

General Description

The WSF3089 is the highest performance trench N-ch MOSFET with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The WSF3089 meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

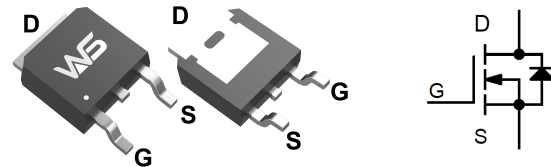
Product Summary

| BVDSS | RDSON | ID |
|-------|-------|-----|
| 30V | 4.5mΩ | 72A |

Applications

- Synchronous Buck Converter
- DC-DC Power System
- Load Switch

TO-252 Pin Configuration



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|-----------|--|------------|-------|
| V_{DS} | Drain-Source Voltage | 30 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Continuous Drain Current, @TC=25°C ¹ | 72 | A |
| | Continuous Drain Current, @TC=100°C ¹ | 46 | A |
| I_{DM} | Pulsed Drain Current ² | 200 | A |
| EAS | Single Pulse Avalanche Energy ³ | 80 | mJ |
| P_D | Total Power Dissipation @TC=25°C ⁴ | 50 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | °C |
| T_J | Operating Junction Temperature Range | -55 to 150 | °C |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|---|------|------|------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient (Steady State) ¹ | --- | 62 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ (t ≤ 10s) | --- | 31 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | 2.5 | °C/W |

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 | 30 | --- | --- | V |
| ΔBV _{DSS} /ΔT _J | BVDSS Temperature Coefficient | Reference to 25°C, I _D =1mA | --- | 0.028 | --- | V/°C |
| R _{DS(ON)} | Static Drain-Source On-Resistance ² | V _{GS} =10V, I _D =30A | --- | 4.5 | 6.2 | mΩ |
| | | V _{GS} =4.5V, I _D =20A | --- | 7.0 | 9.2 | |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.1 | 1.5 | 2.5 | V |
| ΔV _{GS(th)} | V _{GS(th)} Temperature Coefficient | | --- | -6.16 | --- | mV/°C |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =24V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =24V, V _{GS} =0V, T _J =55°C | --- | --- | 5 | |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±20V, V _{DS} =0V | --- | --- | ±100 | nA |
| Q _g | Total Gate Charge (4.5V) | V _{DS} =15V, V _{GS} =10V, I _D =30A | --- | 35 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 6.8 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 7.5 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =15V, V _{GS} =10V, R _G =6Ω I _D =15A | --- | 11 | --- | ns |
| T _r | Rise Time | | --- | 15 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 37.3 | --- | |
| T _f | Fall Time | | --- | 10.6 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =15V, V _{GS} =0V, f=1MHz | --- | 1800 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 220 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 178 | --- | |

Diode Characteristics

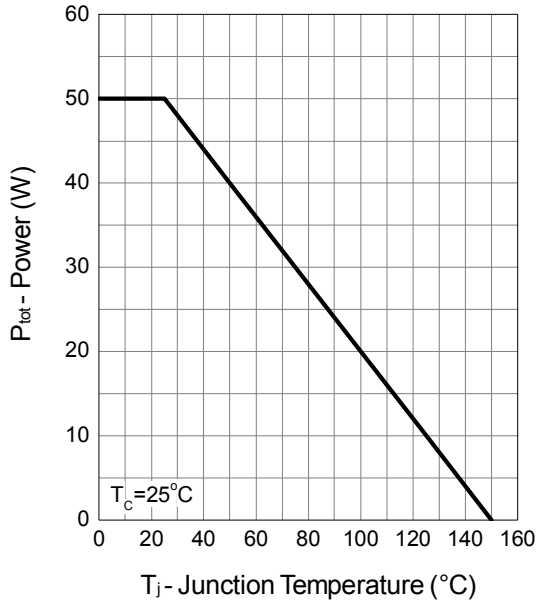
| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|--|---|------|------|------|------|
| I _S | Continuous Source Current ^{1,6} | V _G =V _D =0V, Force Current | --- | --- | 72 | A |
| I _{SM} | Pulsed Source Current ^{2,6} | | --- | --- | 200 | A |
| V _{SD} | Diode Forward Voltage ² | V _{GS} =0V, I _S =1A, T _J =25°C | --- | --- | 1.3 | V |
| t _{rr} | Reverse Recovery Time | IF=20A, di/dt=100A/μs, T _J =25°C | --- | 10 | --- | nS |
| Q _{rr} | Reverse Recovery Charge | | --- | 2.5 | --- | nC |

Note :

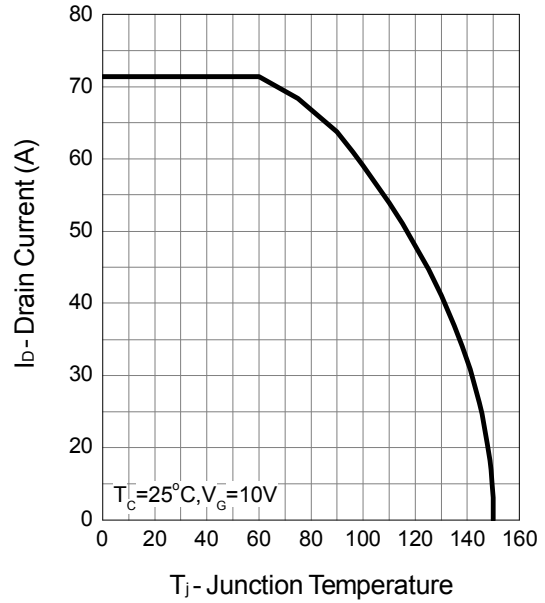
1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper, t<10sec.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
3. The EAS data shows Max. rating. The test condition is V_{DD}=15V, V_{GS}=10V, L=0.5mH, I_{AS}=18A
4. The power dissipation is limited by 175°C junction temperature
5. The Min. value is 100% EAS tested guarantee.
6. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Typical Operating Characteristics

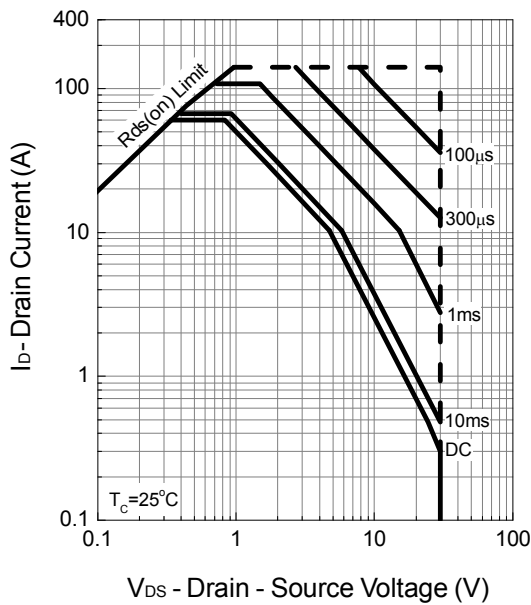
Power Dissipation



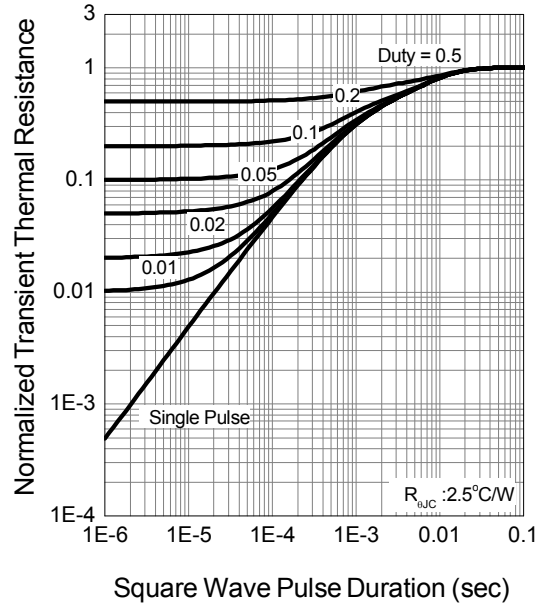
Drain Current



Safe Operation Area

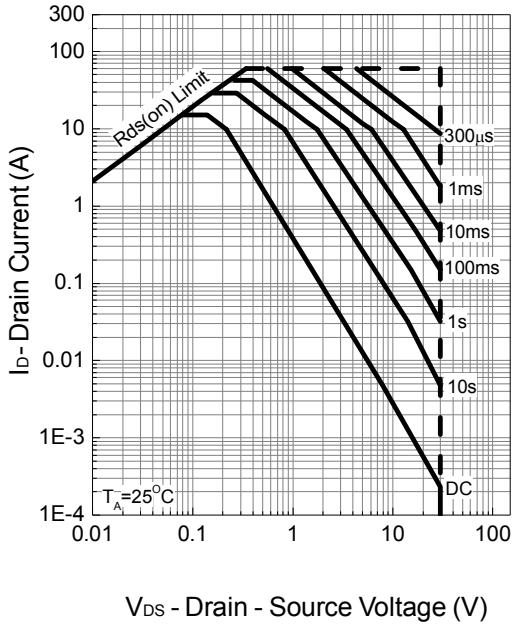


Thermal Transient Impedance

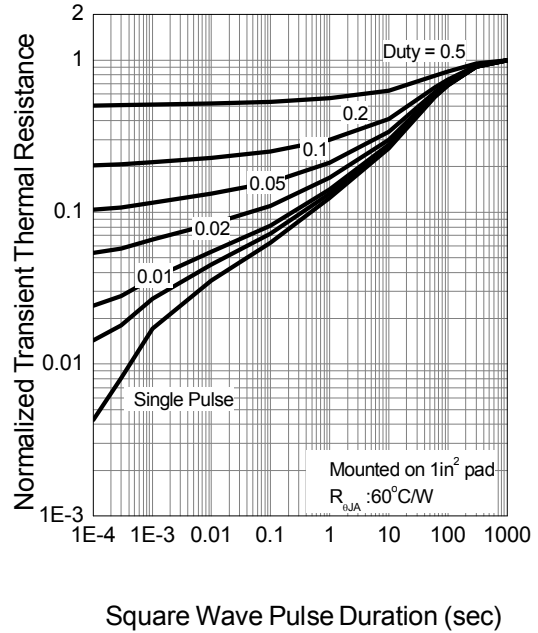


Typical Operating Characteristics

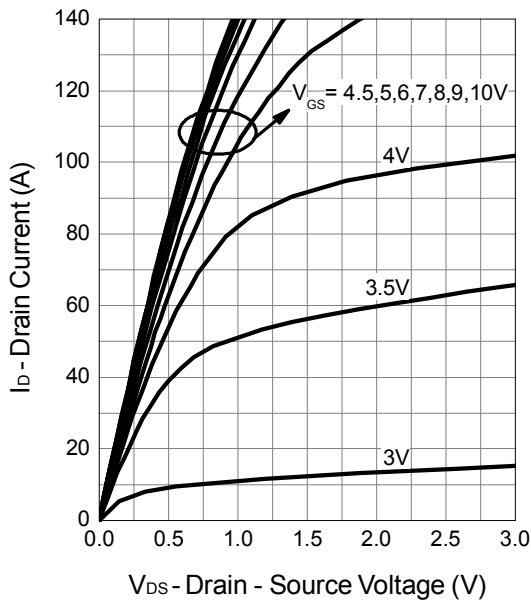
Safe Operation Area



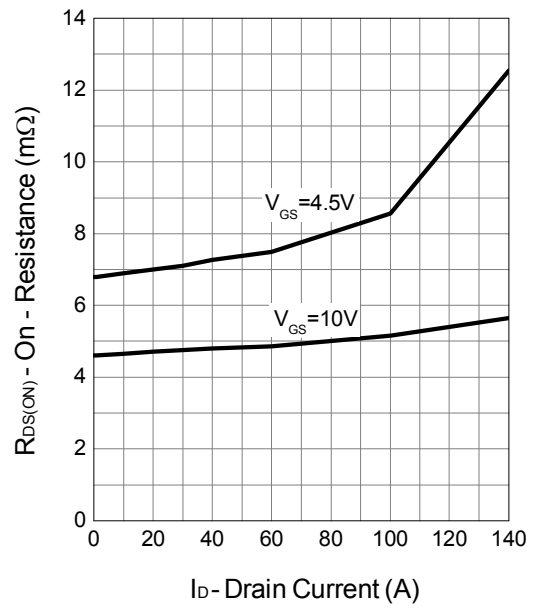
Thermal Transient Impedance



Output Characteristics

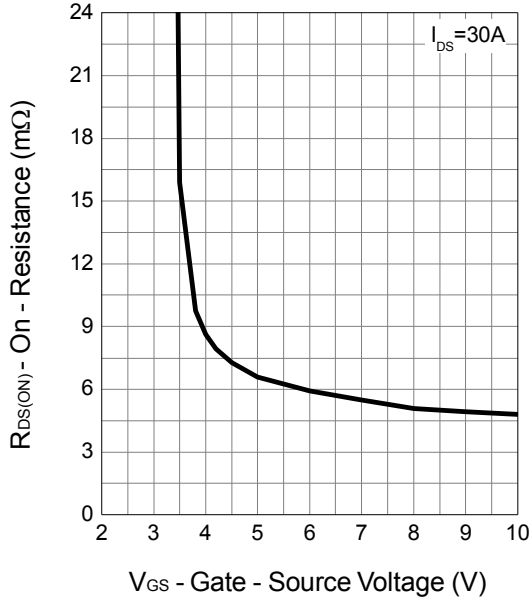


Drain-Source On Resistance

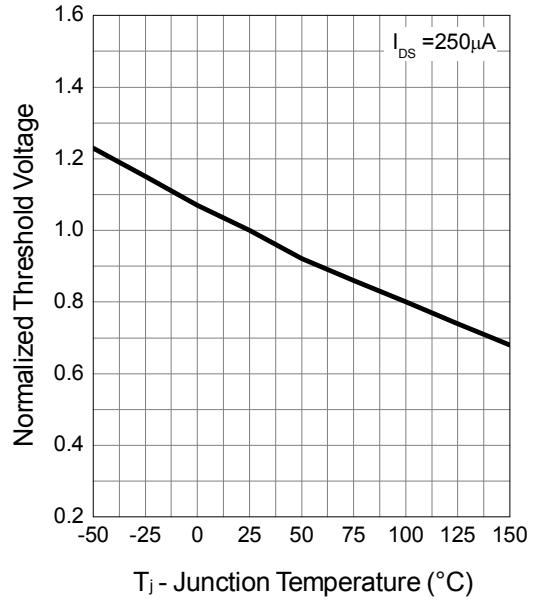


Typical Operating Characteristics

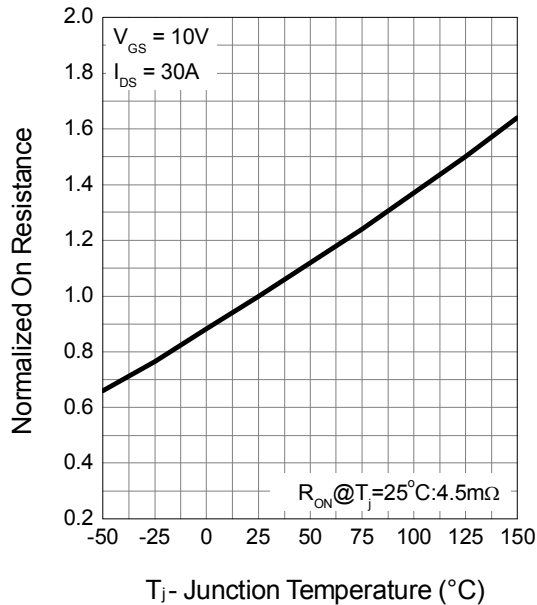
Gate-Source On Resistance



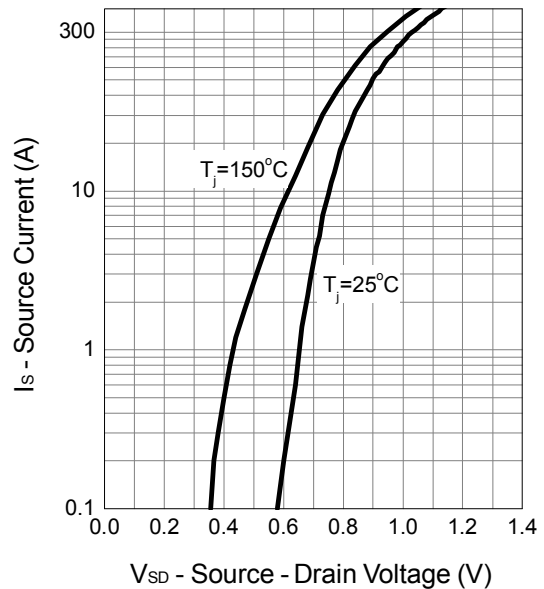
Gate Threshold Voltage



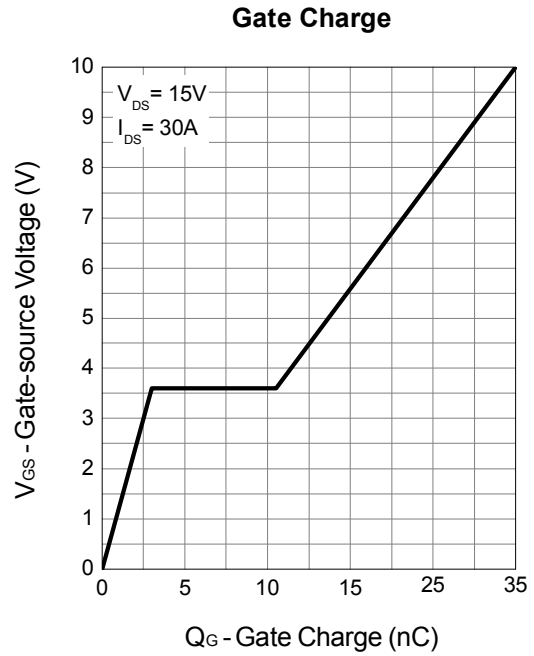
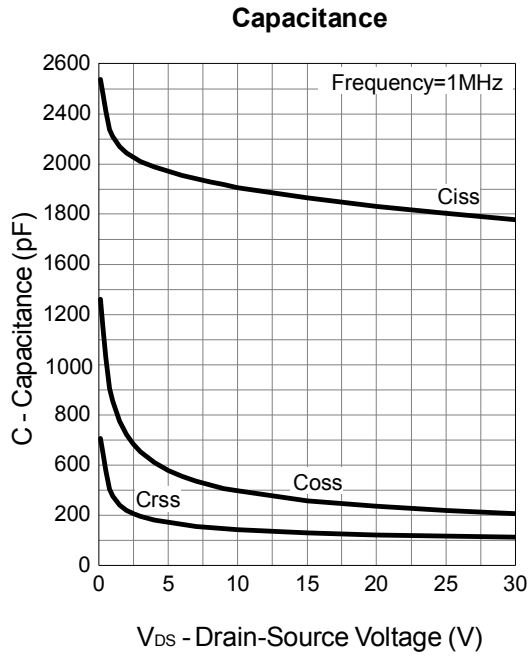
Drain-Source On Resistance



Source-Drain Diode Forward



Typical Operating Characteristics





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