




Power MOSFETS

DATASHEET

LM40350PAP3A

P-Channel
Enhancement Mode MOSFET

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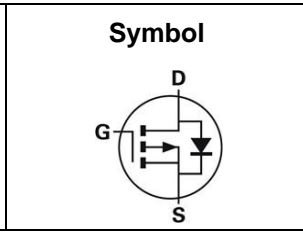
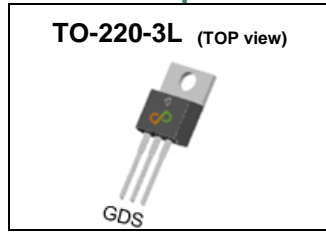


Quality Management Systems

ISO 9001:2015 Certificate

P-Channel Enhancement Mode MOSFET

Pin Description



Product Summary

| Symbol | P-Channel | Unit |
|------------------|-----------|------------|
| V_{DSS} | -40 | V |
| $R_{DS(ON)-Max}$ | 33 | m Ω |
| I_D | -25 | A |

Feature

- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS Tested

Applications

- Load switches
- Synchronous Rectification

Ordering Information

| Orderable Part Number | Package Type | Form | Shipping | Marking |
|-----------------------|--------------|------|------------------|-----------------|
| LM40350PAP3A | TO-220-3L | Tube | 50 / Tape & Reel | 40350 □□□□□□ |

Absolute Maximum Ratings (T_J=25°C Unless Otherwise Noted)

| Symbol | Parameter | P-Channel | Unit |
|--------------|---------------------------------|--------------------------|------|
| V_{DSS} | Drain-Source Voltage | -40 | V |
| V_{GSS} | Gate-Source Voltage | ±20 | |
| T_J | Maximum Junction Temperature | 150 | °C |
| T_{STG} | Storage Temperature Range | -55 to 150 | °C |
| $I_{DM}^{①}$ | Pulse Drain Current Tested | $T_C=25^\circ C$ -61 | A |
| I_D | Continuous Drain Current | $T_C=25^\circ C$ -25 | A |
| | | $T_C=100^\circ C$ -16 | |
| P_D | Maximum Power Dissipation | $T_C=25^\circ C$ 38 | W |
| | | $T_C=100^\circ C$ 15 | |
| $I_{AS}^{②}$ | Avalanche Current, Single pulse | L=0.1mH -16 | A |
| $E_{AS}^{②}$ | Avalanche Energy, Single pulse | L=0.1mH 12.8 | mJ |

Thermal Characteristics

| Symbol | Parameter | Rating | Unit |
|---------------------|--|----------------------|------|
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case | Steady State 3.3 | °C/W |
| $R_{\theta JA}^{③}$ | Thermal Resistance-Junction to Ambient | Steady State 62.5 | °C/W |

Note ① : Max. current is limited by bonding wire

Note ② : UIS tested and pulse width are limited by maximum junction temperature 150°C

Note ③ : Surface Mounted on 1in² FR-4 board with 1oz.

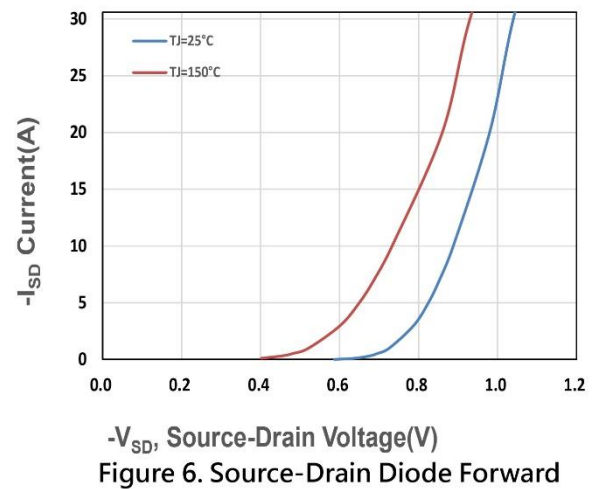
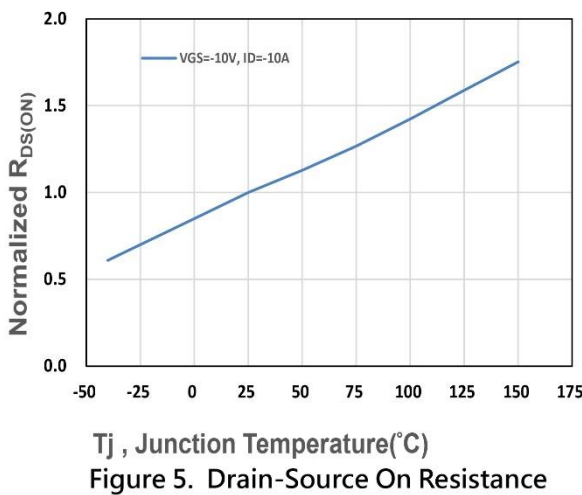
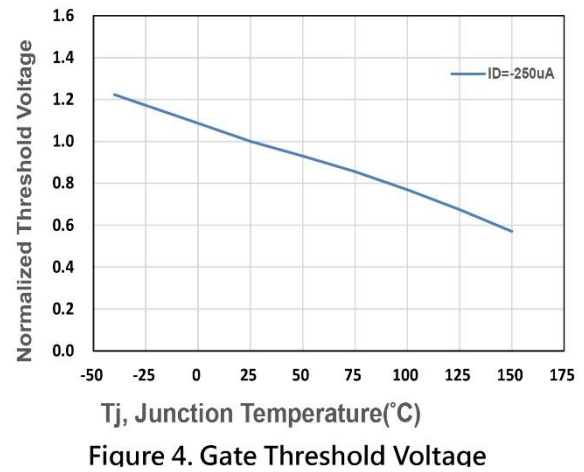
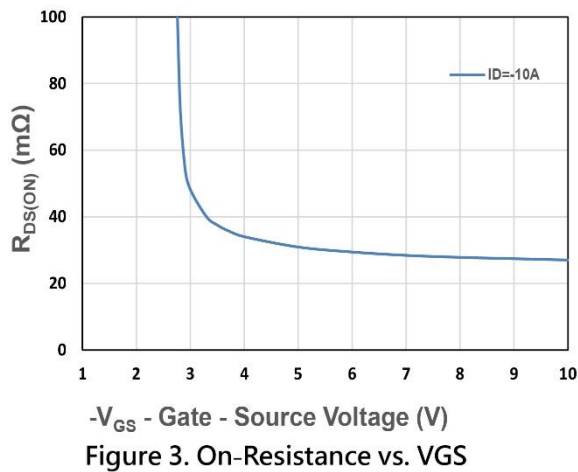
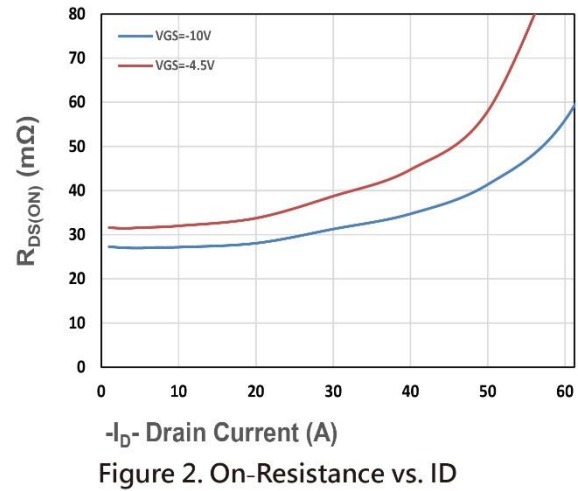
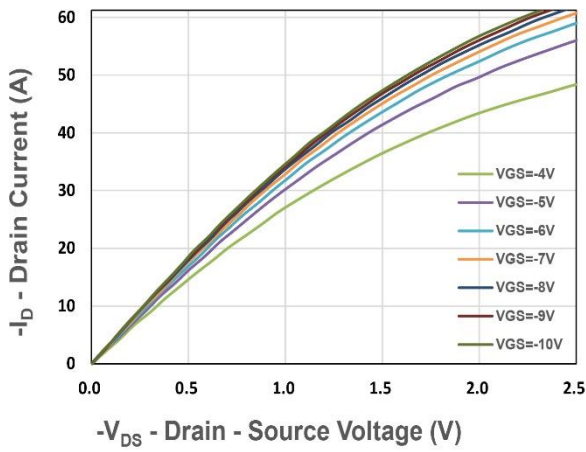
P-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

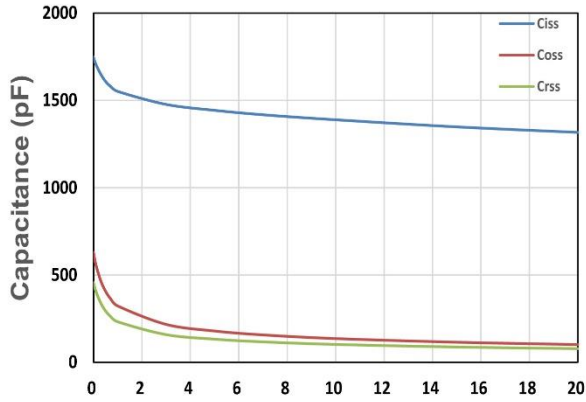
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--|----------------------------------|---|------|------|------|------|
| Static Electrical Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _{DS} =-250uA | -40 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | V _{DS} =-32V, V _{GS} =0V | - | - | -1 | uA |
| V_{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _{DS} =-250uA | -1 | -1.7 | -2.5 | V |
| I_{GSS} | Gate Leakage Current | V _{GS} =±20V, V _{DS} =0V | - | - | ±100 | nA |
| R_{DS(ON)}^④ | Drain-Source On-state Resistance | V _{GS} =-10V, I _{DS} =-10A | - | 28 | 34 | mΩ |
| | | V _{GS} =-4.5V, I _{DS} =-5A | - | 33 | 43 | |
| g_{fs} | Forward Transconductance | V _{DS} =-5V, I _{DS} =-5A | - | 14.5 | - | S |
| Dynamic Characteristics[®] | | | | | | |
| R_G | Gate Resistance | V _{GS} =0V, V _{DS} =0V, Freq.=1MHz | - | 11 | - | Ω |
| C_{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =-20V, Freq.=1MHz | - | 1316 | - | pF |
| C_{oss} | Output Capacitance | | | | | |
| C_{rss} | Reverse Transfer Capacitance | | | | | |
| t_{d(ON)} | Turn-on Delay Time | V _{GS} =-10V, V _{DS} =-30V, I _D =-1A, R _{GEN} =6Ω | - | 4.8 | - | nS |
| t_r | Turn-on Rise Time | | | | | |
| t_{d(OFF)} | Turn-off Delay Time | | | | | |
| t_f | Turn-off Fall Time | | | | | |
| Q_g | Total Gate Charge | V _{GS} =-4.5V, V _{DS} =-20V, I _D =-10A | - | 13 | - | nC |
| Q_g | Total Gate Charge | V _{GS} =-10V, V _{DS} =-20V, I _D =-10A | - | 26.9 | - | |
| Q_{gs} | Gate-Source Charge | | - | 4.88 | - | |
| Q_{gd} | Gate-Drain Charge | | - | 4.51 | - | |
| Source-Drain Characteristics | | | | | | |
| V_{SD}^④ | Diode Forward Voltage | I _{SD} =-5A, V _{GS} =0V | - | -0.8 | -1.1 | V |
| t_{rr} | Reverse Recovery Time | I _F =-5A, V _R =-20V | - | 14.6 | - | nS |
| Q_{rr} | Reverse Recovery Charge | dI _F /dt=100A/μs | - | 7.2 | - | nC |

Note ④ : Pulse test (pulse width≤300us, duty cycle≤2%).

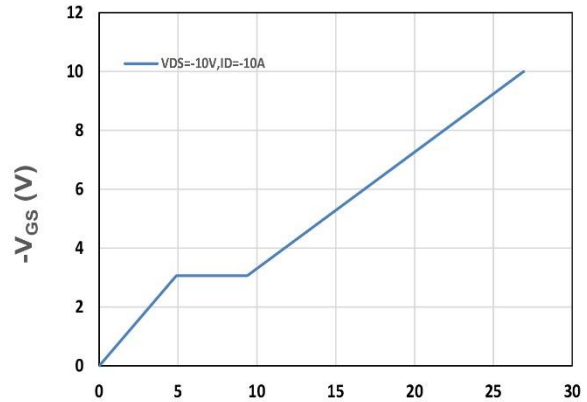
Note ⑤ : Guaranteed by design, not subject to production testing.

P-Channel Typical Characteristics

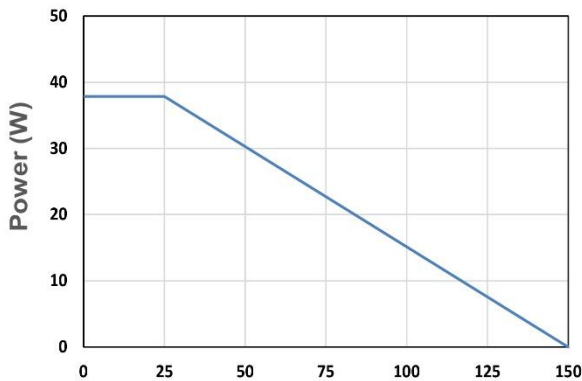




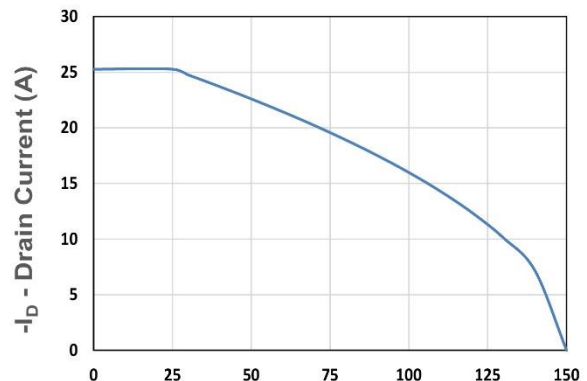
$-V_{DS}$ - Drain - Source Voltage (V)
Figure 7. Capacitance



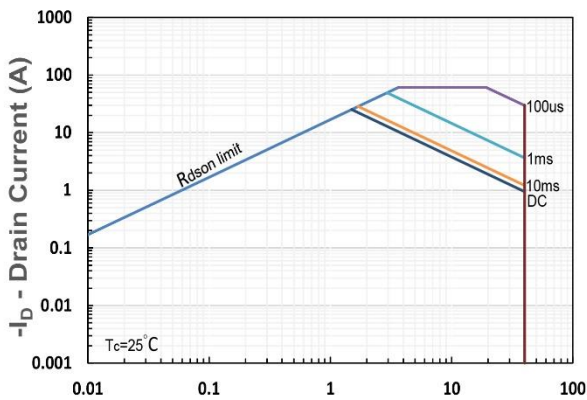
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



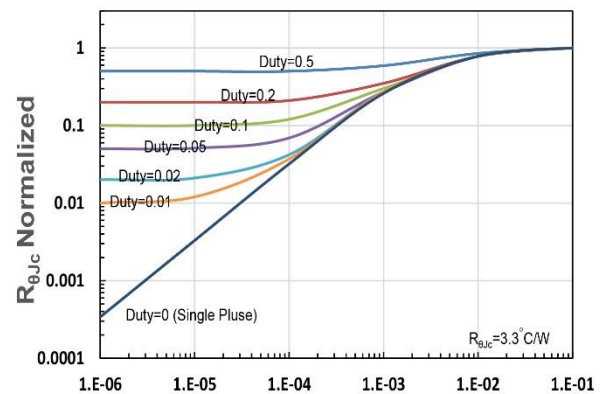
T_c - Case Temperature ($^{\circ}C$)
Figure 9. Power Dissipation



T_c - Case Temperature ($^{\circ}C$)
Figure 10. Drain Current



$-V_{DS}$ - Drain-Source Voltage (V)
Figure 11. Safe Operating Area



t_1 , Square Wave Pulse Duration(s)
Figure 12. $R_{\theta jC}$ Transient Thermal Impedance