

N-Ch 100V Fast Switching MOSFETs
General Description

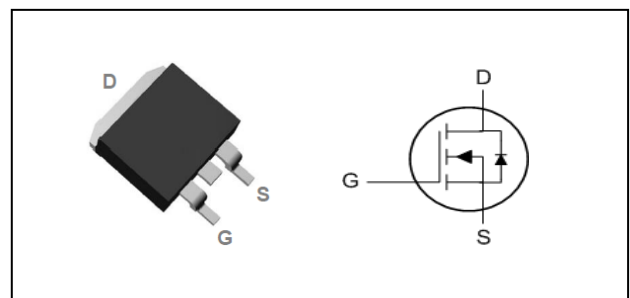
- 100% EAS Guaranteed
- Green Device Available
- Super Low $R_{DS(ON)}$
- Advanced high cell density Trench technology

Applications

- MOTOR Driver.
- BMS.
- High frequency switching and synchronous rectification.

Product Summary

| | | |
|------------------|-----|-----------|
| V_{DS} | 100 | V |
| $R_{DS(ON),typ}$ | 1.8 | $m\Omega$ |
| I_D | 308 | A |

TO263 Pin Configuration

Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|-----------------------|--|------------|------------|
| V_{DS} | Drain-Source Voltage | 100 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D@T_C=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^{1,6}$ | 308 | A |
| $I_D@T_C=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^{1,6}$ | 218 | A |
| I_{DM} | Pulsed Drain Current ² | 550 | A |
| EAS | Single Pulse Avalanche Energy ³ | 1013 | mJ |
| I_{AS} | Avalanche Current | 45 | A |
| $P_D@T_C=25^\circ C$ | Total Power Dissipation ⁴ | 430 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ C$ |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | --- | 60 | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | 0.35 | $^\circ C/W$ |

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

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|--|---|------|-------|------|------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 100 | --- | --- | V |
| R _{DS(ON)} | Static Drain-Source On-Resistance ² | V _{GS} =10V, I _D =30A | --- | 1.8 | 2.2 | mΩ |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 2.0 | --- | 4.0 | V |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =80V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =80V, V _{GS} =0V, T _J =125°C | --- | --- | 100 | |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±20V, V _{DS} =0V | --- | --- | ±100 | nA |
| g _{fs} | Forward Transconductance | V _{DS} =5V, I _D =20A | --- | 75 | --- | S |
| Q _g | Total Gate Charge (10V) | V _{DS} =50V, V _{GS} =10V, I _D =20A | --- | 200 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 54 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 49 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =50V, V _{GS} =10V, R _G =3.0Ω, I _D =20A | --- | 47 | --- | ns |
| T _r | Rise Time | | --- | 28 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 79 | --- | |
| T _f | Fall Time | | --- | 18 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =50V, V _{GS} =0V, f=1MHz | --- | 13370 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 1920 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 388 | --- | |

Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|--|--|------|------|------|------|
| I _s | Continuous Source Current ^{1,5} | V _G =V _D =0V, Force Current | --- | --- | 80 | A |
| V _{SD} | Diode Forward Voltage ² | V _{GS} =0V, I _S =50A, T _J =25°C | --- | --- | 1.1 | V |
| t _{rr} | Reverse Recovery Time | I _F =20A, dI/dt=100A/μs, | --- | 70 | --- | nS |
| Q _{rr} | Reverse Recovery Charge | T _J =25°C | --- | 580 | --- | nC |

Note :

- 1.The data tested by surface mounted on a 1 inch²FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=45A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.
- 6.Package limitation current.

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Typical Characteristics

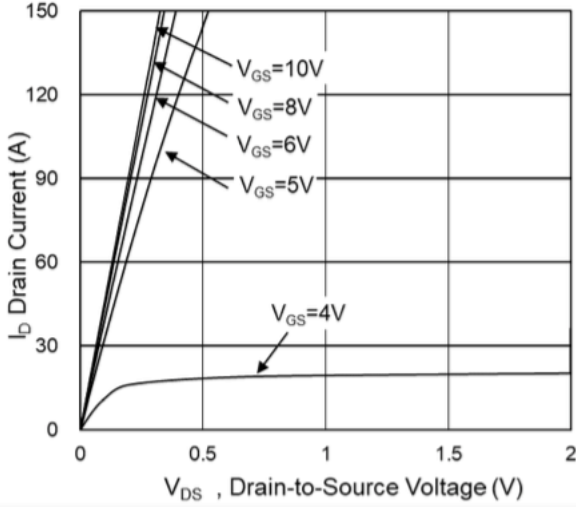


Fig.1 Typical Output Characteristics

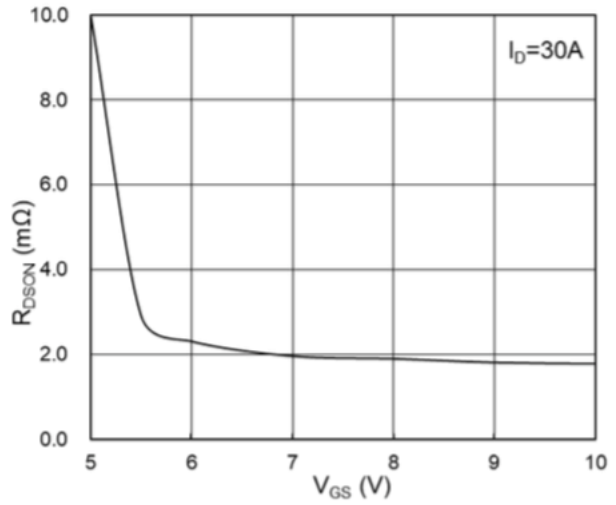


Fig.2 On-Resistance vs G-S Voltage

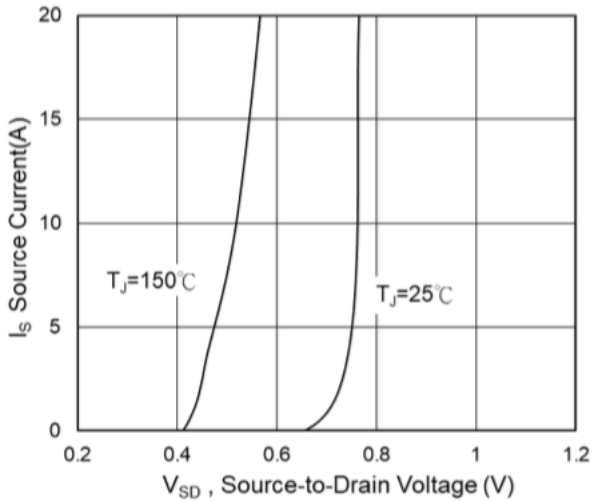


Fig.3 Source Drain Forward Characteristics

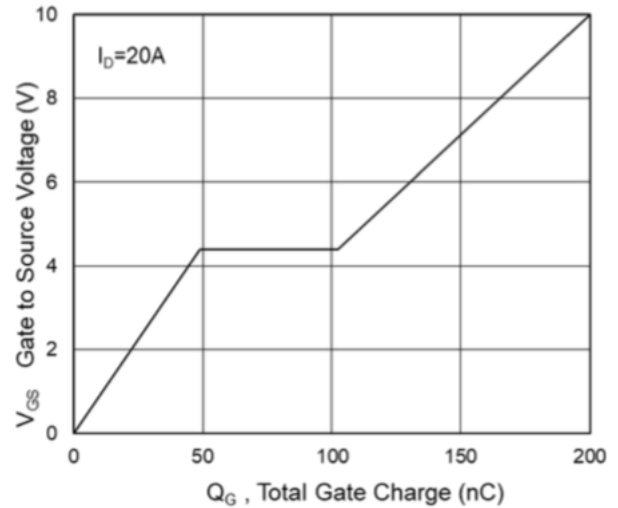


Fig.4 Gate-Charge Characteristics

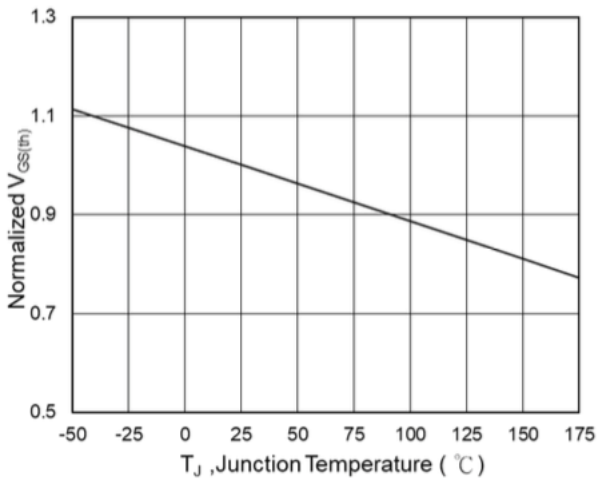


Fig.5 Normalized V_{TH} vs T_J

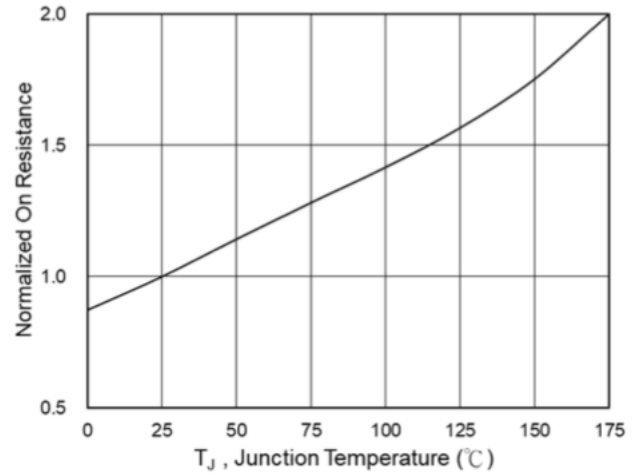


Fig.6 Normalized R_{DSON} vs T_J

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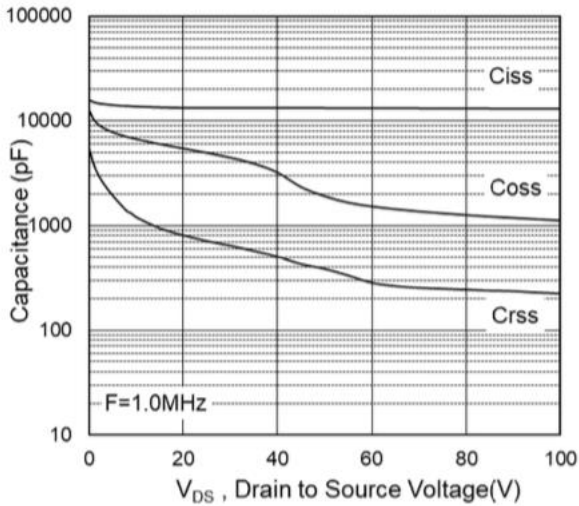


Fig.7 Capacitance

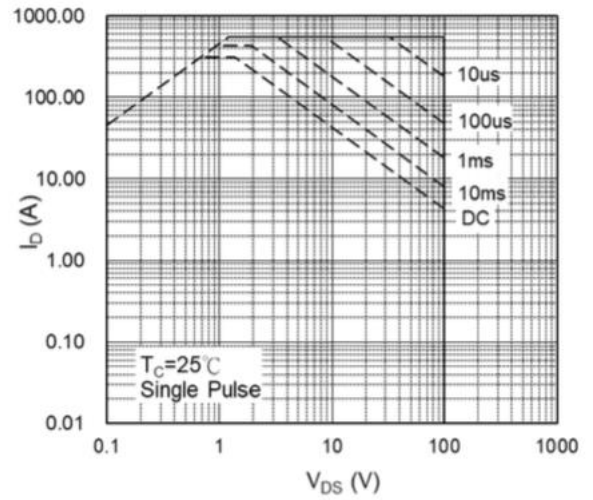


Fig.8 Safe Operating Area

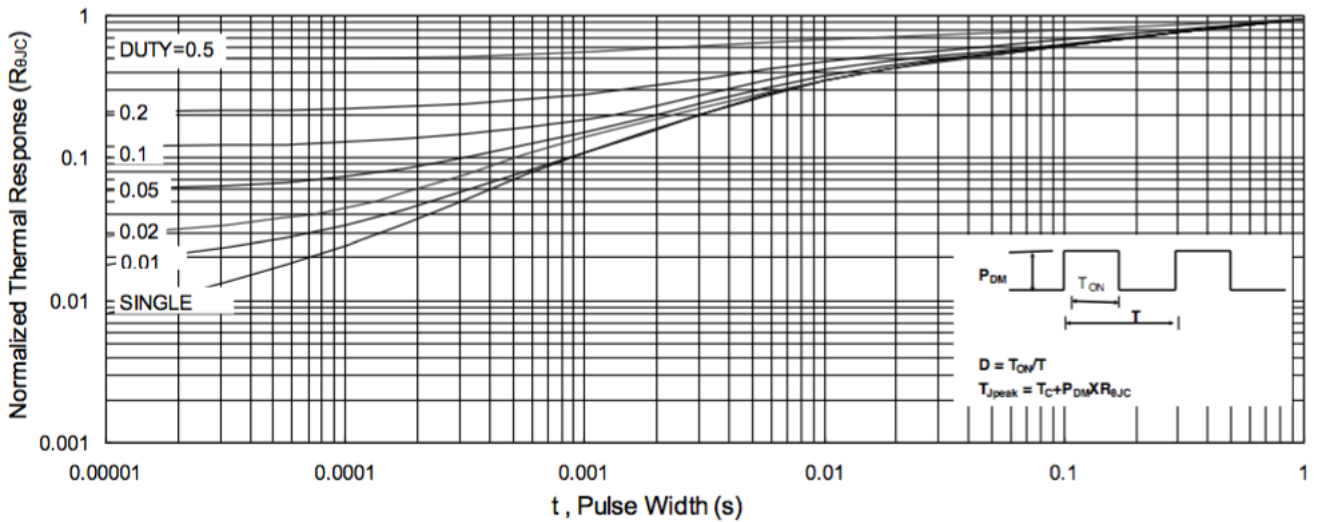


Fig.9 Normalized Maximum Transient Thermal Impedance

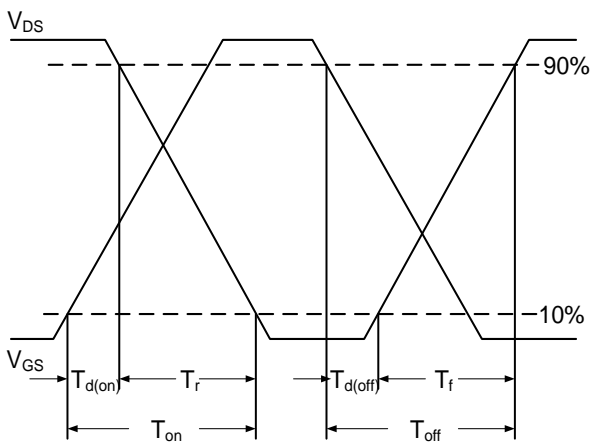


Fig.10 Switching Time Waveform

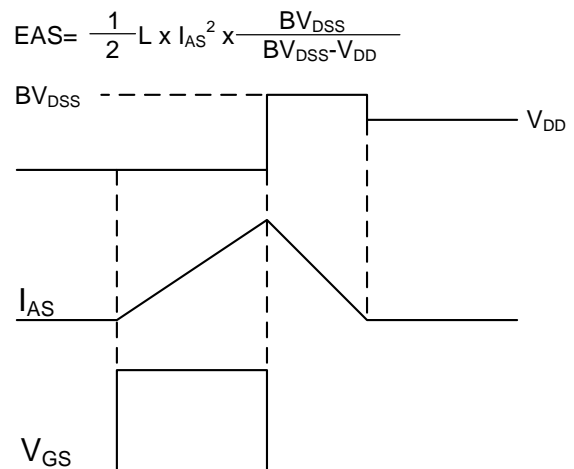
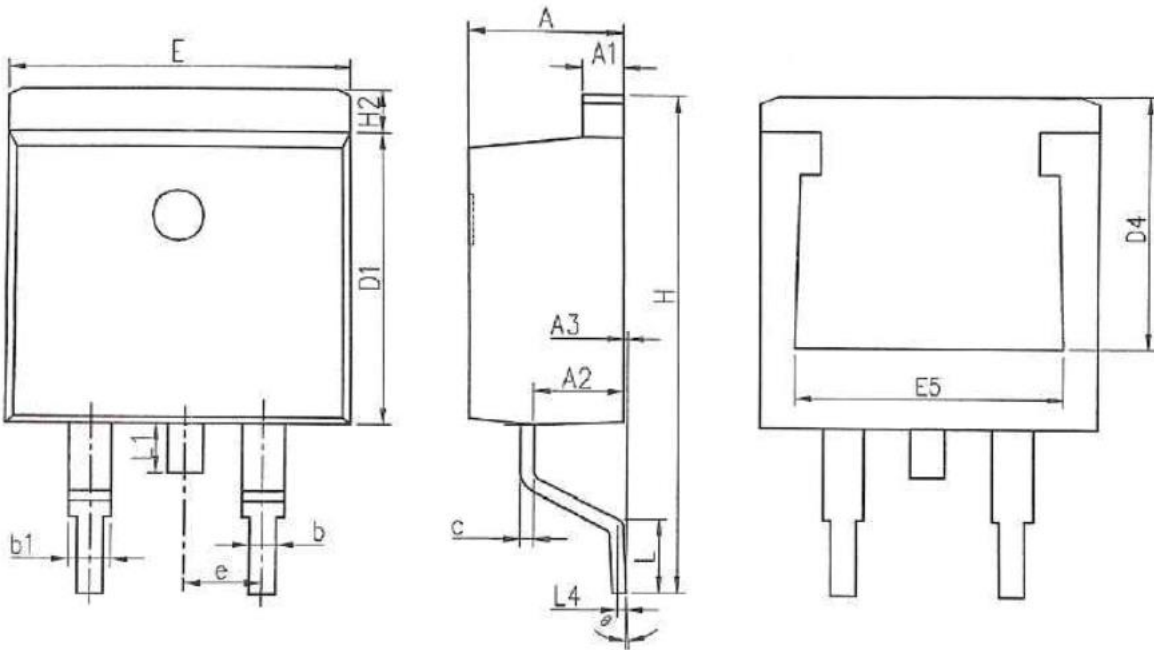


Fig.11 Unclamped Inductive Switching Waveform



| SYMBOLS | MILLIMETERS | | INCHES | |
|---------|-------------|-------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 4.370 | 4.770 | 0.172 | 0.188 |
| A1 | 1.220 | 1.420 | 0.048 | 0.056 |
| A2 | 2.200 | 2.890 | 0.087 | 0.114 |
| A3 | 0.000 | 0.250 | 0.000 | 0.010 |
| b | 0.700 | 0.960 | 0.028 | 0.038 |
| b1 | 1.170 | 1.470 | 0.046 | 0.058 |
| c | 0.300 | 0.530 | 0.012 | 0.021 |
| D1 | 8.500 | 9.300 | 0.335 | 0.366 |
| D4 | 6.600 | - | 0.260 | - |
| E | 9.860 | 10.36 | 0.388 | 0.408 |
| E5 | 7.060 | - | 0.278 | - |
| e | 2.540 BSC | | 0.100 BSC | |
| H | 14.70 | 15.70 | 0.579 | 0.618 |
| H2 | 1.070 | 1.470 | 0.042 | 0.058 |
| L | 2.000 | 2.600 | 0.079 | 0.102 |
| L1 | 1.400 | 1.750 | 0.055 | 0.069 |
| L4 | 0.250 BSC | | 0.010 BSC | |
| Θ | 0° | 9° | 0° | 9° |

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