

Complementary MOSFET

ELM34601AA-N

■ General Description

ELM34601AA-N uses advanced trench technology to provide excellent $R_{ds(on)}$ and low gate charge.

■ Features

- | | |
|--|---|
| N-channel | P-channel |
| • $V_{ds}=30V$ | $V_{ds}=-30V$ |
| • $I_d=7A$ | $I_d=-6A$ |
| • $R_{ds(on)} < 21m\Omega (V_{gs}=10V)$ | $R_{ds(on)} < 35m\Omega (V_{gs}=-10V)$ |
| • $R_{ds(on)} < 32m\Omega (V_{gs}=4.5V)$ | $R_{ds(on)} < 60m\Omega (V_{gs}=-4.5V)$ |

■ Maximum Absolute Ratings

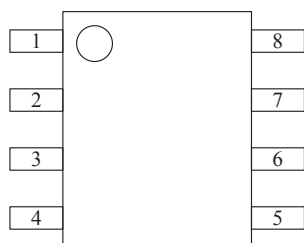
| Parameter | Symbol | N-ch (Max.) | P-ch (Max.) | Unit | Note |
|--|----------------|------------------|-------------|------------|------|
| Drain-source voltage | V_{ds} | 30 | -30 | V | |
| Gate-source voltage | V_{gs} | ± 20 | ± 20 | V | |
| Continuous drain current | I_d | $T_a=25^\circ C$ | 7 | -6 | A |
| | | $T_a=70^\circ C$ | 6 | -5 | |
| Pulsed drain current | I_{dm} | 28 | -24 | A | 3 |
| Power dissipation | P_d | $T_a=25^\circ C$ | 2.0 | 2.0 | W |
| | | $T_a=70^\circ C$ | 1.3 | 1.3 | |
| Junction and storage temperature range | T_j, T_{stg} | -55 to 150 | -55 to 150 | $^\circ C$ | |

■ Thermal Characteristics

| Parameter | Symbol | Device | Typ. | Max. | Unit | Note |
|-----------------------------|-----------------|--------|------|------|--------------|------|
| Maximum junction-to-ambient | $R_{\theta ja}$ | N-ch | | 62.5 | $^\circ C/W$ | |
| Maximum junction-to-ambient | $R_{\theta ja}$ | P-ch | | 62.5 | $^\circ C/W$ | |

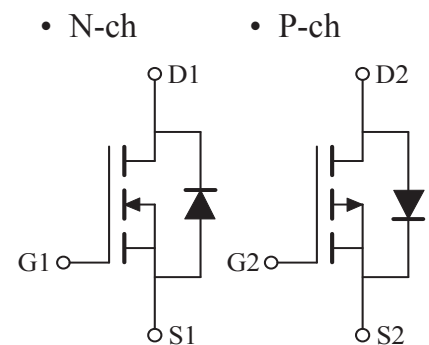
■ Pin configuration

SOP-8(TOP VIEW)



| Pin No. | Pin name |
|---------|----------|
| 1 | SOURCE1 |
| 2 | GATE1 |
| 3 | SOURCE2 |
| 4 | GATE2 |
| 5 | DRAIN2 |
| 6 | DRAIN2 |
| 7 | DRAIN1 |
| 8 | DRAIN1 |

■ Circuit



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■Electrical Characteristics (N-ch)

Ta=25°C

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit | Note |
|------------------------------------|---------|------------------------------------|------|------|------|------|------|
| STATIC PARAMETERS | | | | | | | |
| Drain-source breakdown voltage | BVdss | Id=250μA, Vgs=0V | 30 | | | V | |
| Zero gate voltage drain current | Idss | Vds=24V, Vgs=0V | | | 1 | μA | |
| | | Vds=20V, Vgs=0V, Tj=55°C | | | 10 | | |
| Gate-body leakage current | Igss | Vds=0V, Vgs=±20V | | | ±100 | nA | |
| Gate threshold voltage | Vgs(th) | Vds=Vgs, Id=250μA | 0.8 | 1.5 | 2.5 | V | |
| On state drain current | Id(on) | Vgs=10V, Vds=5V | 28 | | | A | 1 |
| Static drain-source on-resistance | Rds(on) | Vgs=10V, Id=7A | | 14 | 21 | mΩ | 1 |
| | | Vgs=4.5V, Id=6A | | 21 | 32 | | |
| Forward transconductance | Gfs | Vds=10V, Id=5A | | 8 | | S | 1 |
| Diode forward voltage | Vsd | If=1A, Vgs=0V | | | 1 | V | 1 |
| Max.body-diode continuous current | Is | | | | 3 | A | |
| Pulsed current | Ism | | | | 6 | A | 3 |
| DYNAMIC PARAMETERS | | | | | | | |
| Input capacitance | Ciss | Vgs=0V, Vds=10V, f=1MHz | | 1700 | | pF | |
| Output capacitance | Coss | | | 380 | | pF | |
| Reverse transfer capacitance | Crss | | | 260 | | pF | |
| SWITCHING PARAMETERS | | | | | | | |
| Total gate charge | Qg | Vgs=10V, Vds=15V, Id=6A | | 40 | | nC | 2 |
| Gate-source charge | Qgs | | | 28 | | nC | 2 |
| Gate-drain charge | Qgd | | | 12 | | nC | 2 |
| Turn-on delay time | td(on) | Vgs=10V, Vds=15V, Id≈1A Rgen=6Ω | | 20 | | ns | 2 |
| Turn-on rise time | tr | | | 10 | | ns | 2 |
| Turn-off delay time | td(off) | | | 120 | | ns | 2 |
| Turn-off fall time | tf | | | 35 | | ns | 2 |
| Body-diode reverse recovery time | trr | If=5A, dl/dt=100A/μs | | 15.5 | | ns | |
| Body-diode reverse recovery charge | Qrr | | | 7.9 | | nC | |

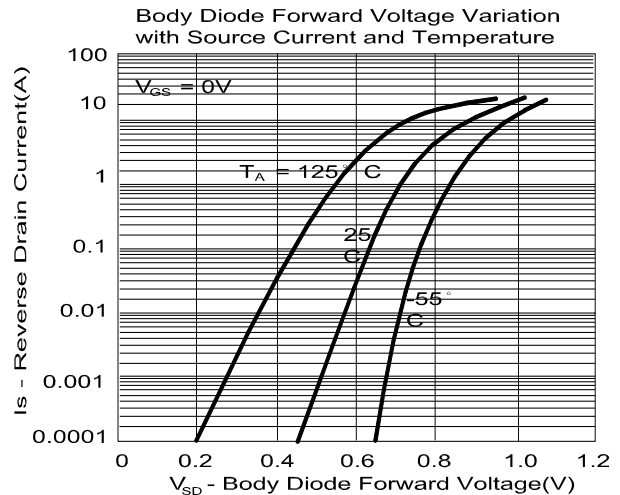
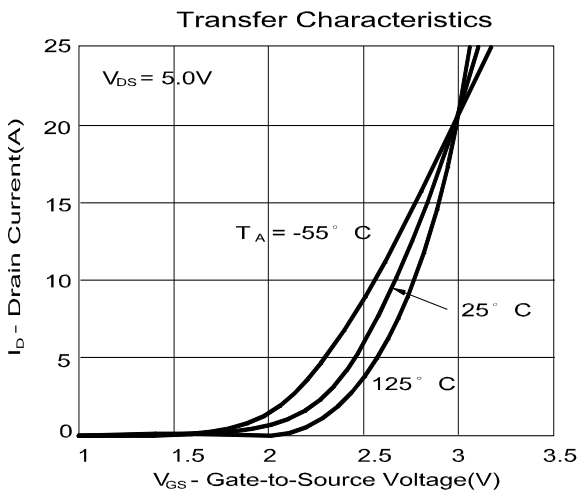
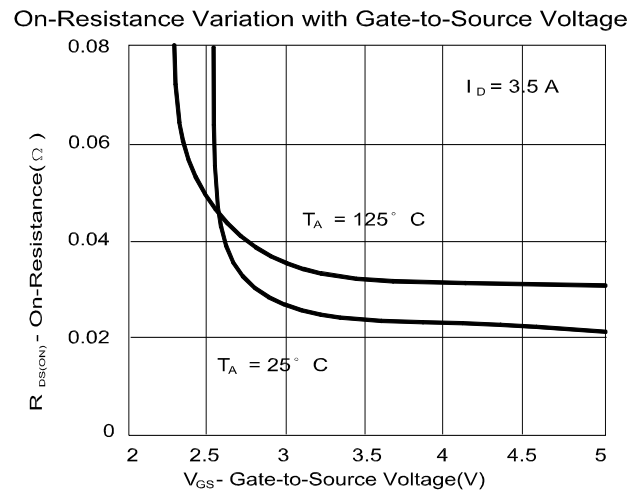
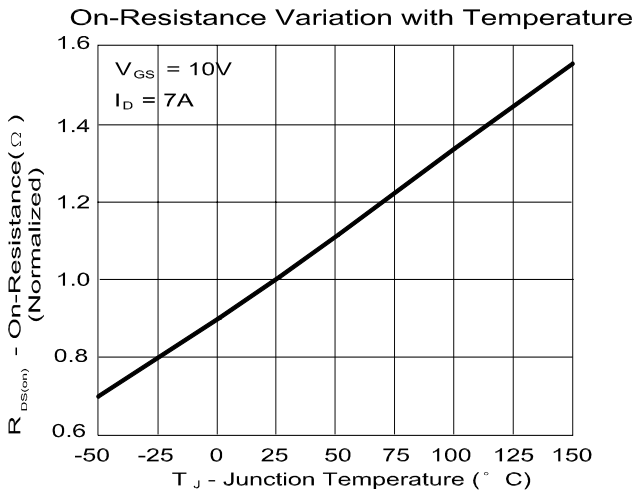
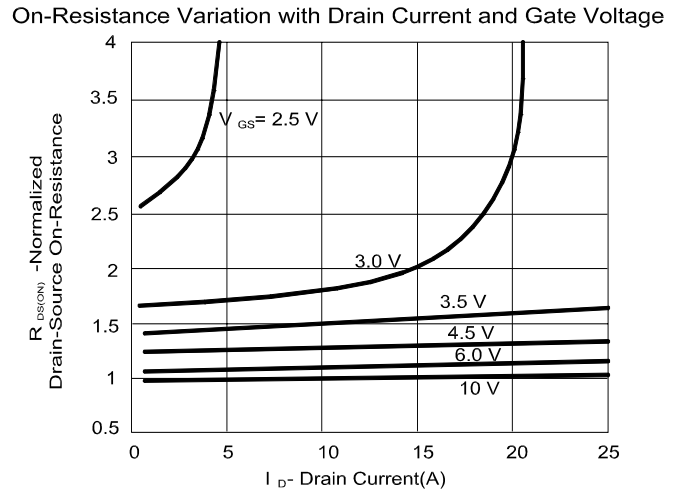
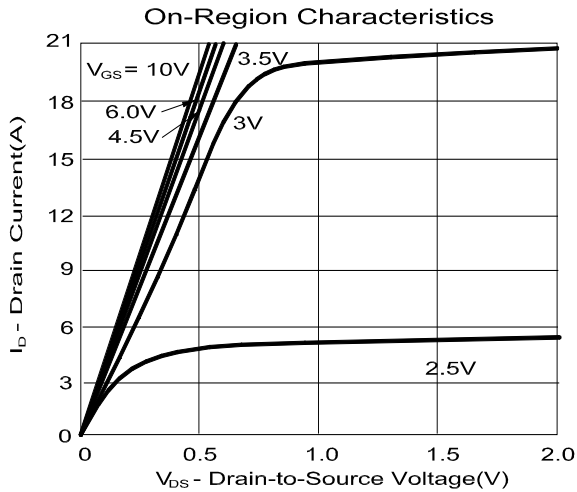
NOTE :

1. Pulse test : Pulsed width≤300μsec and Duty cycle≤2%.
2. Independent of operating temperature.
3. Pulsed width limited by maximum junction temperature.
4. Duty cycle ≤ 1%.

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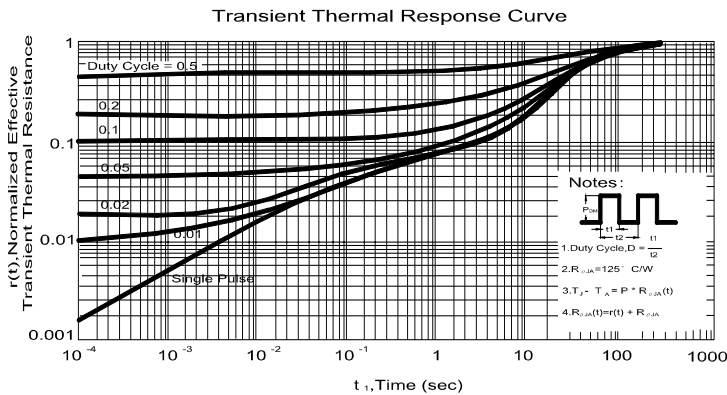
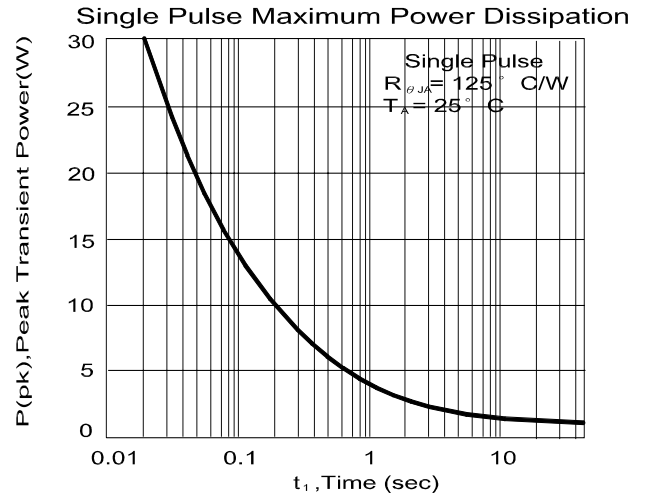
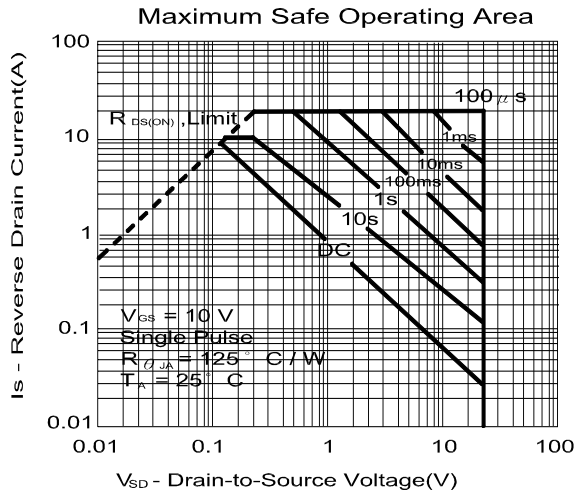
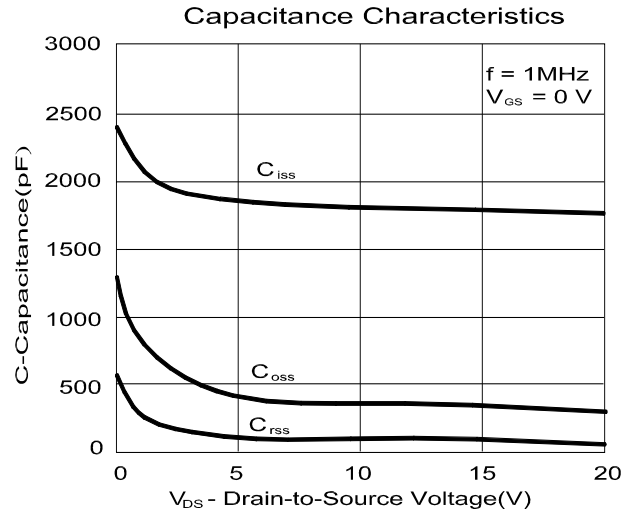
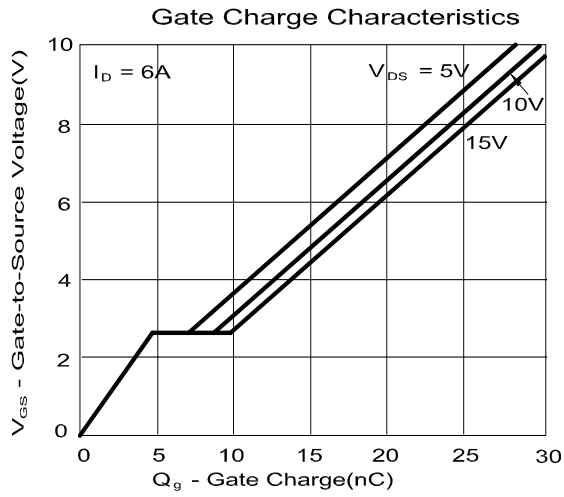
ELM34601AA-N

■ Typical Electrical and Thermal Characteristics (N-ch)



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Complementary MOSFET

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■Electrical Characteristics (P-ch)

Ta=25°C

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit | Note |
|------------------------------------|---------|--|------|------|------|------|------|
| STATIC PARAMETERS | | | | | | | |
| Drain-source breakdown voltage | BVdss | Id=-250μA, Vgs=0V | -30 | | | V | |
| Zero gate voltage drain current | Idss | Vds=-24V, Vgs=0V | | | -1 | μA | |
| | | Vds=-20V, Vgs=0V, Tj=55°C | | | -10 | | |
| Gate-body leakage current | Igss | Vds=0V, Vgs=±20V | | | ±100 | nA | |
| Gate threshold voltage | Vgs(th) | Vds=Vgs, Id=-250μA | -0.8 | -1.5 | -2.5 | V | |
| On state drain current | Id(on) | Vgs=-10V, Vds=-5V | -24 | | | A | 1 |
| Static drain-source on-resistance | Rds(on) | Vgs=-10V, Id=-6A | | 28 | 35 | mΩ | 1 |
| | | Vgs=-4.5V, Id=-5A | | 44 | 60 | | |
| Forward transconductance | Gfs | Vds=-10V, Id=-5A | | 7 | | S | 1 |
| Diode forward voltage | Vsd | If=-1A, Vgs=0V | | | -1 | V | 1 |
| Max.body-diode continuous current | Is | | | | -3 | A | |
| Pulsed current | Ism | | | | -6 | A | 3 |
| DYNAMIC PARAMETERS | | | | | | | |
| Input capacitance | Ciss | Vgs=0V, Vds=-10V, f=1MHz | | 970 | | pF | |
| Output capacitance | Coss | | | 370 | | pF | |
| Reverse transfer capacitance | Crss | | | 180 | | pF | |
| SWITCHING PARAMETERS | | | | | | | |
| Total gate charge | Qg | Vgs=-10V, Vds=-15V Id=-5A | | 28 | | nC | 2 |
| Gate-source charge | Qgs | | | 6 | | nC | 2 |
| Gate-drain charge | Qgd | | | 12 | | nC | 2 |
| Turn-on delay time | td(on) | Vgs=-10V, Vds=-15V Id≈-1A, Rl=1Ω, Rgen=6Ω | | 20 | | ns | 2 |
| Turn-on rise time | tr | | | 17 | | ns | 2 |
| Turn-off delay time | td(off) | | | 160 | | ns | 2 |
| Turn-off fall time | tf | | | 75 | | ns | 2 |
| Body-diode reverse recovery time | trr | If=-5A, dl/dt=100A/μs | | 15.5 | | ns | |
| Body-diode reverse recovery charge | Qrr | | | 7.9 | | nC | |

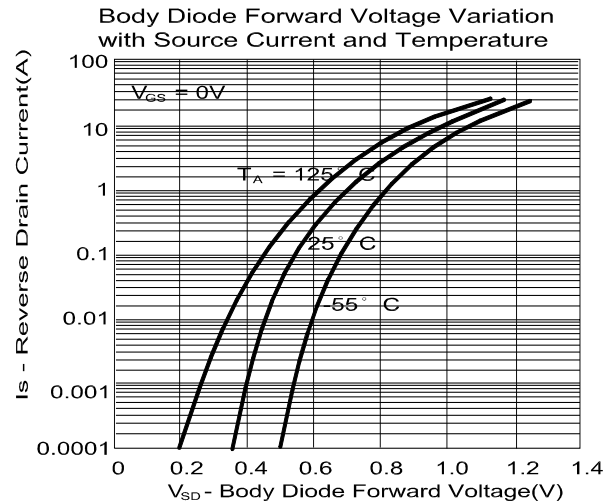
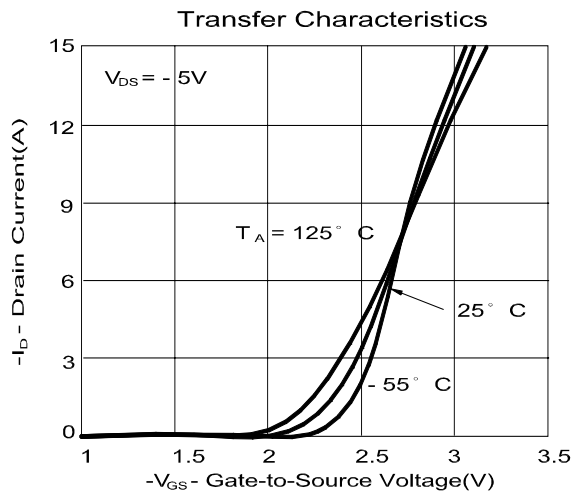
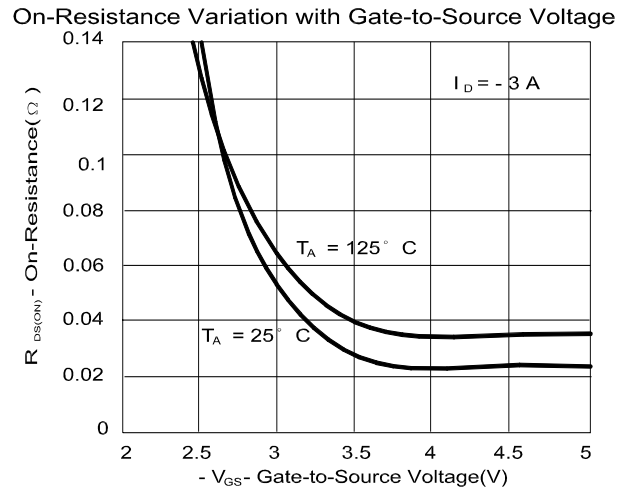
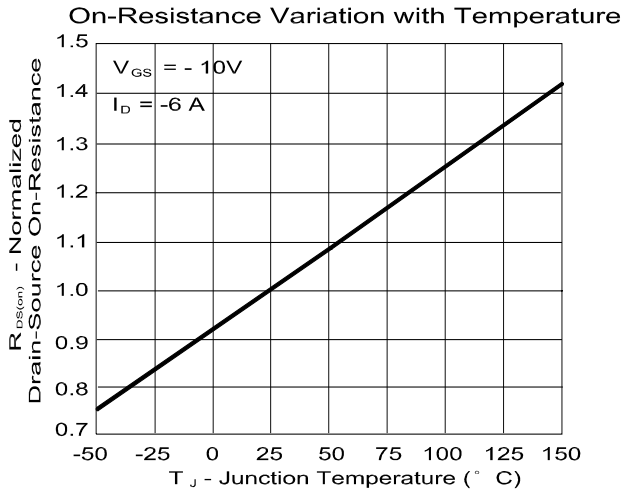
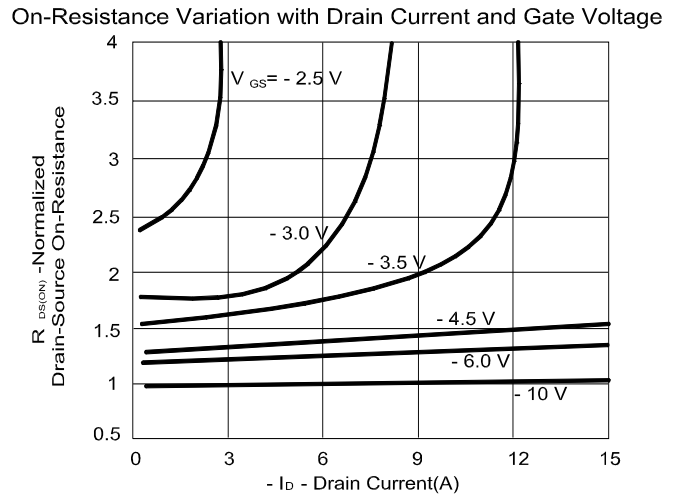
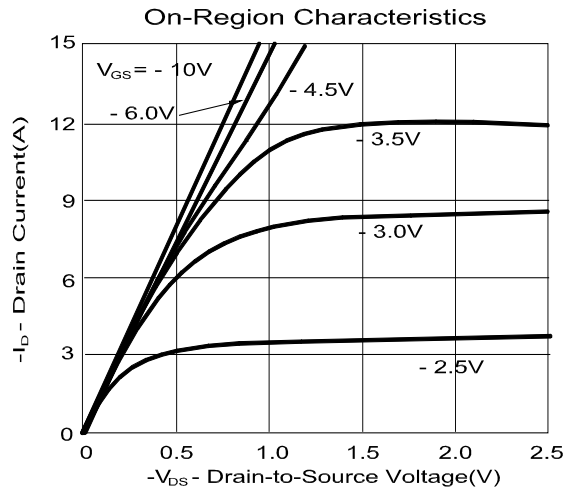
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