

Analog Power AM20N06-90I MOSFET Datasheet

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Key Features:

Low $r_{DS(on)}$ trench technology

Low thermal impedance

Fast switching speed

Typical Applications:

White LED boost converters

Automotive Systems

Industrial DC/DC Conversion Circuits

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N-Channel 60-V (D-S) MOSFET

Key Features:

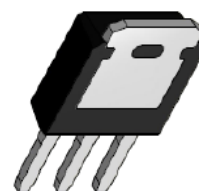
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

Typical Applications:

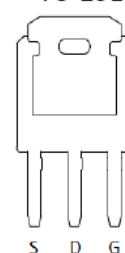
- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits



RoHS
COMPLIANT
HALOGEN
FREE



TO-251



| PRODUCT SUMMARY | | |
|-----------------|----------------------------|-----------|
| V_{DS} (V) | $r_{DS(on)}$ (m Ω) | I_D (A) |
| 60 | 94 @ $V_{GS} = 10V$ | 19 |
| | 109 @ $V_{GS} = 4.5V$ | 18 |

| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) | | | | |
|---|--------------------------|----------------|------------|------------------|
| Parameter | | Symbol | Limit | Units |
| Drain-Source Voltage | | V_{DS} | 60 | V |
| Gate-Source Voltage | | V_{GS} | ± 20 | |
| Continuous Drain Current ^a | $T_A = 25^\circ\text{C}$ | I_D | 19 | A |
| Pulsed Drain Current ^b | | I_{DM} | 75 | |
| Continuous Source Current (Diode Conduction) ^a | | I_S | 42 | A |
| Power Dissipation ^a | $T_A = 25^\circ\text{C}$ | P_D | 50 | W |
| Operating Junction and Storage Temperature Range | | T_J, T_{stg} | -55 to 150 | $^\circ\text{C}$ |

| THERMAL RESISTANCE RATINGS | | | |
|--|-----------------|---------|--------------------|
| Parameter | Symbol | Maximum | Units |
| Maximum Junction-to-Ambient ^a | $R_{\theta JA}$ | 40 | $^\circ\text{C/W}$ |
| Maximum Junction-to-Case | $R_{\theta JC}$ | 3 | |

Notes

- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

Electrical Characteristics

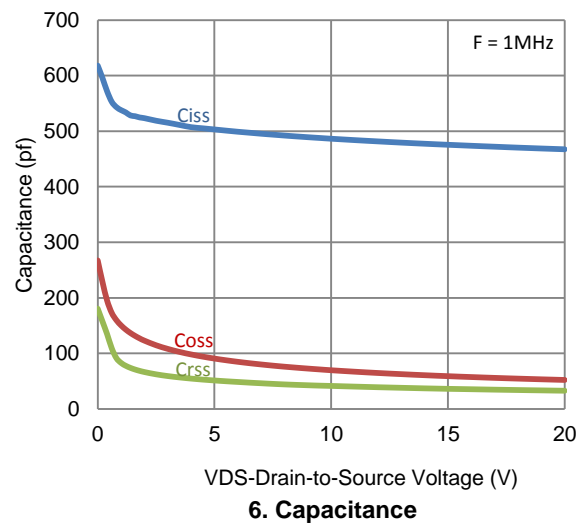
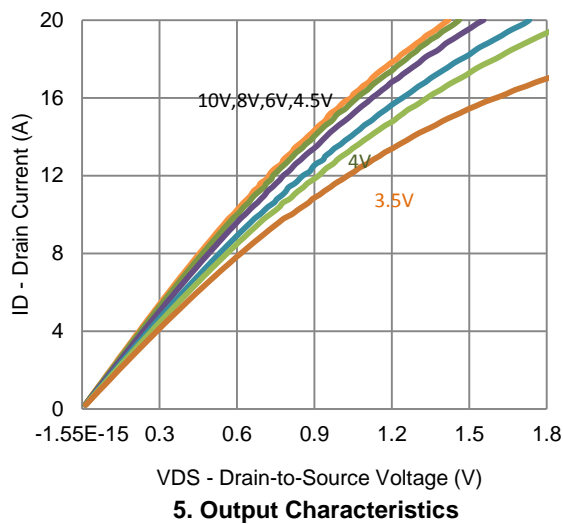
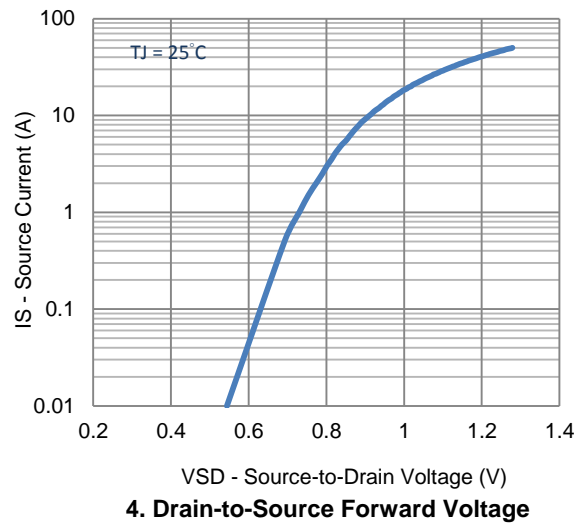
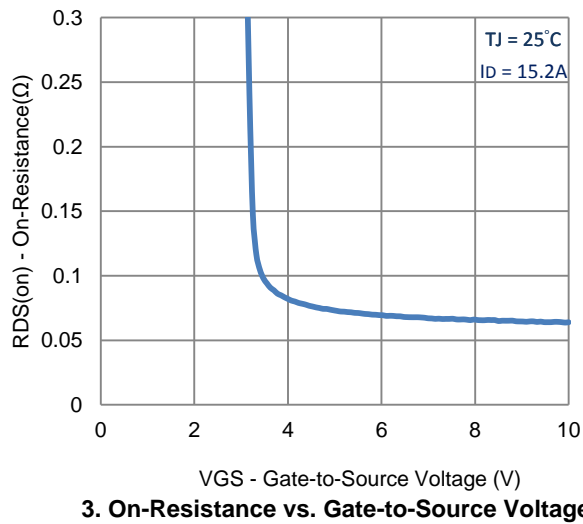
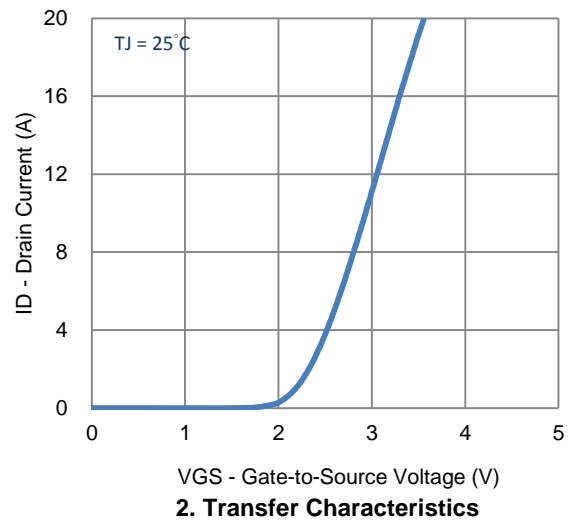
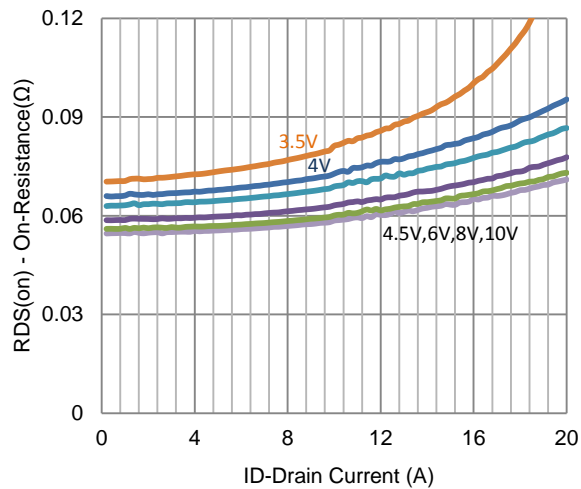
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---------------------------------|--------------|---|-----|------|-----------|------|
| Static | | | | | | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250 \mu A$ | 1 | | | V |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0 V, V_{GS} = \pm 20 V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 48 V, V_{GS} = 0 V$ | | | 1 | uA |
| | | $V_{DS} = 48 V, V_{GS} = 0 V, T_J = 55^\circ C$ | | | 25 | |
| On-State Drain Current | $I_{D(on)}$ | $V_{DS} = 5 V, V_{GS} = 10 V$ | 30 | | | A |
| Drain-Source On-Resistance | $r_{DS(on)}$ | $V_{GS} = 10 V, I_D = 15.2 A$ | | | 94 | mΩ |
| | | $V_{GS} = 4.5 V, I_D = 14 A$ | | | 109 | |
| Forward Transconductance | g_{fs} | $V_{DS} = 15 V, I_D = 15.2 A$ | | 20 | | S |
| Diode Forward Voltage | V_{SD} | $I_S = 21 A, V_{GS} = 0 V$ | | 1.03 | | V |
| Dynamic | | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = 30 V, V_{GS} = 4.5 V, I_D = 15.2 A$ | | 5.1 | | nC |
| Gate-Source Charge | Q_{gs} | | | 2.3 | | |
| Gate-Drain Charge | Q_{gd} | | | 2.0 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DS} = 30 V, R_L = 2 \Omega, I_D = 15.2 A, V_{GEN} = 10 V, R_{GEN} = 6 \Omega$ | | 4 | | ns |
| Rise Time | t_r | | | 9 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 17 | | |
| Fall Time | t_f | | | 19 | | |
| Input Capacitance | C_{iss} | $V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz$ | | 475 | | pF |
| Output Capacitance | C_{oss} | | | 59 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 36 | | |

Notes

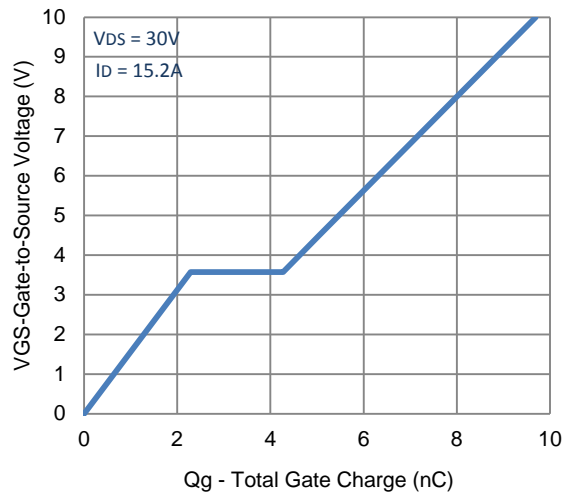
- Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

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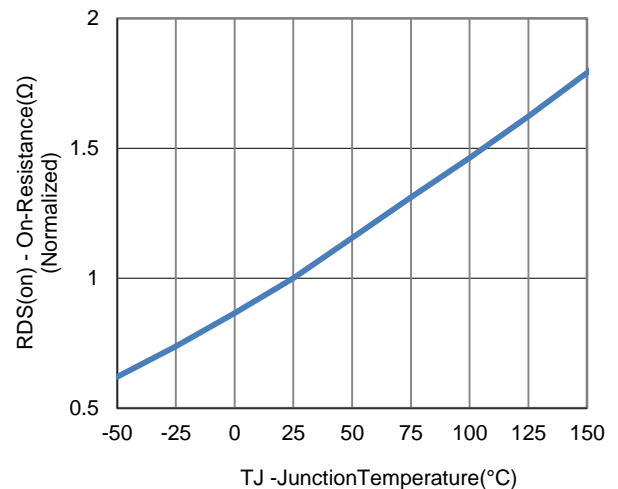
Typical Electrical Characteristics



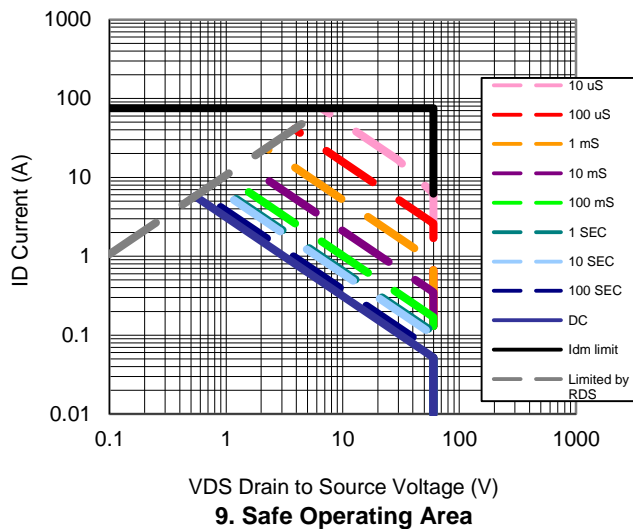
Typical Electrical Characteristics



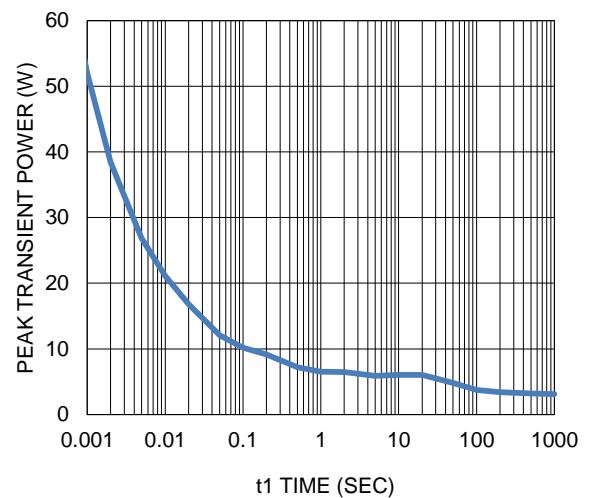
7. Gate Charge



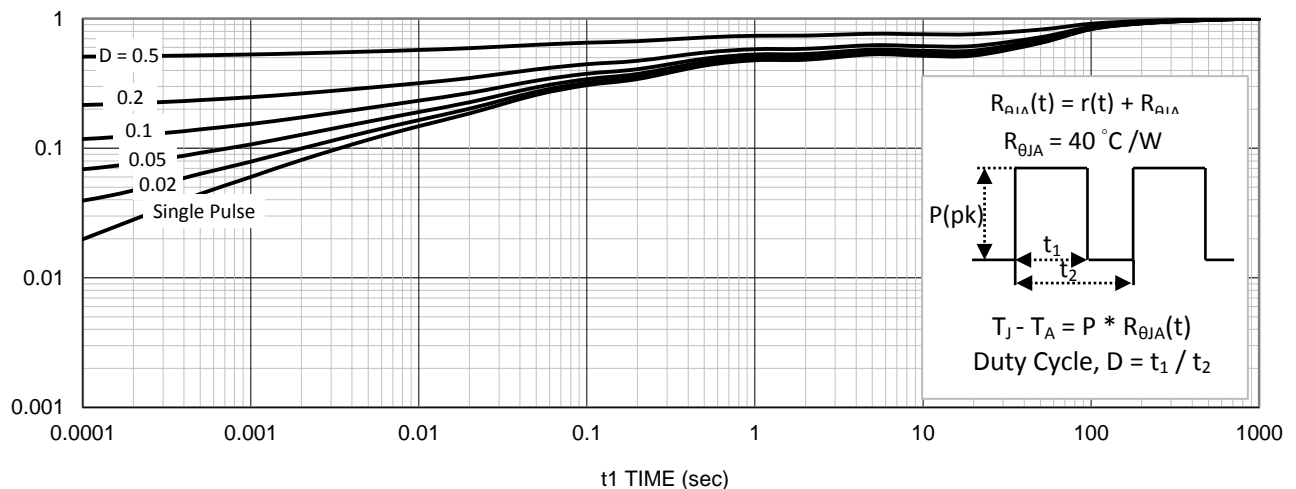
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



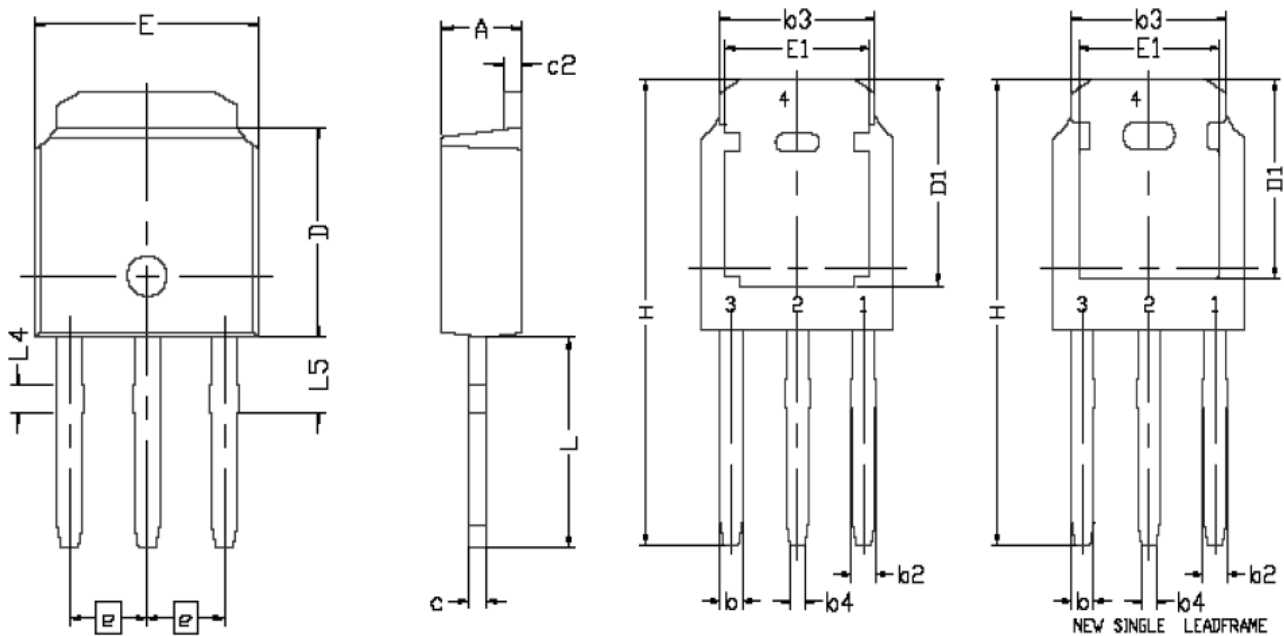
10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information

Package Information



| SYMBOL | DIMENSIONAL REQMTS | | |
|--------|--------------------|-------|-------|
| | MIN | NOM | MAX |
| E | 6.40 | 6.60 | 6.731 |
| L | 5.08 | 6.08 | 6.28 |
| L4 | 0.66 | 0.76 | 0.86 |
| L5 | 1.96 | 2.16 | 2.36 |
| D | 6.00 | 6.10 | 6.223 |
| H | 12.90 | 13.20 | 13.50 |
| b | 0.64 | 0.76 | 0.88 |
| b2 | 0.77 | 0.84 | 1.14 |
| b3 | 5.21 | 5.34 | 5.46 |
| b4 | 0.41 | 0.51 | 0.61 |
| e | 2.286 BSC | | |
| A | 2.20 | 2.30 | 2.38 |
| c | 0.40 | 0.50 | 0.60 |
| c2 | 0.40 | 0.50 | 0.60 |
| D1 | 5.30 | -- | -- |
| E1 | 4.40 | -- | -- |