

MS48P25

P-Channel 30-V (D-S) MOSFET

Description

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low $R_{DS(on)}$ and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, and PCMCIA cards, cellular and cordless telephones.

Features

- Low $r_{DS(on)}$ provides higher efficiency and extends battery life
- Low thermal impedance copper lead frame SOIC-8 saves board space
- Fast switching speed
- RoHS compliant package

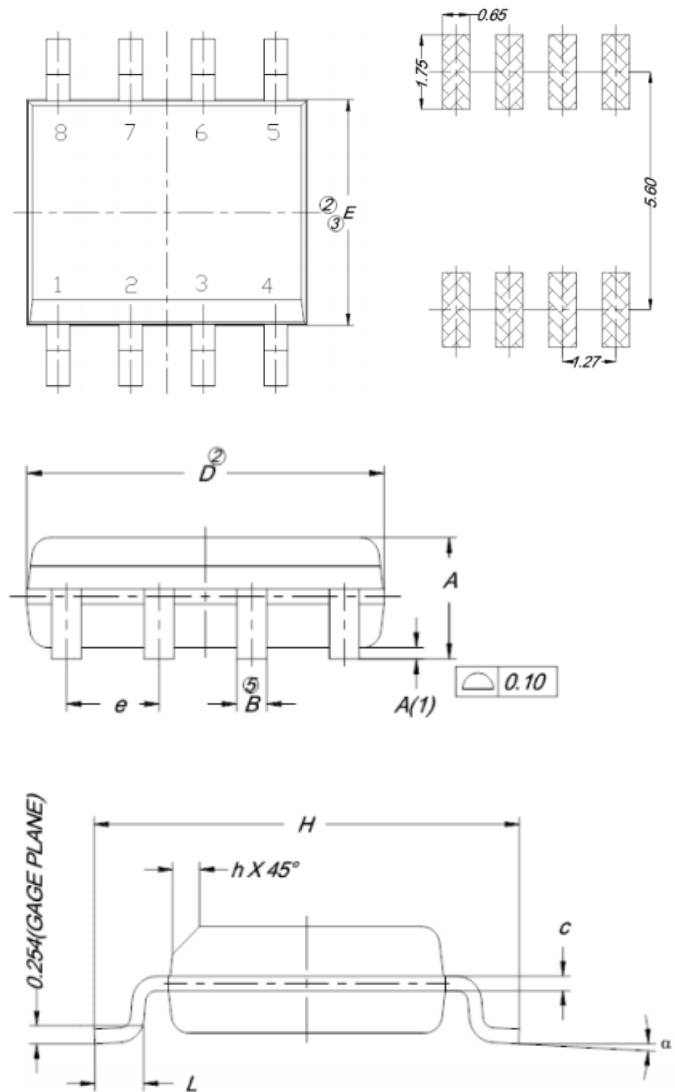
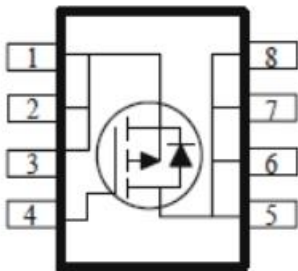
Packing & Order Information

3,000/Reel



**RoHS
COMPLIANT**

Graphic symbol



| DIM. | MILLIMETERS | | |
|----------|-------------|------|------|
| | MIN. | NOM. | MAX. |
| A | 1.35 | 1.55 | 1.75 |
| A(1) | 0.10 | 0.18 | 0.25 |
| B | 0.38 | 0.45 | 0.51 |
| C | 0.19 | 0.22 | 0.25 |
| D | 4.80 | 4.90 | 5.00 |
| E | 3.80 | 3.90 | 4.00 |
| e | 1.27 BSC | | |
| H | 5.80 | 6.00 | 6.20 |
| L | 0.50 | 0.72 | 0.93 |
| α | 0° | 4° | 8° |
| h | 0.25 | 0.38 | 0.50 |

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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Value | Unit |
|---------------|--|-------------|------------------|
| V_{DS} | Drain-Source Voltage | -30 | V |
| V_{GS} | Gate-Source Voltage | ± 25 | V |
| I_D | Continuous Drain Current ^a ($T_A=25^\circ\text{C}$) | -11.5 | A |
| | Continuous Drain Current ^a ($T_A=70^\circ\text{C}$) | -9.3 | A |
| I_{DM} | Pulsed Drain Current ^b | -50 | A |
| I_S | Continuous Source Current (Diode Conduction) ^a | ± 4.3 | A |
| P_D | Power Dissipation ^a ($T_A=25^\circ\text{C}$) | 3.1 | W |
| | Power Dissipation ^a ($T_A=70^\circ\text{C}$) | 2.2 | W |
| T_J/T_{STG} | Operating Junction and Storage Temperature | -55 to +150 | $^\circ\text{C}$ |

Thermal characteristics ($T_c=25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Maximum | Units |
|-----------------|---|---------|--------------------|
| $R_{\theta JA}$ | Maximum Junction-to-Ambient C/W ^a ($t \leq 10$ sec) | 40 | $^\circ\text{C/W}$ |
| | Maximum Junction-to-Ambient C/W ^a (Steady-State) | 80 | |

Notes

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

Static

| Symbol | Parameter | Test Conditions | Min | Typ. | Max. | Units |
|--------------|---------------------------------|--|-------|------|-----------|---------------|
| $V_{GS(th)}$ | Gate-Source Threshold Voltage | $V_{DS} = V_{GS}$, $I_D = -250\mu\text{A}$ | -1.0 | | | V |
| I_{GSS} | Gate-Body Leakage | $V_{DS} = 0$ V, $V_{GS} = \pm 25$ V | | | ± 100 | nA |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = -24$ V, $V_{GS} = 0$ V $V_{DS} = -24$ V, $V_{GS} = 0$ V, $T_J = 55^\circ\text{C}$ | | | -1 -25 | μA |
| $I_{D(on)}$ | On-State Drain Current | $V_{DS} = 5$ V, $V_{GS} = 10$ V | -5.75 | | | A |
| $I_{DS(on)}$ | Drain-Source On-Resistance | $V_{DS} = 10$ V, $I_D = -9.2$ A $V_{DS} = -4.5$ V, $I_D = -7.5$ A | | | 13 19 | m Ω |
| g_{fs} | Forward Transconductance | $V_{GS} = -15$ V, $I_D = -9.2$ A | | 40 | | S |
| V_{SD} | Diode Forward Voltage | $I_S = -2.2$ A, $V_{GS} = 0$ V | | -0.7 | | V |

Dynamic

| Symbol | Parameter | Test Conditions | Min | Typ. | Max. | Units |
|----------|--------------------|--|-----|------|------|-------|
| Q_g | Total Gate Charge | $V_{DS} = -15$ V, $I_D = -9.2$ A, $V_{GS} = -4.5$ V | -- | 42 | -- | nC |
| Q_{gs} | Gate-Source Charge | | -- | 13 | -- | nC |
| Q_{gd} | Gate-Drain Charge | | -- | 20 | -- | nC |

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| Dynamic | | | | | | |
|--------------|------------------------------|---|-----|------|------|-------|
| Symbol | Parameter | Test Conditions | Min | Typ. | Max. | Units |
| $t_{d(on)}$ | Turn-On Delay Time | $I_D = -9.2 \text{ A}$, $R_L = 1.7 \Omega$, $V_{GEN} = -10 \text{ V}$, $R_{GEN} = 6 \Omega$ $V_{DS} = -15 \text{ V}$ | -- | 9 | -- | ns |
| t_r | Rise Time | | -- | 48 | -- | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | -- | 104 | -- | ns |
| t_f | Fall Time | | -- | 59 | -- | ns |
| C_{ISS} | Input Capacitance | $V_{DS} = -15 \text{ V}$ $f = 1 \text{ MHz}$, $V_{GS} = 0 \text{ V}$ | -- | 2380 | -- | pF |
| C_{OSS} | Output Capacitance | | -- | 369 | -- | pF |
| C_{RSS} | Reverse Transfer Capacitance | | -- | 350 | -- | pF |

Notes

- Pulse test: $PW \leq 300\mu s$ duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.

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Typical Electrical Characteristics

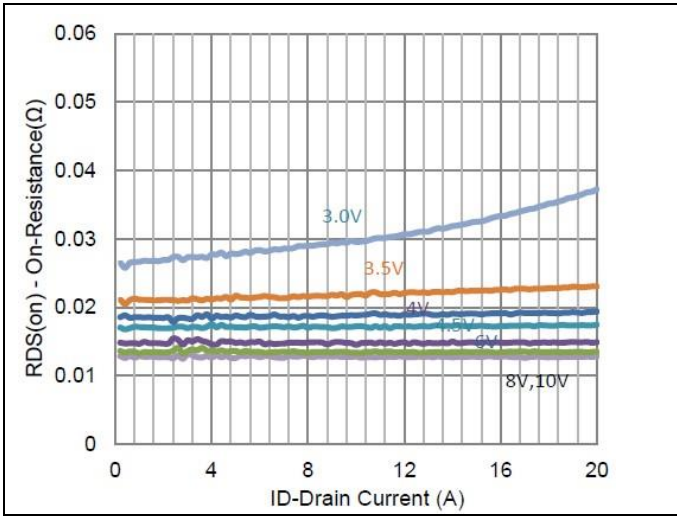


FIG.1-ON REGION CHARACTERISTICS

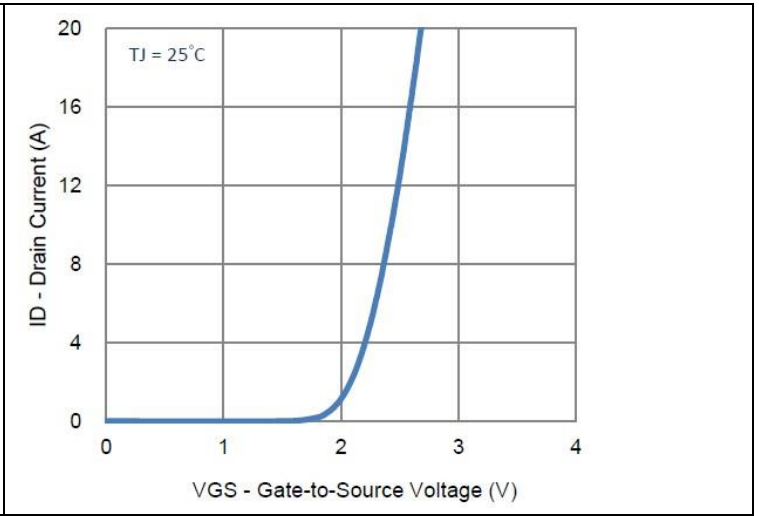


FIG.2-TRANSFER CHARACTERISTICS

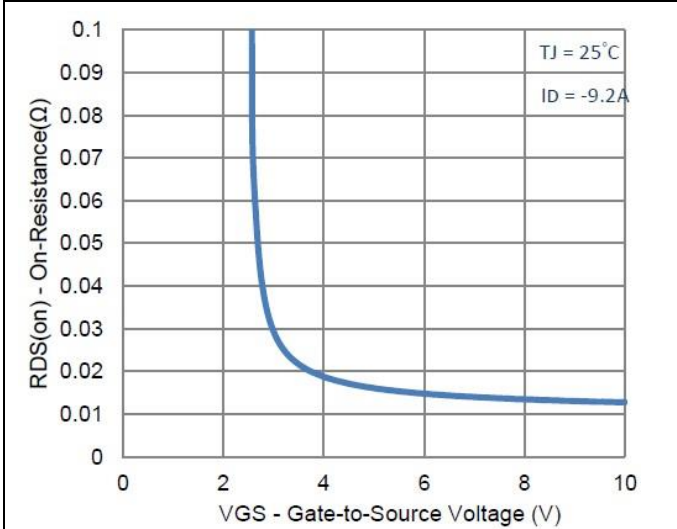


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

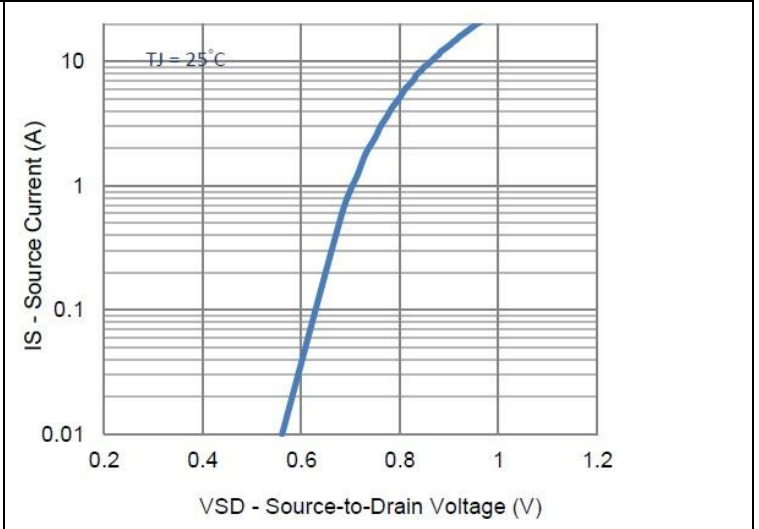


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

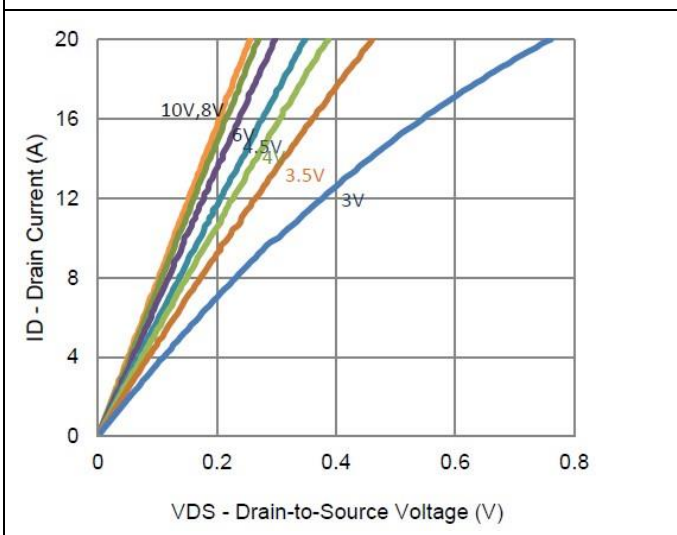


FIG.5-CAPACITANCE CHARACTERISTICS

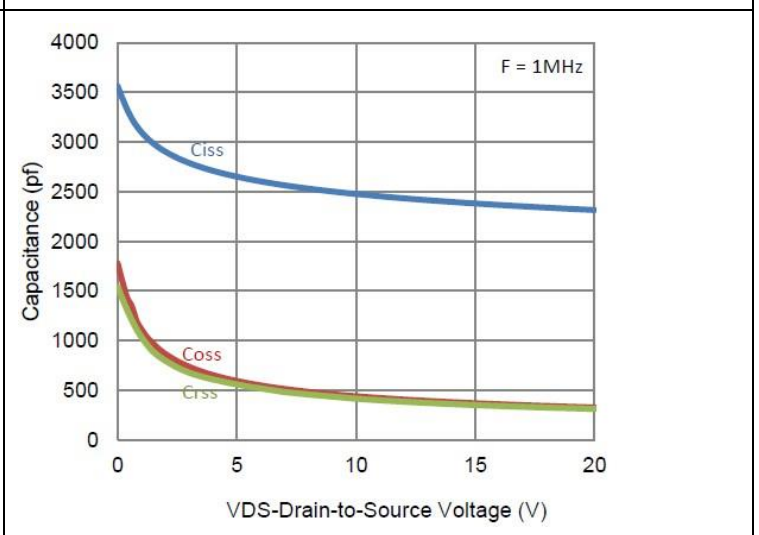


FIG.6-GATE CHARGE CHARACTERISTICS

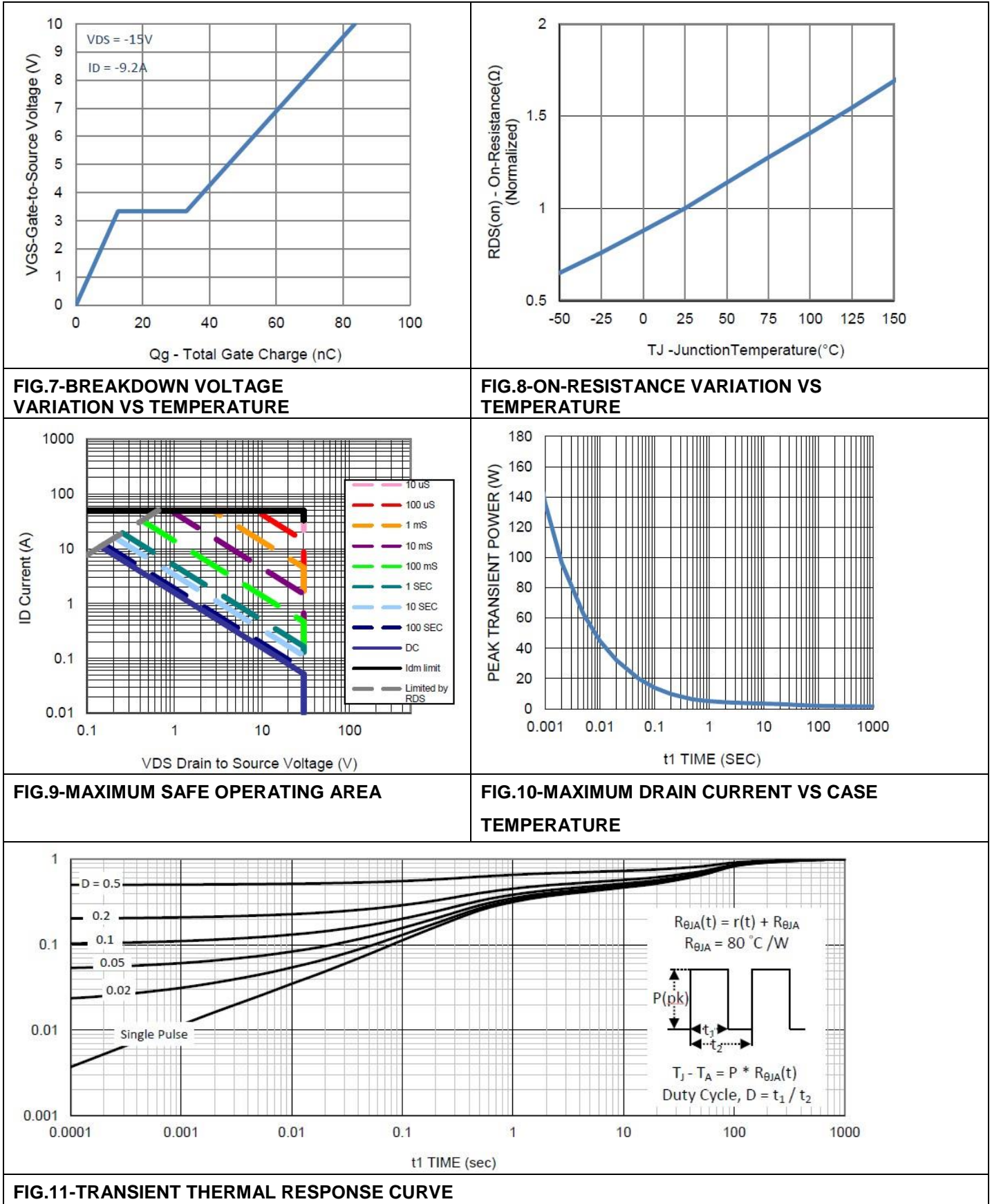
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