_j)$

Diagram 9: Typ. Gate charge



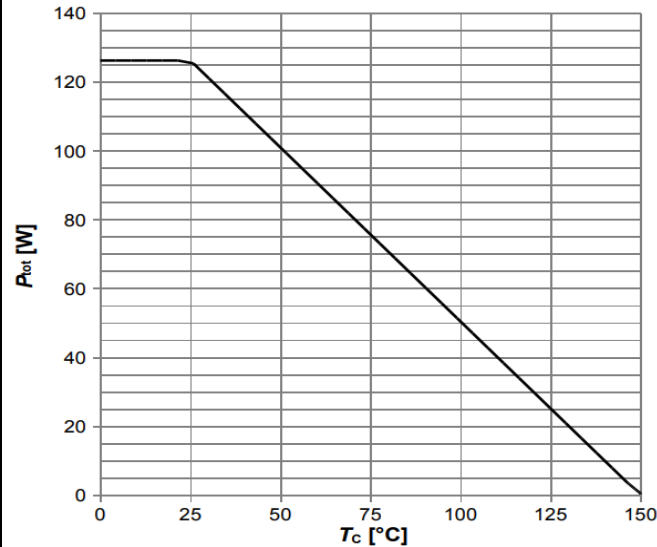
$V_{GS}=f(Q_{gate}); I_D=50A \text{ pulsed}; \text{parameter: } V_{DD}$

Diagram 10: Typ. Maximum Safe Operating Area



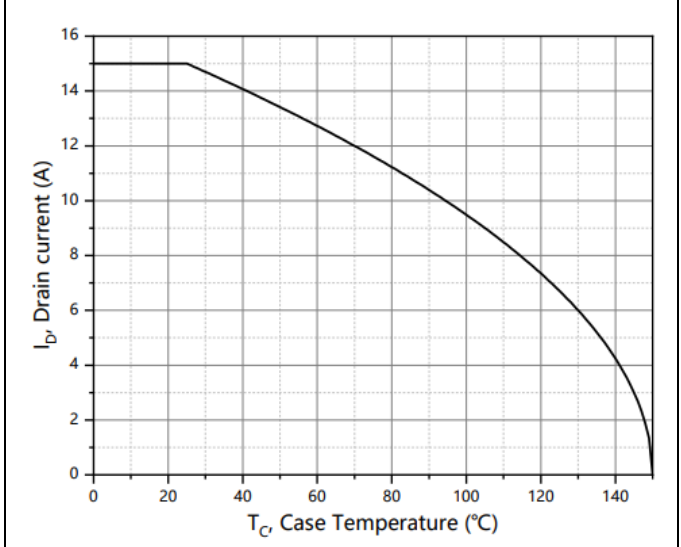
$I_D=f(V_{DS}); T_C=25^\circ C; D=0; \text{parameter } t_p$

Diagram 11: Typ. Power Dissipation



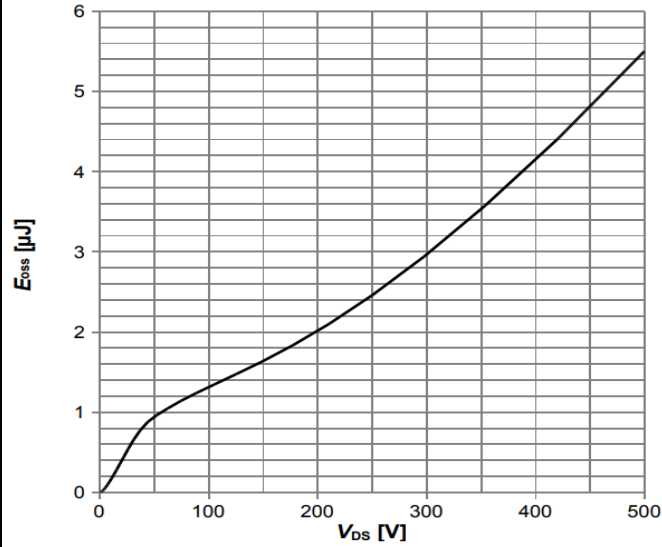
$P_{tot}=f(T_c); \text{TO252}$

Diagram 12: Typ. Drain Current De-rating



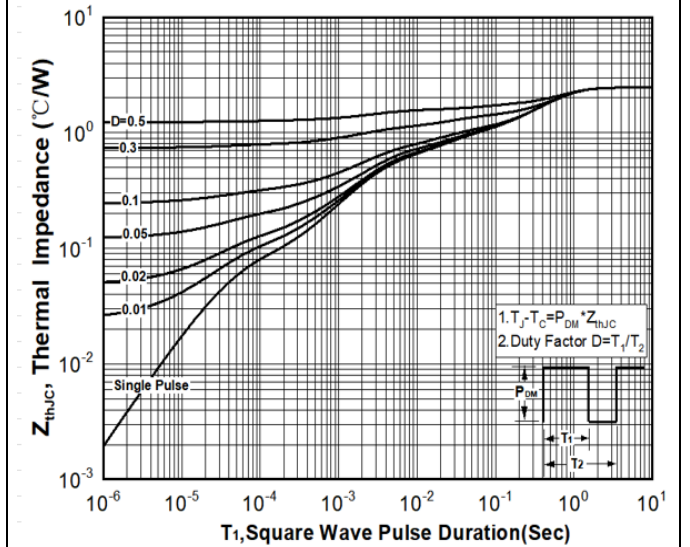
$I_D=f(T_c)$

Diagram 13: Typ. Coss stored energy



$E_{oss}=f(V_{DS})$

Diagram 14: Typ. Max. transient thermal impedance



$Z_{thJC} = f(t_p)$; parameter: $D = t_p/T$

Released

5 Test Circuits

Table 8 Diode characteristics

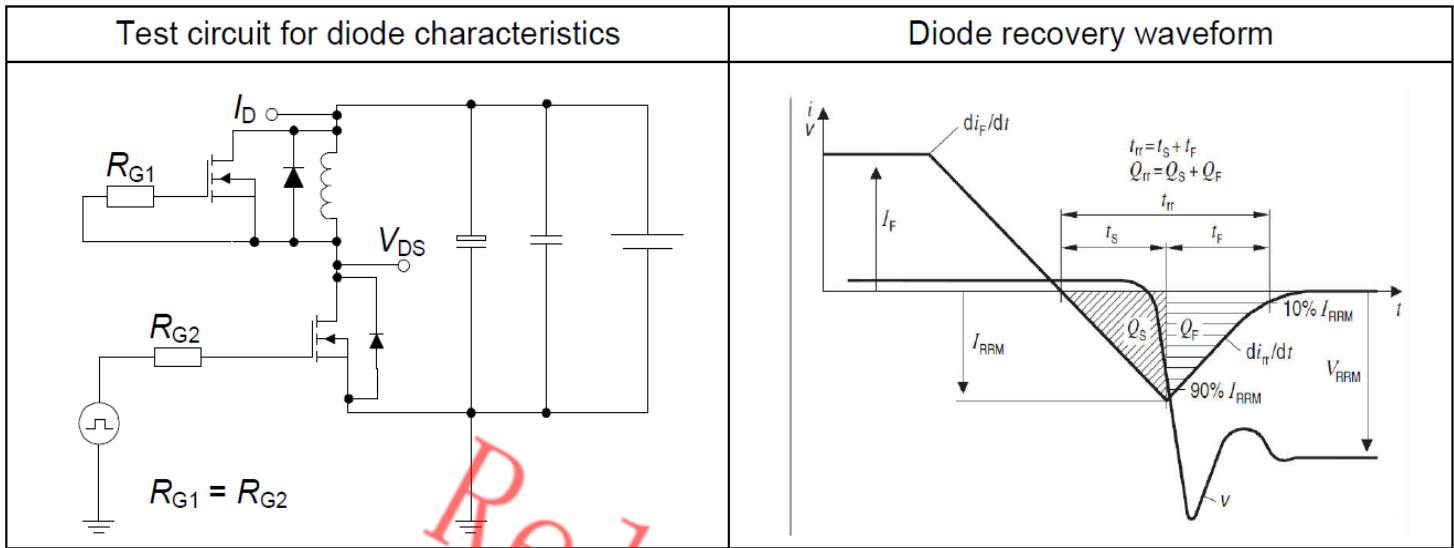


Table 9 Switching times

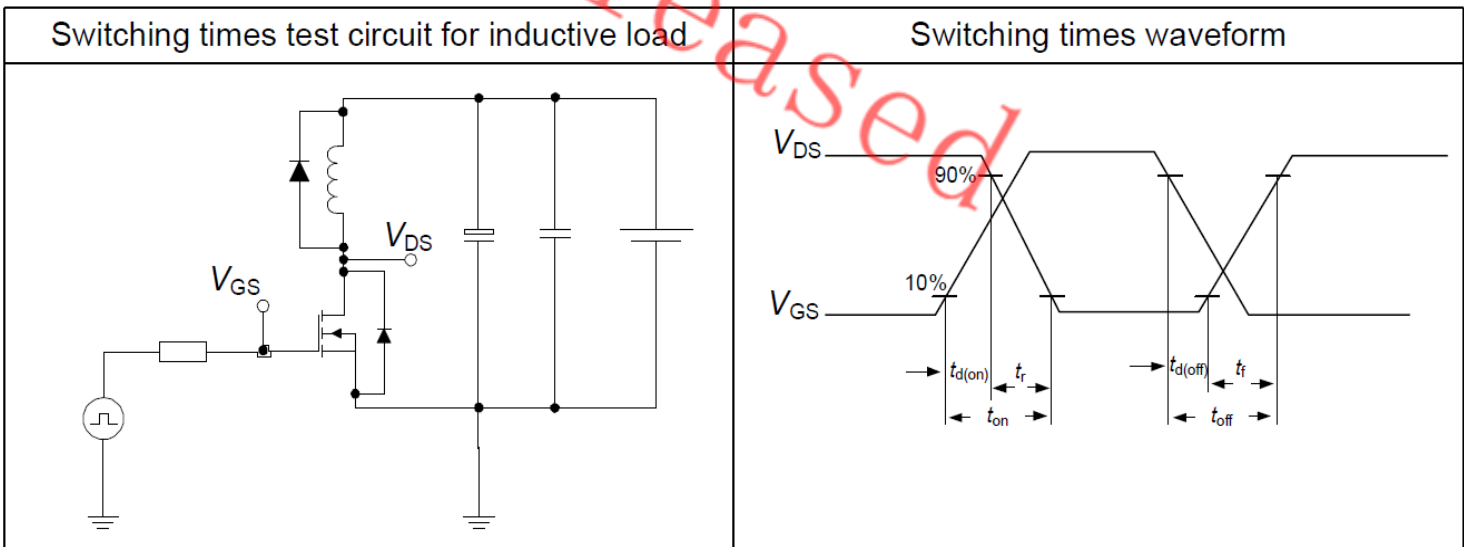
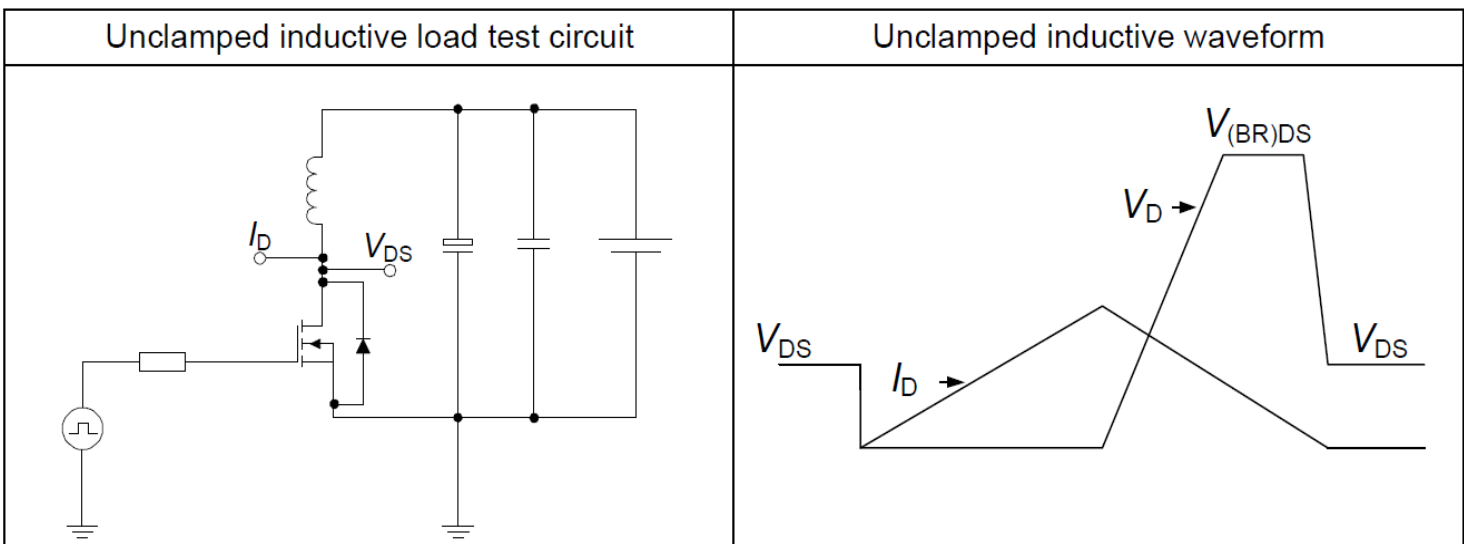
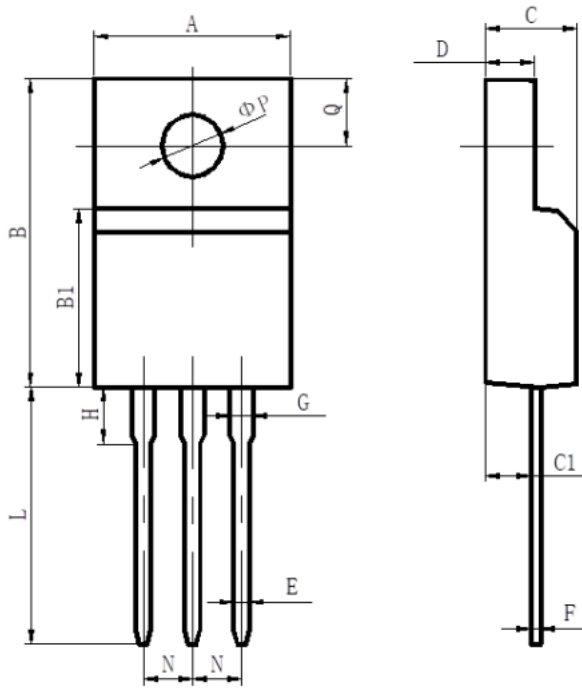


Table 10 Unclamped inductive load



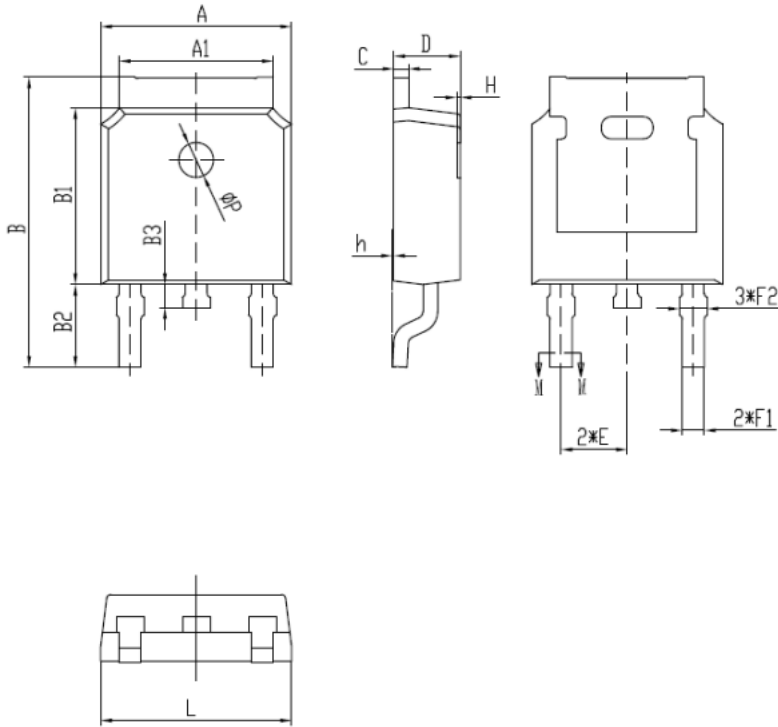
6 Package Outlines



| 项目 | 规范(mm) | |
|----------|--------|-------|
| | MIN | MAX |
| A | 9.70 | 10.30 |
| B | 15.50 | 16.10 |
| B1 | 8.99 | 9.39 |
| C | 4.40 | 4.80 |
| C1 | 2.15 | 2.55 |
| D | 2.50 | 2.90 |
| E | 0.70 | 0.90 |
| F | 0.40 | 0.60 |
| G | 1.12 | 1.42 |
| H | 3.40 | 3.80 |
| L | 12.6 | 13.6 |
| N | 2.34 | 2.74 |
| Q | 3.15 | 3.55 |
| ϕP | 3.00 | 3.30 |

Figure1: Outline PG-TO220F(HT)

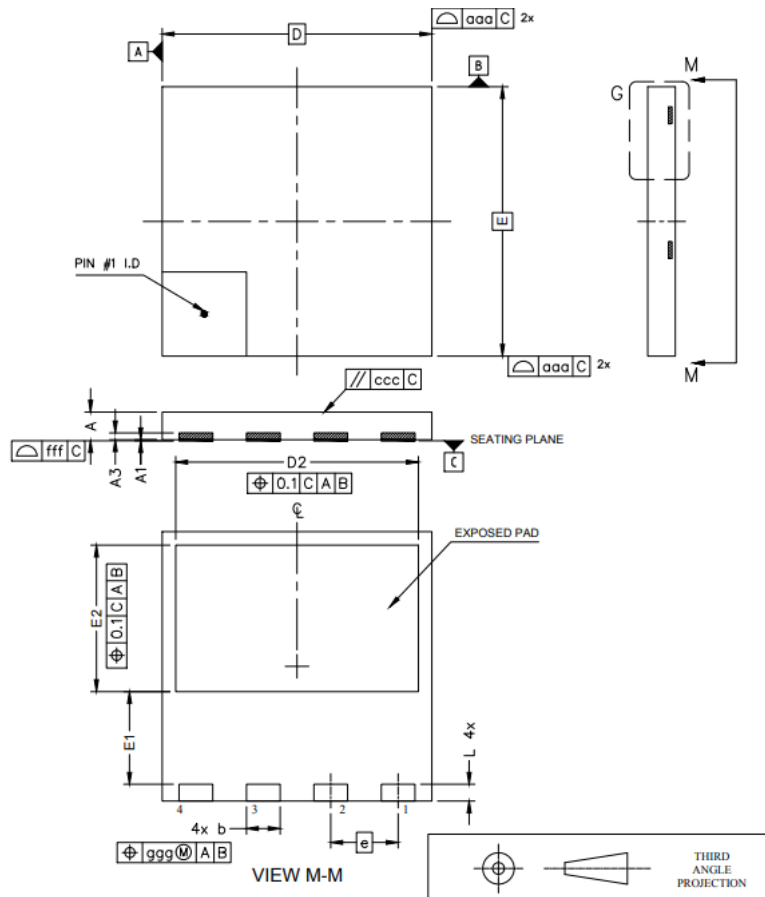
Released



| 项目 | 规范(mm) | |
|----------|--------|-------|
| | MIN | MAX |
| A | 6.50 | 6.70 |
| A1 | 5.16 | 5.46 |
| B | 9.77 | 10.17 |
| B1 | 6.00 | 6.20 |
| B2 | 2.60 | 3.00 |
| B3 | 0.70 | 0.90 |
| C | 0.45 | 0.61 |
| D | 2.20 | 2.40 |
| E | 2.186 | 2.386 |
| F1 | 0.67 | 0.87 |
| F2 | 0.76 | 0.96 |
| H | 0.00 | 0.30 |
| h | 0.00 | 0.127 |
| L | 6.50 | 6.70 |
| ϕP | 1.10 | 1.30 |

Figure2: Outline PG-T0252(HT)

Released



| SYMBOL | MIN | MAX |
|--------|----------|------|
| A | 0.75 | 0.95 |
| A1 | 0.00 | 0.05 |
| A3 | 0.10 | 0.30 |
| b | 0.90 | 1.10 |
| D | 7.90 | 8.10 |
| E | 7.90 | 8.10 |
| D2 | 7.10 | 7.30 |
| E1 | 2.65 | 2.85 |
| E2 | 4.25 | 4.45 |
| e | 2.00 BSC | |
| L | 0.40 | 0.60 |
| aaa | 0.10 | |
| ggg | 0.05 | |
| ccc | 0.05 | |
| fff | 0.05 | |

Figure3: Outline PG-DFN8X8(RYX)

Released

Revision History

| Revision | Date | Subjects (major changes since last revision) |
|----------|------------|--|
| 1.0 | 2023-11-14 | Preliminary version |
| 1.1 | 2023-12-25 | Added package DFN8X8 |

Released

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [MOSFET](#) category:

Click to view products by [ANHI](#) manufacturer:

Other Similar products are found below :

[IRFD120](#) [IRFY240C](#) [JANTX2N5237](#) [2SK2267\(Q\)](#) [BUK455-60A/B](#) [MIC4420CM-TR](#) [VN1206L](#) [NDP4060](#) [SI4482DY](#)
[IPS70R2K0CEAKMA1](#) [SQD23N06-31L-GE3](#) [TK16J60W,S1VQ\(O](#) [2SK2614\(TE16L1,Q\)](#) [DMN1017UCP3-7](#) [EFC2J004NUZTDG](#)
[DMN1053UCP4-7](#) [SQJ469EP-T1-GE3](#) [NTE2384](#) [DMC2700UDMQ-7](#) [DMN2080UCB4-7](#) [DMN61D9UWQ-13](#) [US6M2GTR](#)
[DMN31D5UDJ-7](#) [DMP22D4UFO-7B](#) [DMN1006UCA6-7](#) [DMN16M9UCA6-7](#) [STF5N65M6](#) [IRF40H233XTMA1](#) [STU5N65M6](#)
[DMN6022SSD-13](#) [DMN13M9UCA6-7](#) [DMTH10H4M6SPS-13](#) [DMN2990UFB-7B](#) [IPB80P04P405ATMA2](#) [2N7002W-G](#) [MCAC30N06Y-](#)
[TP](#) [MCQ7328-TP](#) [NTMC083NP10M5L](#) [NVMFS2D3P04M8LT1G](#) [BXP7N65D](#) [BXP4N65F](#) [AOL1454G](#) [WMJ80N60C4](#) [BXP2N20L](#)
[BXP2N65D](#) [BXT1150N10J](#) [BXT1700P06M](#) [TSM60NB380CP](#) [ROG](#) [RQ7L055BGTCR](#) [DMNH15H110SK3-13](#)