# N-Channel 100V(D-S) MOSFET

| Product summary | | |
|---|---|---|
| $V_{DS}$ | 100 | V |
| $R_{DS(ON)}$(at $V_{GS}$=10V) Typ. | 4.4 | mΩ |
| $I_D$(Tc=25℃) | 128 | A |

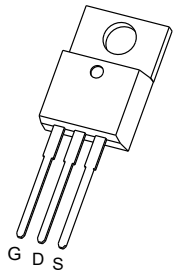
## Features

- Low Gate Charge
- High Current Capability

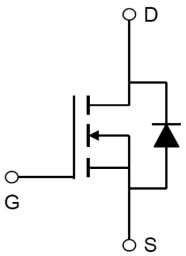
## Applications

- Current Switching
- Motor Driving
- Power management

## Pin Configuration




TO-220




## Packing Information

| Device | Package | Packaging | Quantity |
|---|---|---|---|
| ECFB128N10A | TO-220 | Tube | 50pcs |

## Absolute Maximum Ratings (at $T_A$=25℃ Unless Otherwise Noted)

| Symbol | Parameter | | Rating | Units |
|---|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | | 100 | V |
| $V_{GS}$ | Gate-Source Voltage | | ±20 | V |
| $I_D$ | Continuous Drain Current [A] | $T_C$=25℃ | 128 | A |
| | | $T_C$=100℃ | 81 | A |
| $I_{DM}$ | Pulse Drain Current Tested [B] | | 417 | A |
| $I_{AS}$ | Avalanche Current [C] | | 42 | A |
| $E_{AS}$ | Single Pulse Avalanche Energy [C] | | 265 | mJ |
| $P_D$ | Power Dissipation [D] | $T_C$=25℃ | 167 | W |
| $T_J$,$T_{STG}$ | Junciton and Storage Temperature Range | | -55 to +150 | ℃ |

## Thermal Characteristics

| Symbol | Parameter | Typical | Units |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance-Junction to case | 0.75 | ℃/W |

## Electrical Characteristics (at $T_J$ =25℃ Unless Otherwise Noted)

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Static Parameters | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V,$I_D$=250uA | 100 | -- | -- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=80V,$V_{GS}$=0V | -- | -- | 1 | uA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{DS}$=0V,$V_{GS}$=±20V | -- | -- | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$,$I_D$=250uA | 2.0 | 2.7 | 4.0 | V |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance [E] | $V_{GS}$=10V,$I_D$=20A | -- | 4.4 | 5.3 | mΩ |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=1A,$V_{GS}$=0V | -- | -- | 1.0 | V |
| $I_S$ | Diode Continuous Current | $T_C$=25℃ | -- | -- | 167 | A |
| Dynamic Parameters [F] | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V,$V_{DS}$=50V f=1MHZ | -- | 2816 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 614 | -- | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 7.4 | -- | pF |
| $R_g$ | Gate Resistance | $V_{GS}$=0V,$V_{DS}$=0V f=1MHZ | -- | 2.4 | -- | Ω |
| $Q_g$ | Total Gate Charge | $V_{DS}$=50V,$I_D$=20A $V_{GS}$=10V | -- | 42 | -- | nC |
| $Q_{gs}$ | Gate-Source Charge | | -- | 9.7 | -- | nC |
| $Q_{gd}$ | Gate-Drain Charge | | -- | 10.6 | -- | nC |
| $t_{D(on)}$ | Turn-on Delay Time | $V_{DS}$=50V,$R_L$=2.5Ω, $R_{GEN}$=6Ω, $V_{GS}$=10V | -- | 13 | -- | ns |
| $t_r$ | Turn-on Rise Time | | -- | 25 | -- | ns |
| $t_{D(off)}$ | Turn-off Delay Time | | -- | 43 | -- | ns |
| $t_f$ | Turn-off Fall Time | | -- | 37 | -- | ns |
| $t_{rr}$ | Reverse recovery time | $I_F$=15A, di/dt=100 A/uS | -- | 60 | -- | ns |
| $Q_{rr}$ | Reverse recovery charge | | -- | 61 | -- | nC |

A. Computed continuous current assumes the condition of TJ_Max while the actual continuous current depends on the thermal & electro-mechanical application board design.

B. This single-pulse measurement was taken under TJ_Max = 150°C.

C. This single-pulse measurement was taken under the following condition [L = 300uH, $V_{GS}$=10V, $V_{DS}$=50V] while its value is limited by TJ_Max = 150°C.

D. The power dissipation PD is based on TJ_Max = 150°C.

E. The data tested by pulsed , pulse width≦300us , duty cycle≦0.5%.

F. Guaranteed by design, not subject to production testing.

## Typical Characteristics

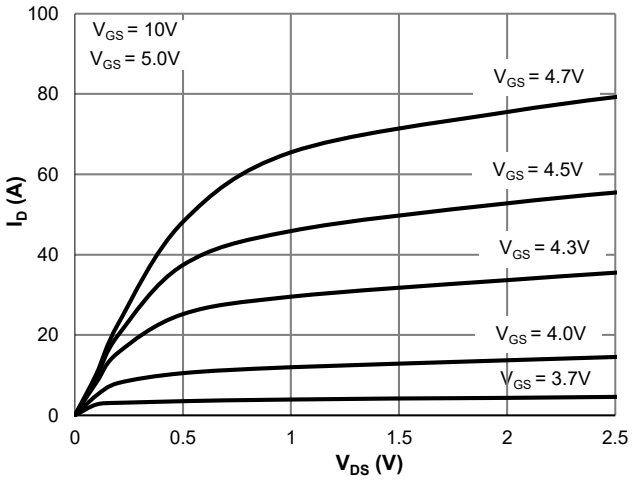



**Figure 1: Saturation Characteristics**

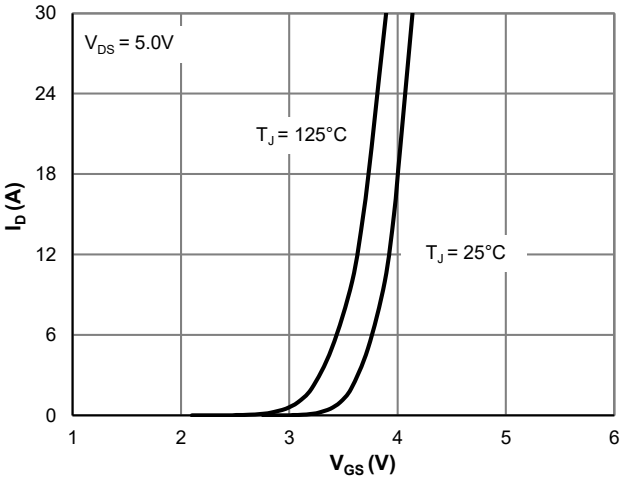



**Figure 2: Transfer Characteristics**

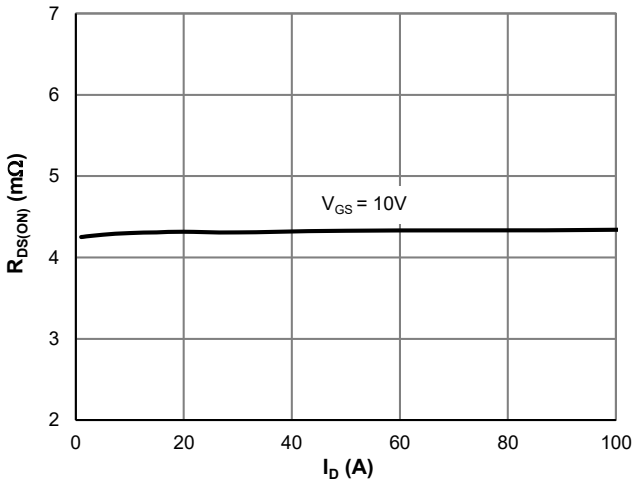



**Figure 3: $R_{DS(ON)}$ vs. Drain Current**

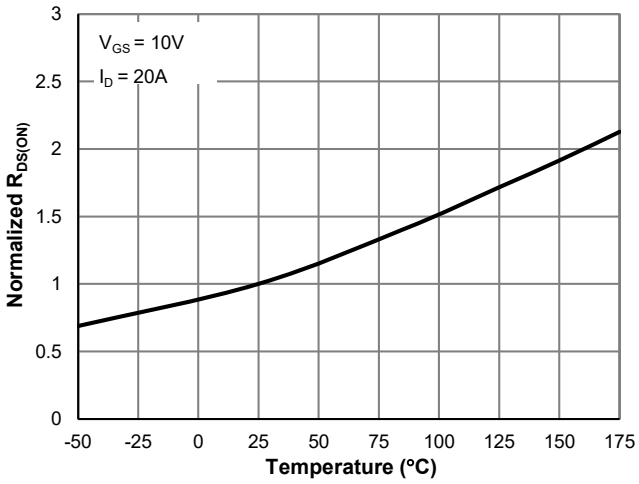



**Figure 4: $R_{DS(ON)}$ vs. Junction Temperature**

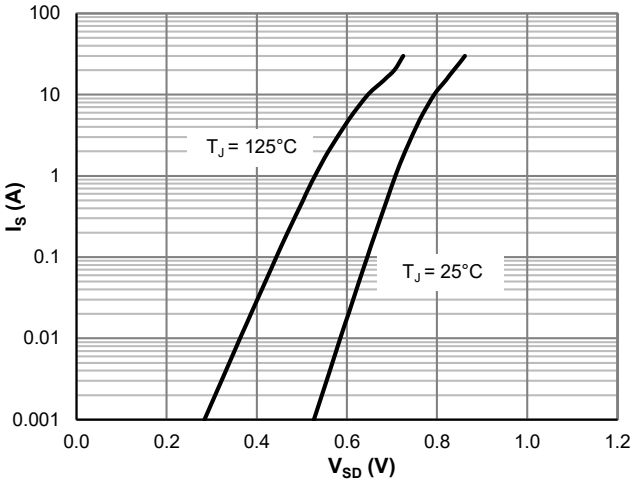



**Figure 5: Body-Diode Characteristics**

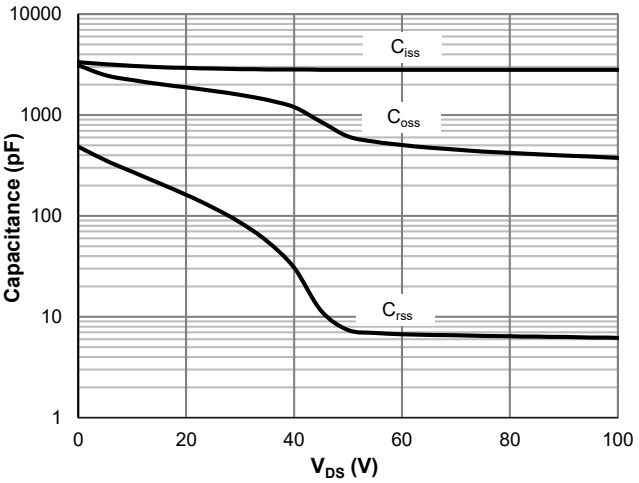



**Figure 6: Capacitance Characteristics**

## Typical Characteristics

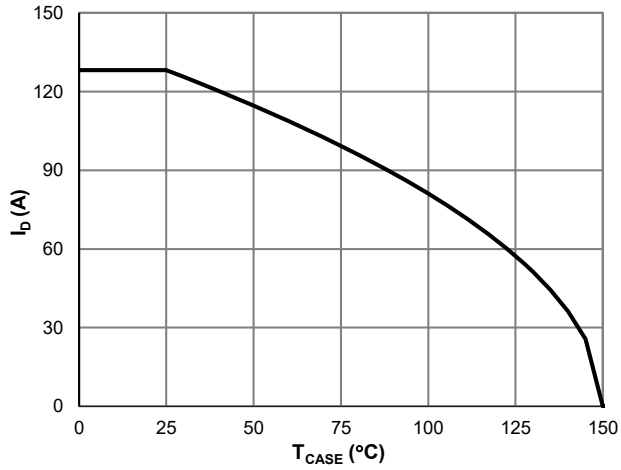



**Figure 7: Current De-rating**

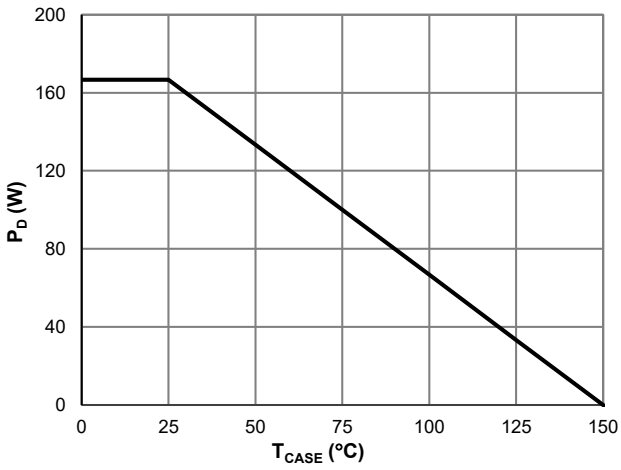



**Figure 8: Power De-rating**

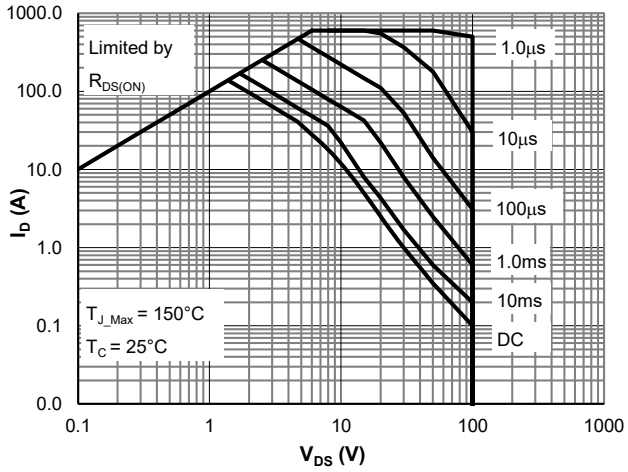



**Figure 9: Maximum Safe Operating Area**

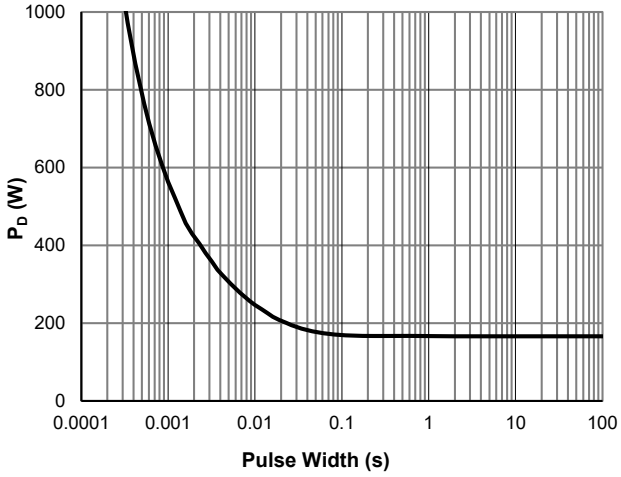



**Figure 10: Single Pulse Power Rating, Junction-to-Case**

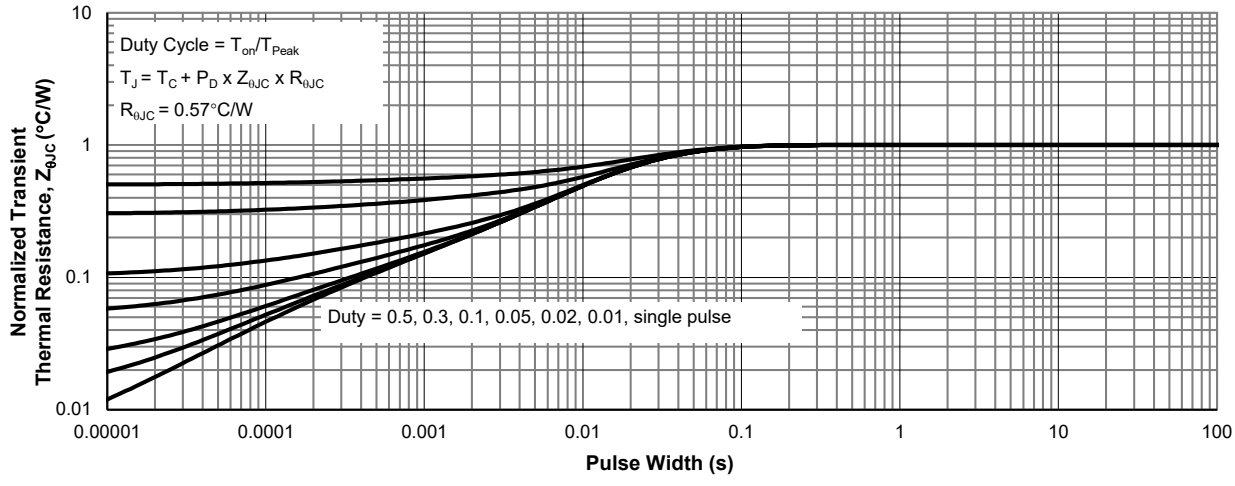
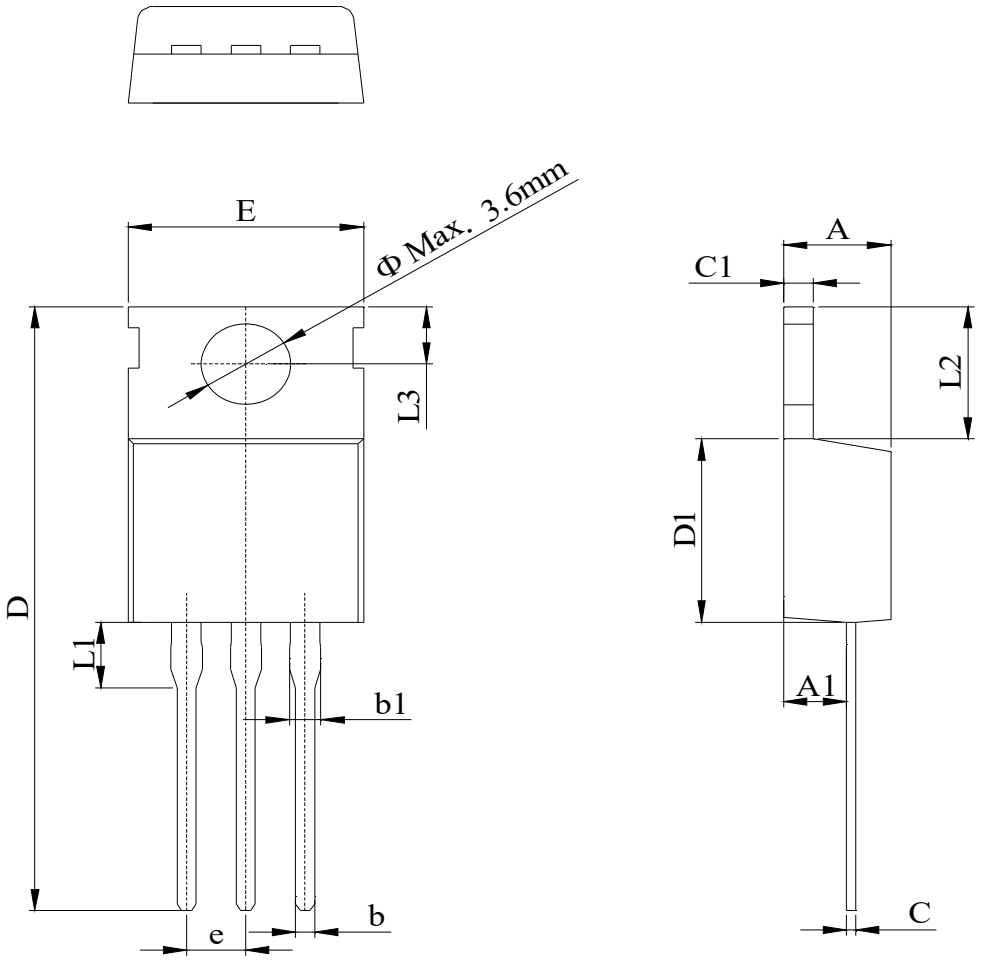



**Figure 11: Normalized Maximum Transient Thermal Impedance**

## TO-220 Package Information




| DIM. | MILLIMETER | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 4.37 | | 4.70 |
| A1 | 2.20 | | 3.00 |
| b | 0.70 | | 0.95 |
| b1 | 1.14 | | 1.70 |
| C | 0.45 | | 0.60 |
| C1 | 1.23 | | 1.40 |
| D | 28.00 | | 29.80 |
| D1 | 8.80 | | 9.90 |
| E | 9.70 | | 10.50 |
| L1 | | | 3.80 |
| L2 | 6.25 | | 6.90 |
| L3 | 2.40 | | 3.00 |
| e | | 2.54 BSC | |