Elektronische Bauelemente

# SSG4543C

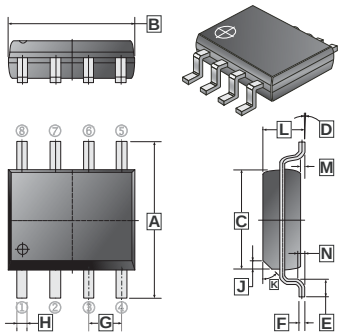
**N-Ch: 6.5 A, 40 V, $R_{DS(ON)}$ 32 mΩ**
**P-Ch: -7.6 A, -40 V, $R_{DS(ON)}$ 30 mΩ**
**N & P-Ch Enhancement Mode Power MOSFET**

RoHS Compliant Product
A suffix of "-C" specifies halogen & lead-free

## 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, PCMCIA cards, cellular and cordless telephones

**SOP-8**



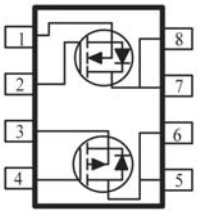

| REF. | Millimeter | | REF. | Millimeter | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| A | 5.8 | 6.20 | H | 0.35 | 0.51 |
| B | 4.80 | 5.00 | J | 0.375 REF. | |
| C | 3.80 | 4.00 | K | 45° | |
| D | 0° | 8° | L | 1.35 | 1.75 |
| E | 0.50 | 0.93 | M | 0.10 | 0.25 |
| F | 0.19 | 0.25 | N | 0.25 REF. | |
| G | 1.27 TYP. | | | | |

## FEATURES

- Low $R_{DS(on)}$ provides higher efficiency and extends battery life.
- Low thermal impedance copper leadframe SOP-8 saves board space
- Fast switching speed
- High performance trench technology

## PACKAGE INFORMATION

| Package | MPQ | LeaderSize |
|---|---|---|
| SOP-8 | 2.5K | 13' inch |




## MAXIMUM RATINGS ($T_A$ = 25°C unless otherwise specified)

| PARAMETER | SYMBOL | N-CH | P-CH | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 40 | -40 | V |
| Gate-Source Voltage | $V_{GS}$ | 20 | -20 | V |
| Continuous Drain Current [1] | $I_D$ @ $T_A$ = 25°C | 6.5 | -7.6 | A |
| | $I_D$ @ $T_A$ = 70°C | 5.5 | -6.3 | A |
| Pulsed Drain Current [2] | $I_{DM}$ | ±50 | ±50 | A |
| Continuous Source Current (Diode Conduction) [1] | $I_S$ | 2.3 | -2.1 | A |
| Total Power Dissipation [1] | $P_D$ @ $T_A$ = 25°C | 2.1 | 2.1 | W |
| | $P_D$ @ $T_A$ = 70°C | 1.3 | 1.3 | W |
| Operating Junction & Storage Temperature Range | $T_J$, $T_{STG}$ | -55 ~ 150 | | °C |
| **Thermal Resistance Ratings** | | | | |
| Maximum Junction-to-Ambient [1] | t≦ 10 sec | $R_{\theta JA}$ | 62.5 | °C / W |
| | Steady State | | 110 | °C / W |

Notes

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

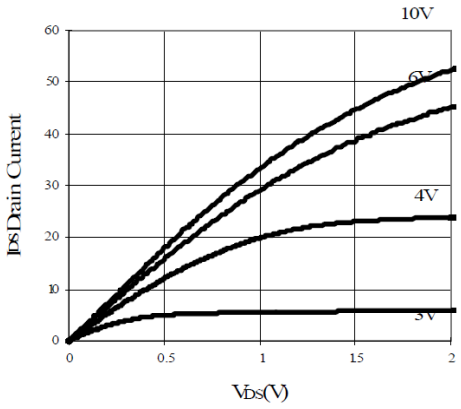
## ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C unless otherwise specified)

| Parameter | Symbol | Ch | Min. | Typ. | Max. | Unit | Teat Conditions |
|---|---|---|---|---|---|---|---|
| **Static** | | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | N | 1 | - | - | V | $V_{DS}$= $V_{GS}$, $I_D$= 250μA |
| | | P | -1 | - | - | | $V_{DS}$= $V_{GS}$, $I_D$= -250μA |
| Gate-Body Leakage Current | $I_{GSS}$ | N | - | - | ±100 | nA | $V_{DS}$= 0V, $V_{GS}$= 20V |
| | | P | - | - | ±100 | | $V_{DS}$= 0V, $V_{GS}$= -20V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | N | - | - | 1 | μA | $V_{DS}$= 32V, $V_{GS}$= 0V |
| | | P | - | - | -1 | | $V_{DS}$= -32V, $V_{GS}$= 0V |
| On-State Drain Current [1] | $I_{D(on)}$ | N | 25 | - | - | A | $V_{DS}$= 5V, $V_{GS}$= 10V |
| | | P | -50 | - | - | | $V_{DS}$= -5V, $V_{GS}$= -10V |
| Drain-Source On-Resistance [1] | $R_{DS(ON)}$ | N | - | - | 32 | mΩ | $V_{GS}$= 10V, $I_D$= 6.5A |
| | | | - | - | 42 | | $V_{GS}$= 4.5V, $I_D$= 5.7A |
| | | P | - | - | 30 | | $V_{GS}$= -10V, $I_D$= -7.6A |
| | | | - | - | 40 | | $V_{GS}$= -4.5V, $I_D$= -6.2A |
| Forward Transconductance [1] | $g_{fs}$ | N | - | 40 | - | S | $V_{DS}$= 15V, $I_D$= 6.5A |
| | | P | - | 31 | - | | $V_{DS}$= -15V, $I_D$= -7.6A |
| **Dynamic [2]** | | | | | | | |
| Total Gate Charge | $Q_g$ | N | - | 13 | - | nC | N-Channel<br>$I_D$= 6.5A, $V_{DS}$= 15V, $V_{GS}$= 4.5V<br><br>P-Channel<br>$I_D$= -7.6A, $V_{DS}$= -15V, $V_{GS}$= -4.5V |
| | | P | - | 14 | - | | |
| Gate-Source Charge | $Q_{gs}$ | N | - | 3.3 | - | | |
| | | P | - | 5.8 | - | | |
| Gate-Drain Charge | $Q_{gd}$ | N | - | 4.5 | - | | |
| | | P | - | 12 | - | | |
| Input Capacitance | $C_{ISS}$ | N | - | 440 | - | pF | N-Channel<br>$V_{DS}$= 15V, $V_{GS}$= 0V, f= 1MHz<br><br>P-Channel<br>$V_{DS}$= -15V, $V_{GS}$= 0V, f= 1MHz |
| | | P | - | 1800 | - | | |
| Output Capacitance | $C_{OSS}$ | N | - | 80 | - | | |
| | | P | - | 280 | - | | |
| Reverse Transfer Capacitance | $C_{RSS}$ | N | - | 130 | - | | |
| | | P | - | 150 | - | | |
| Turn-On Delay Time | $T_{d(on)}$ | N | - | 20 | - | nS | N-Channel<br>$V_{DD}$= 15V, $V_{GS}$= 10V<br>$I_D$= 1A, $R_{GEN}$= 25Ω<br><br>P-Channel<br>$V_{DD}$= -15V, $V_{GS}$= -10V<br>$I_D$= -1A, $R_{GEN}$= 15Ω |
| | | P | - | 15 | - | | |
| Rise Time | $T_r$ | N | - | 9 | - | | |
| | | P | - | 16 | - | | |
| Turn-Off Delay Time | $T_{d(off)}$ | N | - | 70 | - | | |
| | | P | - | 62 | - | | |
| Fall Time | $T_f$ | N | - | 20 | - | | |
| | | P | - | 46 | - | | |

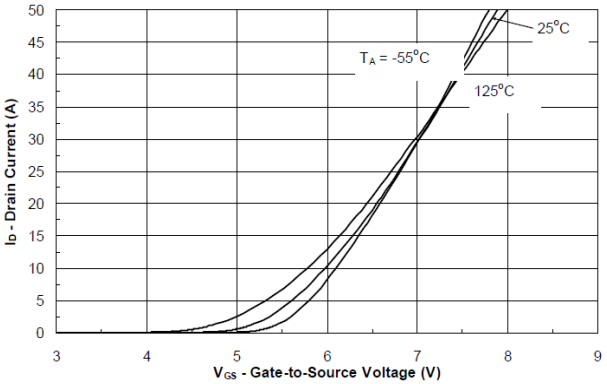
Notes

1. Pulse test : PW ≦ 300μs duty cycle ≦ 2%.
2. Guaranteed by design, not subject to production testing.

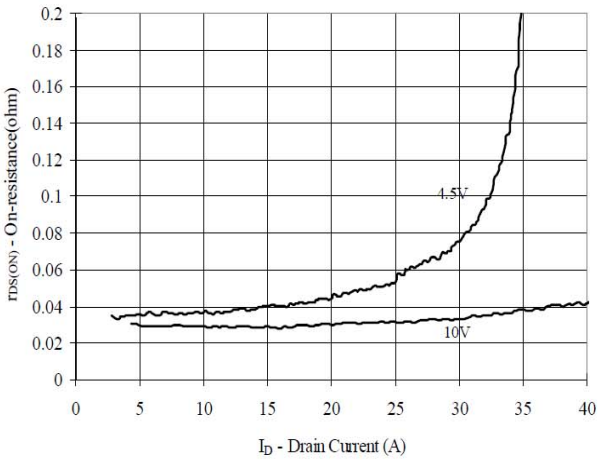
## CHARACTERISTIC CURVES (N-Channel)



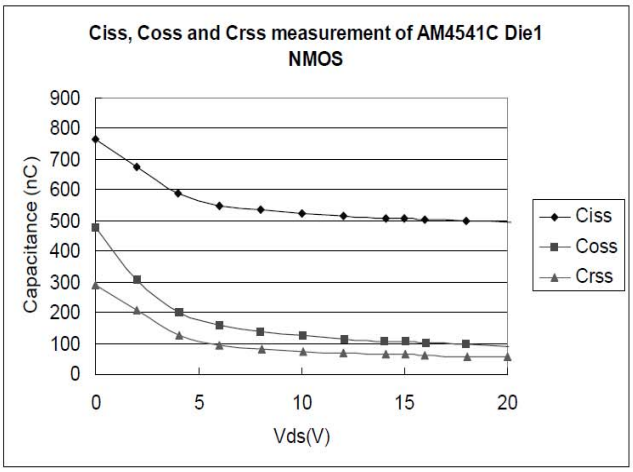

**Output Characteristics**



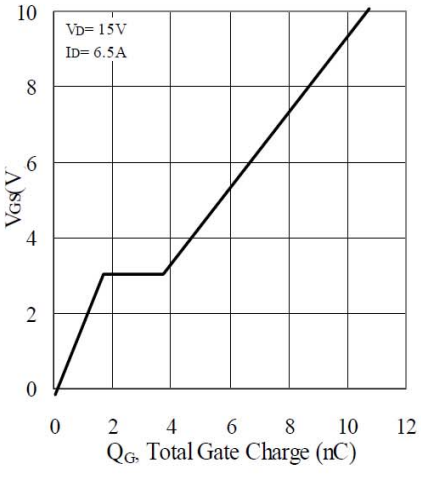

**Transfer Characteristics**



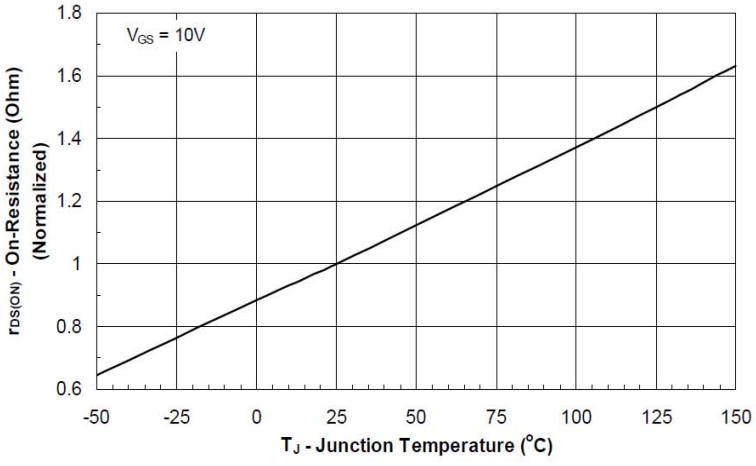

**On Resistance vs. Drain Current**




**Capacitance**

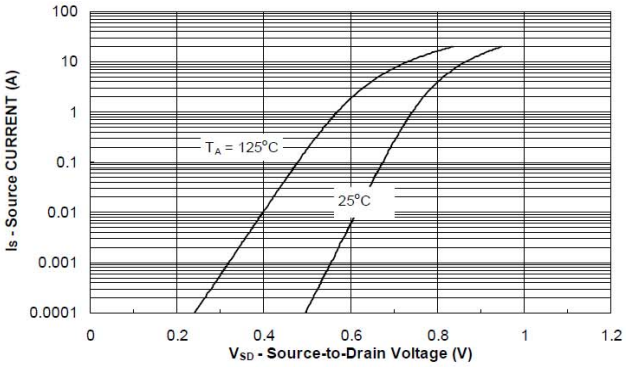



**Gate Charge**

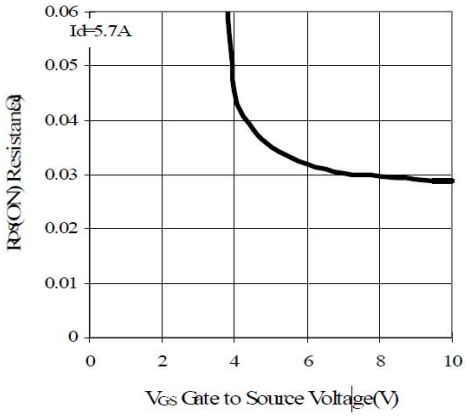



**On-Resistance vs. Junction Temperature**

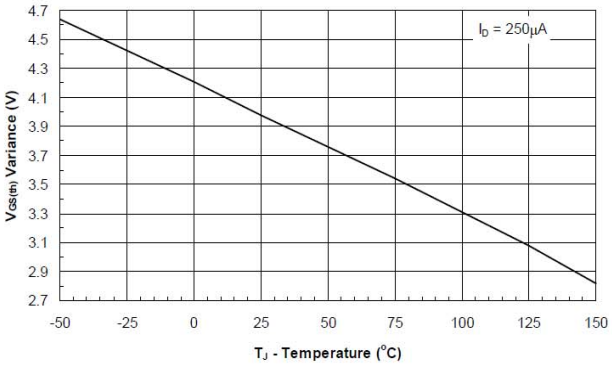
## CHARACTERISTIC CURVES




**Source-Drain Diode Forward Voltage**




**On-Resistance vs. Gate-to-Source Voltage**




**Threshold Voltage**

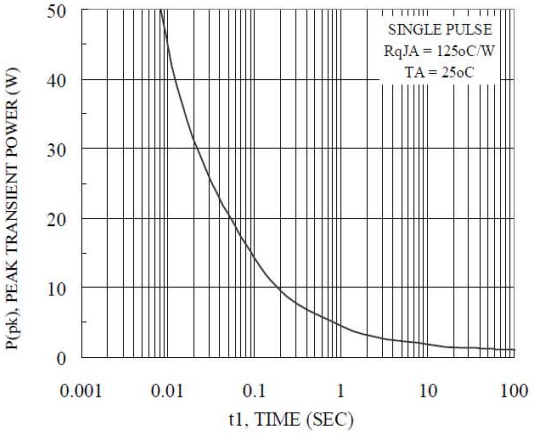



**Figure 10. Single Pulse Maximum Power Dissipation**

**Normalized Thermal Transient Junction to Ambient**

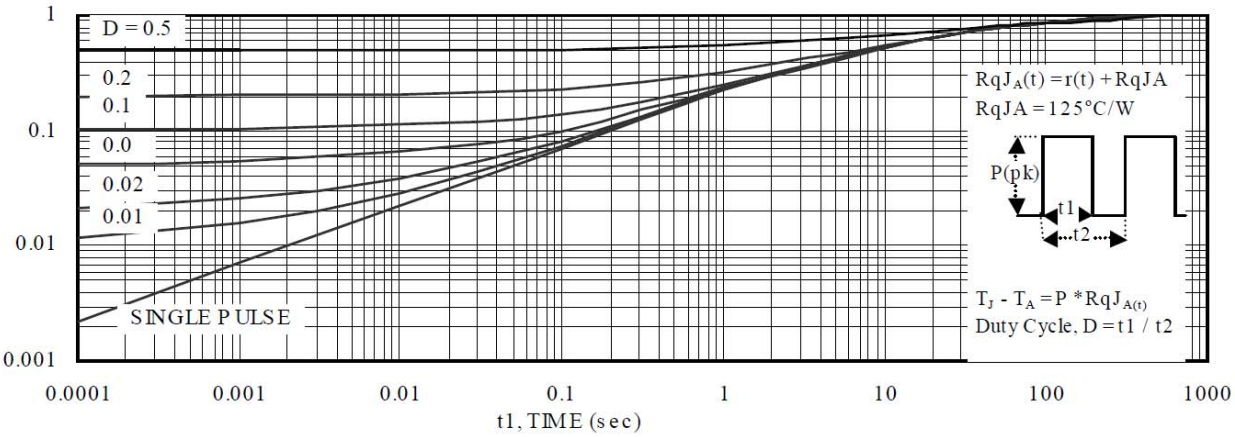
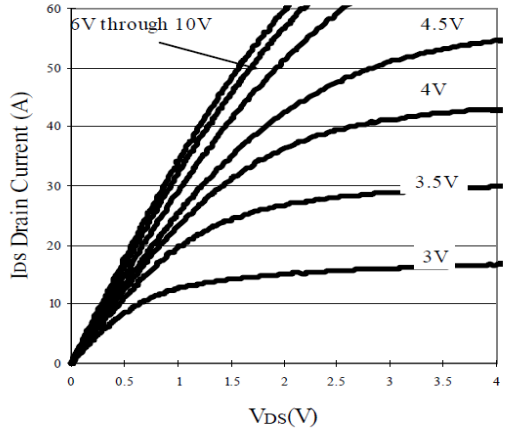
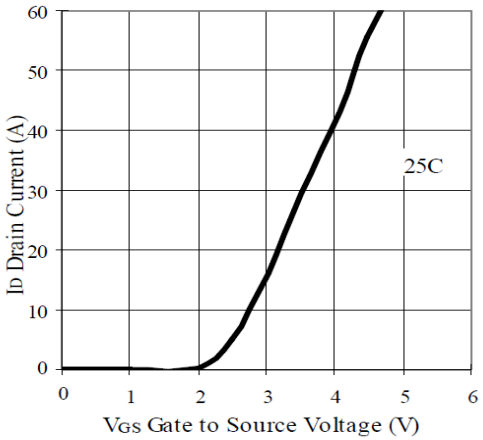



**Figure 11. Transient Thermal Response Curve**

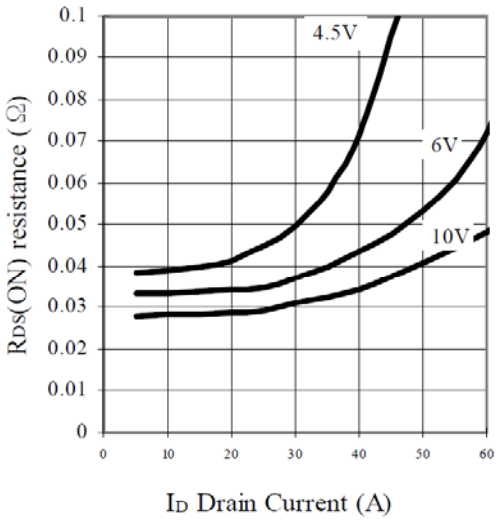
## CHARACTERISTIC CURVES (P-Channel)



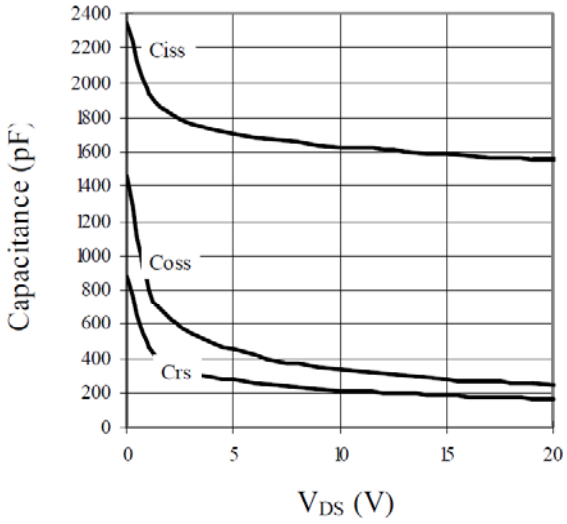

**Output Characteristics**



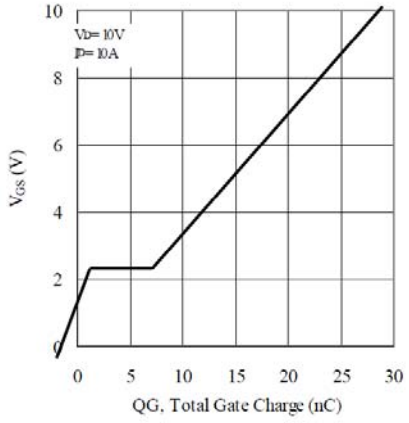

**Transfer Characteristics**




**On Resistance Vs Vgs Voltage**




**Capacitance**

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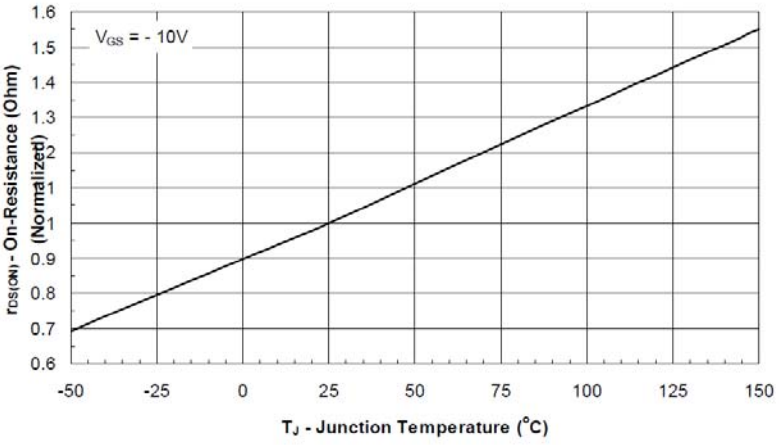
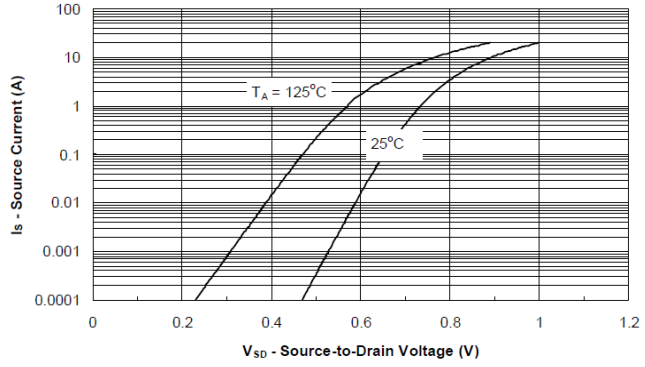



**On-Resistance vs. Junction Temperature**

## CHARACTERISTIC CURVES

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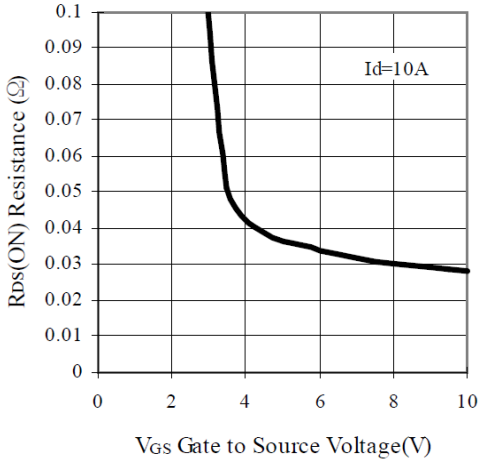
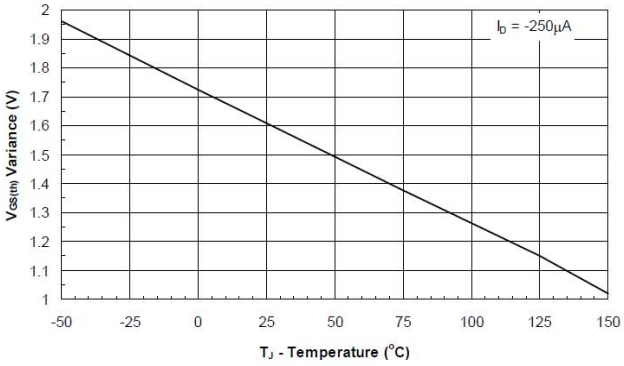
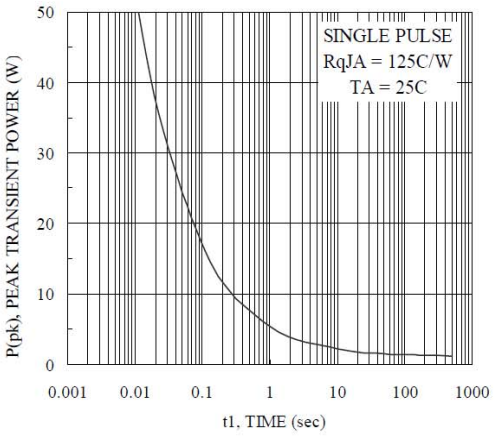



**On-Resistance with Gate to Source Voltage**




**Threshold Voltage**

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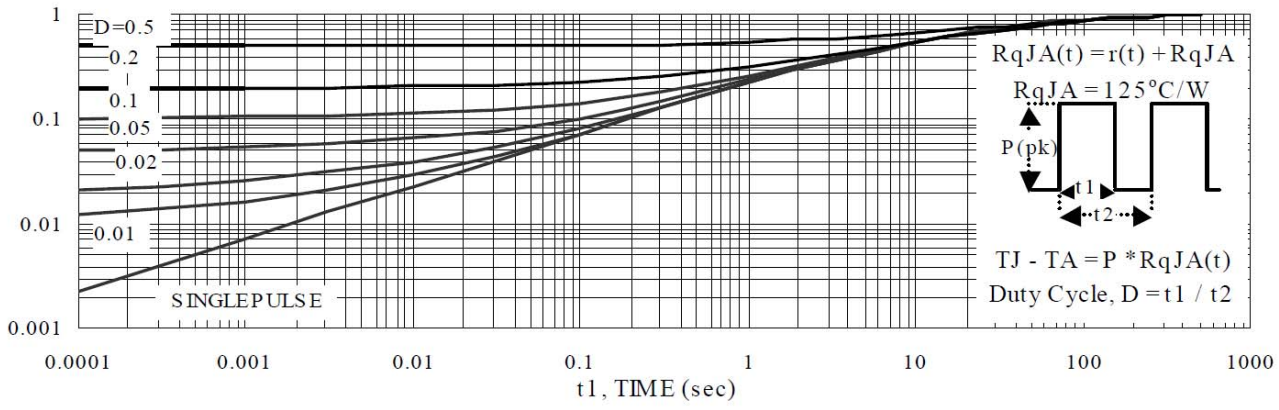


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