# iMF404

# P-Channel Enhancement Mode MOSFET

## Datasheet

## 1. Product Information

### 1.1 Features

- Advanced Trench Cell Design
- RoHS Compliant and Halogen Free
- Moisture Sensitivity Level MSL1



### 1.2 Package Type

LFPAK5x6-4L

### 1.3 Quick Reference

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Limiting Values** | | | | | | |
| $P_{tot}$ | Total Power Dissipation | $T_C$ = 25 ℃ | - | - | 300 | W |
| $I_{DS}$ | Drain-Source Current | $T_C$ = 25 ℃, $V_{GS}$ = - 10 V | - | - | - 233 | A |
| | | $T_C$ = 100 ℃, $V_{GS}$ = - 10 V | - | - | - 165 | A |
| **Static Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$ = 0 V, $I_{DS}$ = - 250 μA | - 40 | - | - | V |
| $V_{GS(th)}$ | Gate-Source Threshold Voltage | $V_{DS}$ = $V_{GS}$, $I_{DS}$ = - 250 μA | - 1 | - | - 2.5 | |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance | $V_{GS}$ = - 10 V, $I_{DS}$ = - 30 A | - | 2.4 | 3 | mΩ |
| | | $V_{GS}$ = - 4.5 V, $I_{DS}$ = - 20 A | | 3.9 | 5.2 | |

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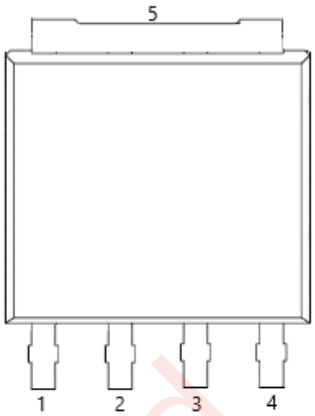
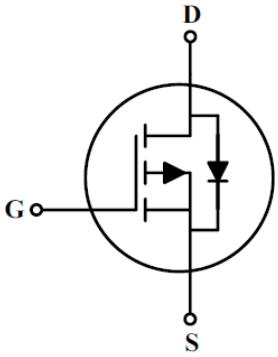
## 2. Ordering Code & Marking Information

| Ordering Code | Marking Information |
|---|---|
| iMF404 | iMF404<br>XXXXX<br>X : Date Code |



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## 3. Pin Description

| Pin | Description | Simplified Outline | Symbol |
|---|---|---|---|
| 1~3 | Source(S) |  |  |
| 4 | Gate(G) | | |
| 5 | Drain(D) | | |





## 4. Limiting Values

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | | - 40 | V |
| $V_{GS}$ | Gate-Source Voltage | | ± 20 | |
| $I_{DS}$ | Drain-Source Current | $T_C$ = 25 ℃, $V_{GS}$ = - 10 V | - 233 | A |
| | | $T_C$ = 100 ℃, $V_{GS}$ = - 10 V | - 165 | |
| $I_{DM}$[Note1] | Pulsed Drain-Source Current | $T_C$ = 25 ℃, $V_{GS}$ = - 10 V | - 700 | A |
| $I_S$ | Diode Forward Current | $T_C$ = 25 ℃, $V_{GS}$ = 0 V | - 233 | |
| $E_{AS}$ | Single Pulsed Avalanche Energy | L = 1.0 mH, $V_{DD}$ = - 40 V | 722 | mJ |
| $P_{tot}$ | Total Power Dissipation | $T_C$ = 25 ℃ | 300 | W |
| $R_{\theta JA}$[Note2] | Thermal Resistance- Junction to Ambient | | 57 | ℃ / W |
| $R_{\theta JC}$ | Thermal Resistance- Junction to Case | | 0.5 | |
| $T_{stg}$ | Storage Temperature | | - 55 ~ 175 | ℃ |
| $T_J$ | Junction Temperature | | 175 | |

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## 5. Electrical Characteristics ($T_A$ = 25 °C Unless Otherwise Noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Static Characteristics | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$ = 0 V, $I_{DS}$ = - 250 μA | - 40 | - | - | V |
| $V_{GS(th)}$ | Gate-Source Threshold Voltage | $V_{DS}$ = $V_{GS}$, $I_{DS}$ = - 250 μA | - 1 | - | - 2.5 | |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$ = - 32 V, $V_{GS}$ = 0 V | - | - | - 1 | μA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{DS}$ = 0 V, $V_{GS}$ = ± 20 V | - | - | ± 100 | nA |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance | $V_{GS}$ = - 10 V, $I_{DS}$ = - 30 A | - | 2.4 | 3.0 | mΩ |
| | | $V_{GS}$ = - 4.5 V, $I_{DS}$ = - 20 A | - | 3.9 | 5.2 | |
| Diode Characteristics | | | | | | |
| $V_{SD}$ | Diode Forward Voltage | $I_{SD}$ = - 30 A, $V_{GS}$ = 0 V | - | - | -1.3 | V |
| $t_{rr}$[Note3] | Reverse Recovery Time | $I_{DS}$ = - 30 A, $V_{GS}$ = 0 V<br>$dI_{SD}/dt$ = 100 A/μs | - | 36 | - | nS |
| $Q_{rr}$[Note3] | Reverse Recovery Charge | | - | 38 | - | nC |
| Dynamic Characteristics[Note3] | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0 V, $V_{DS}$ = - 20 V<br>Frequency = 1 MHz | - | 15704 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 1048 | - | |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 238 | - | |
| $t_d$(on) | Turn-on Delay Time | $V_{DS}$ = - 20 V, $V_{GEN}$ = - 10 V,<br>$R_G$ = 3.9 Ω, $R_L$ = 0.66 Ω,<br>$I_{DS}$ = - 30 A | - | 15 | - | nS |
| $t_r$ | Turn-on Rise Time | | - | 72 | - | |
| $t_d$(off) | Turn-off Delay Time | | - | 330 | - | |
| $t_f$ | Turn-off Fall Time | | - | 96 | - | |
| Gate Charge Characteristics[Note3] | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{DS}$ = - 20 V, $V_{GS}$ = - 10 V,<br>$I_{DS}$ = - 30 A | - | 259 | - | nC |
| $Q_{gs}$ | Gate-Source Charge | | - | 68 | - | |
| $Q_{gd}$ | Gate-Drain Charge | | - | 32 | - | |

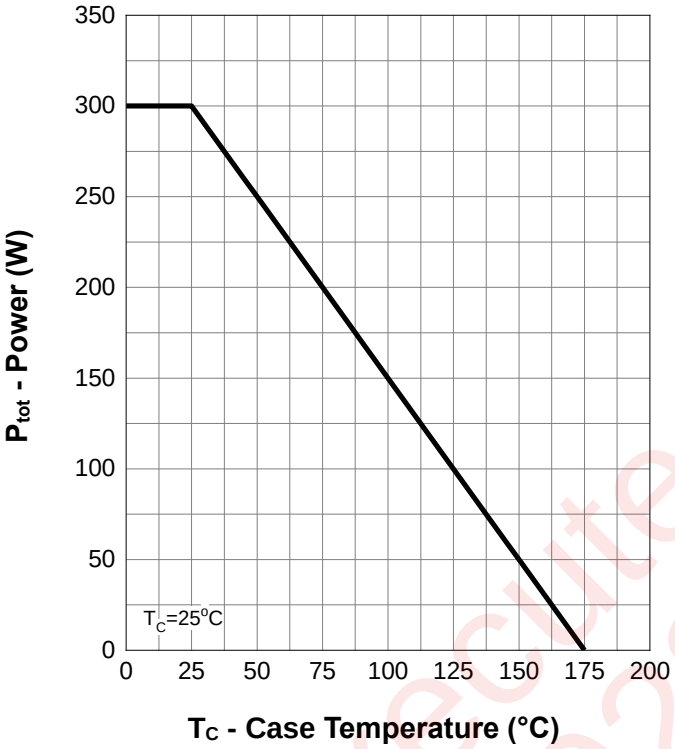
Note 1：Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
Note 2：Surface Mounted on 1 $in^2$ pad area, t ≤ 10 sec.
Note 3：Guaranteed by design, not subject to production testing.

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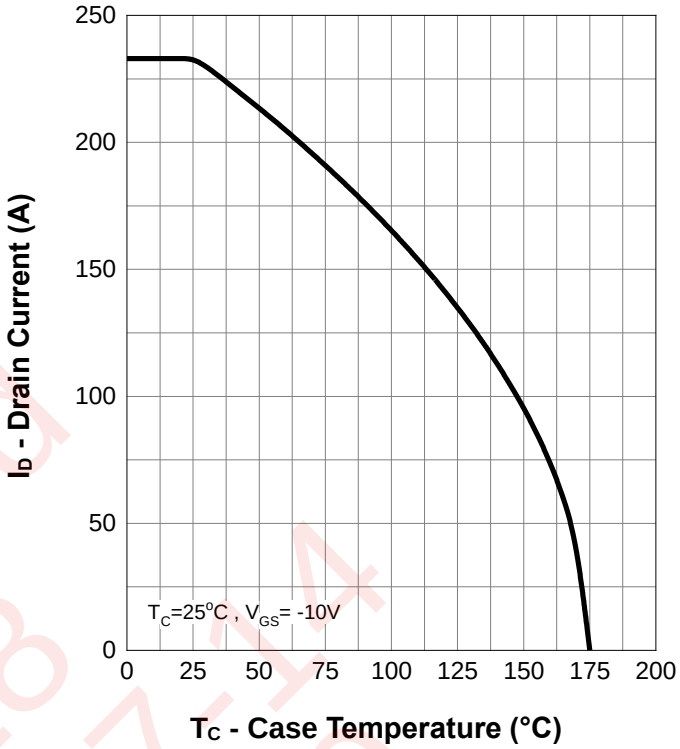

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## 6. Typical Characteristics

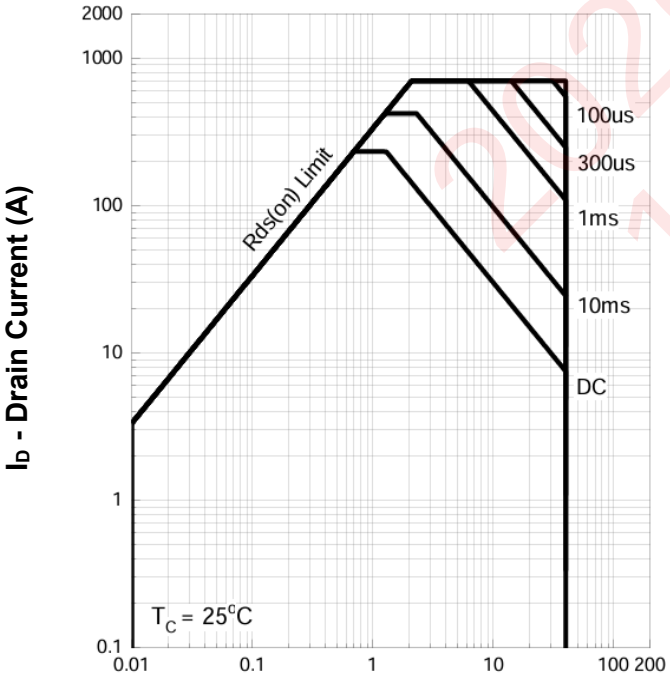
**Power Capability**



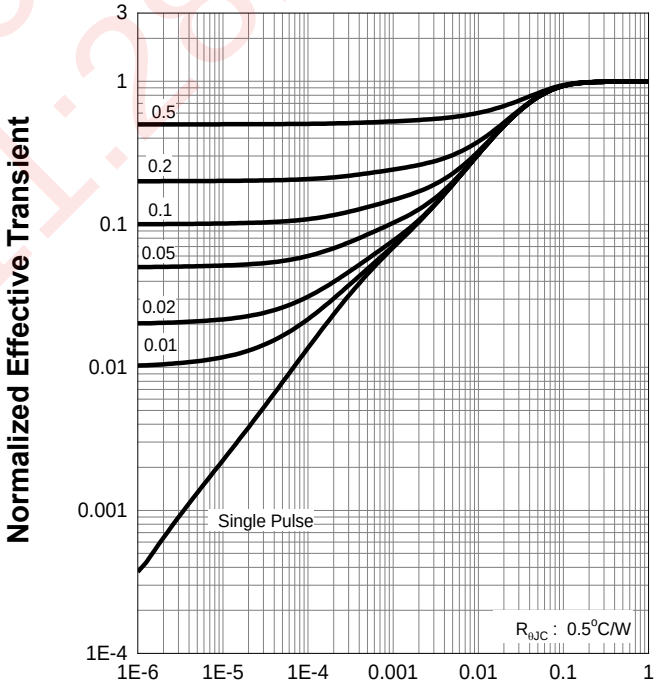

**Current Capability**




**Safe Operating Area**




**Transient Thermal Impedance**

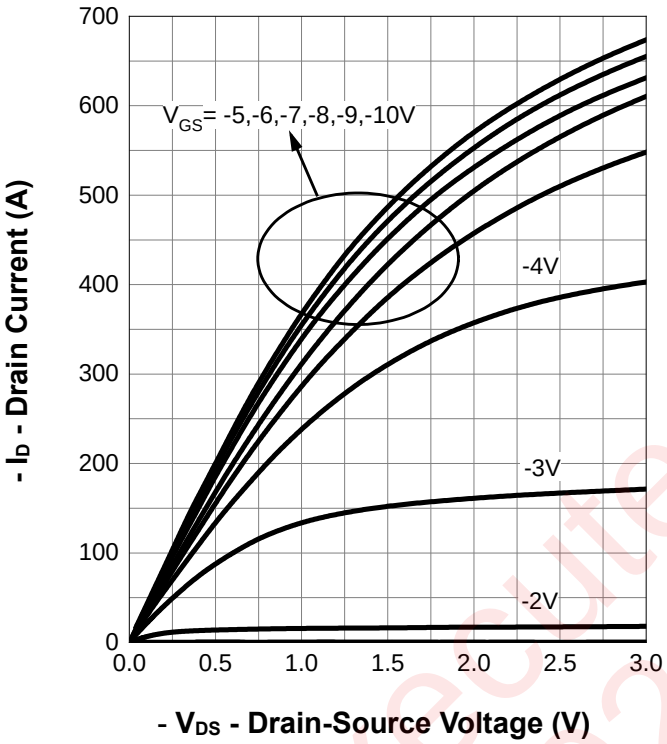



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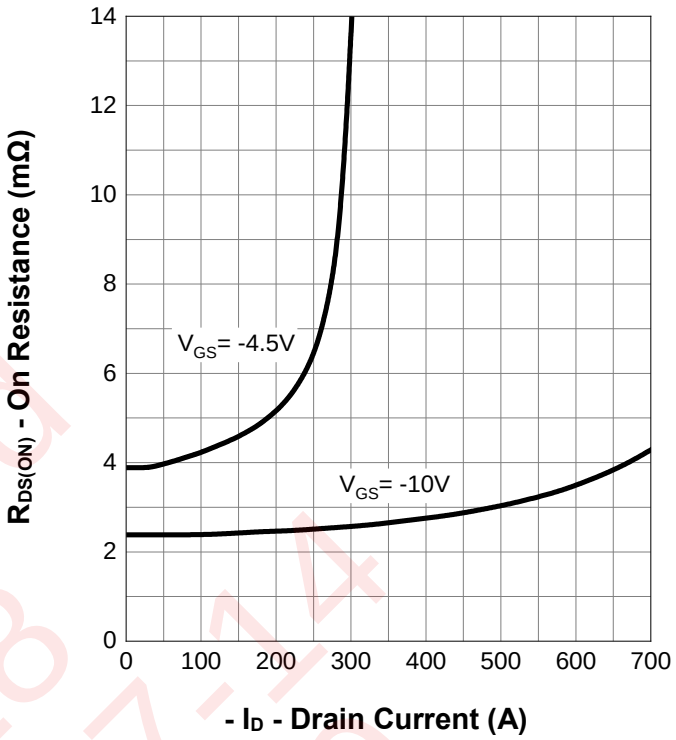

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## 6. Typical Characteristics (cont.)

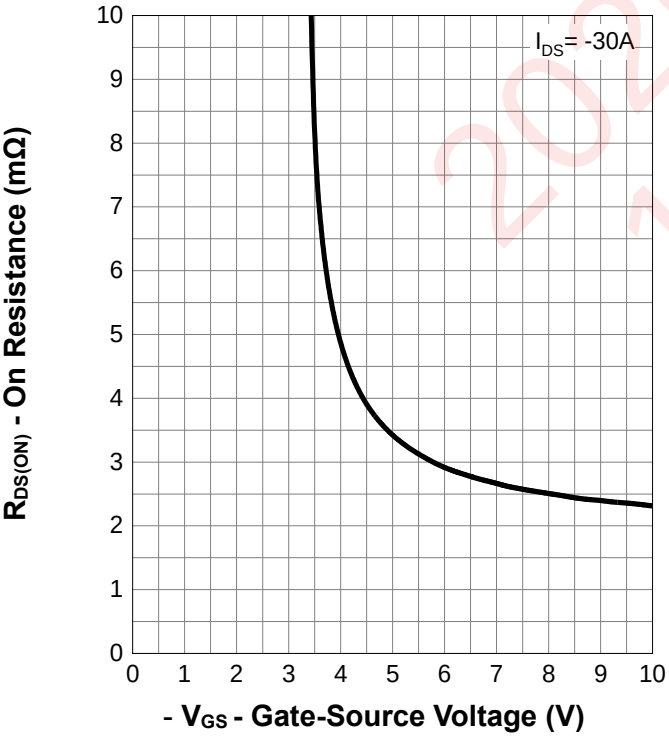
**Output Characteristics**



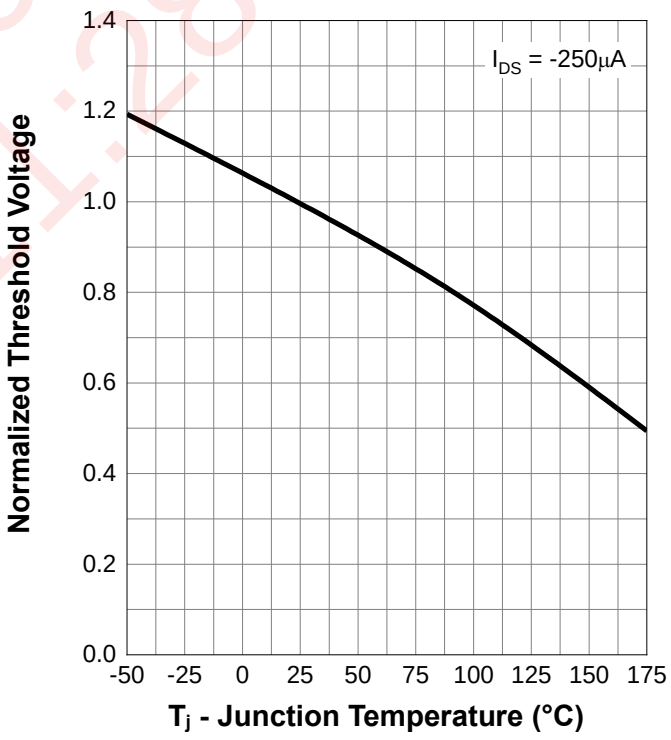

**On Resistance**




**Transfer Characteristics**




**Normalized Threshold Voltage**



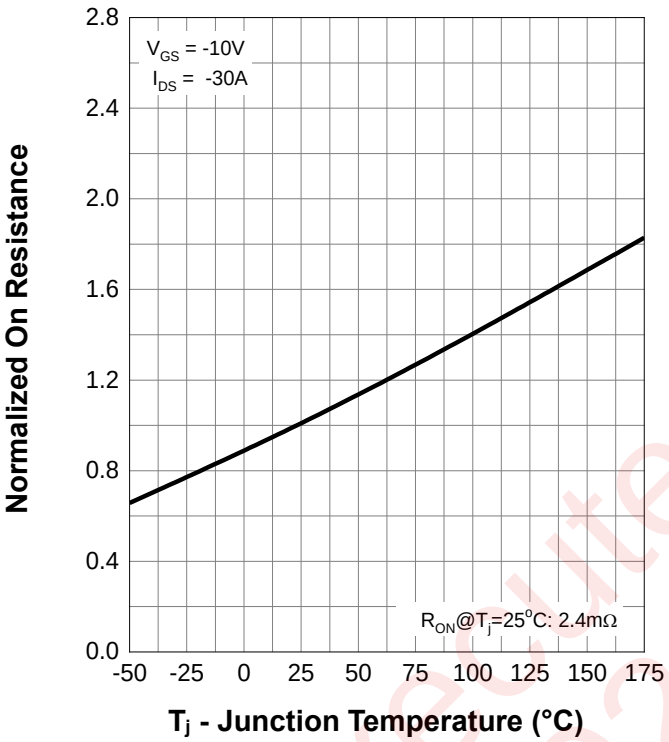

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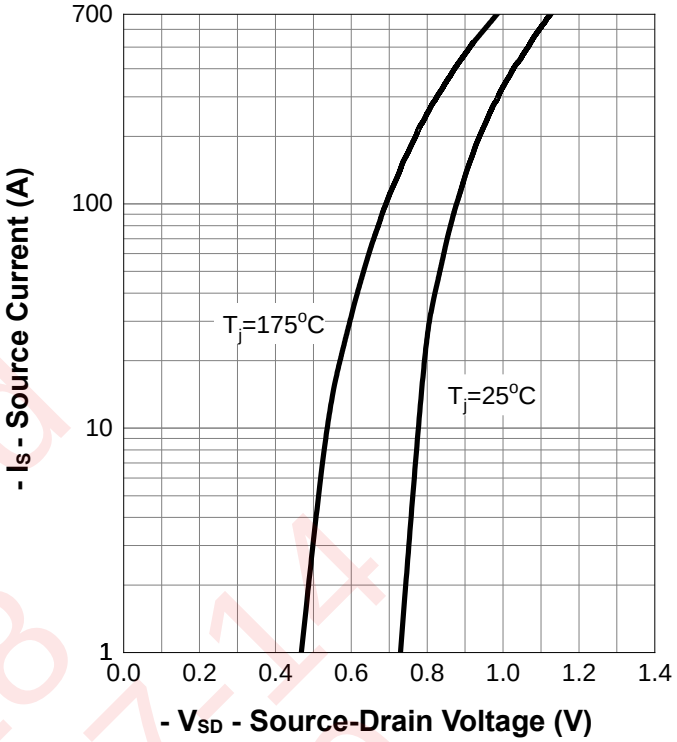
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## 6. Typical Characteristics (cont.)

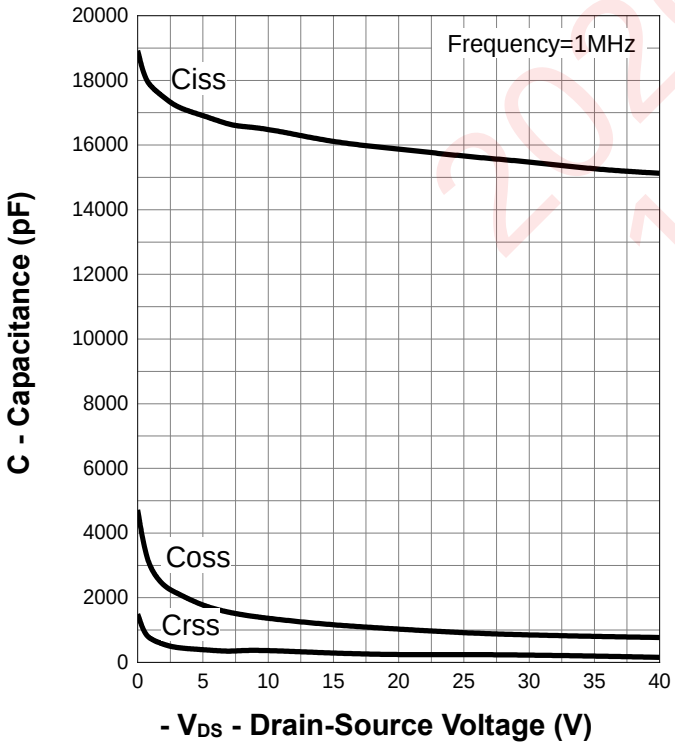
**Normalized On Resistance**



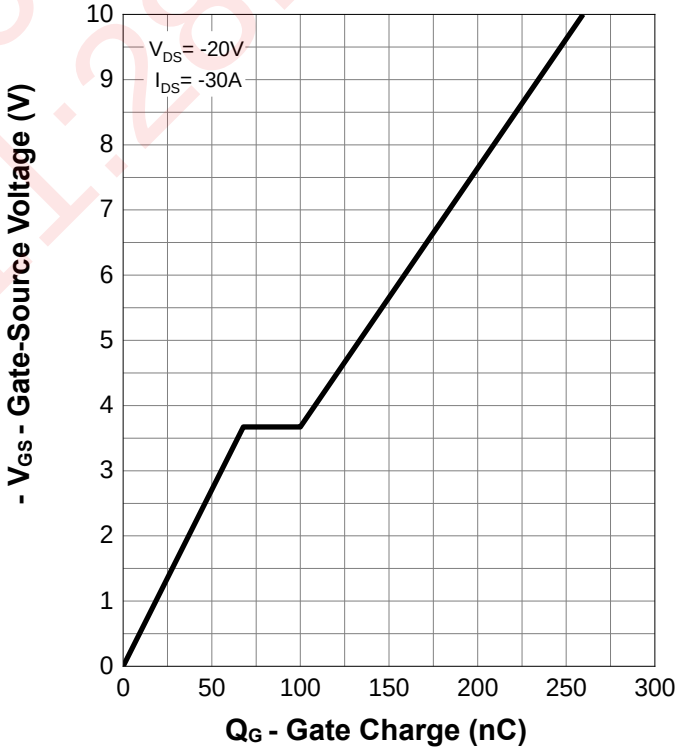

**Diode Forward Current**




**Capacitance**




**Gate Charge**




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