*Preliminary*

**Advanced Power Electronics Corp.**

***DUAL N-CHANNEL ENHANCEMENT MODE POWER MOSFET***

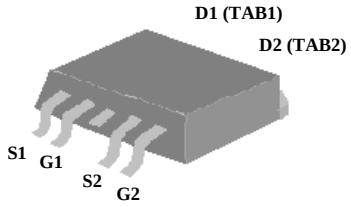
- ▼ **Simple Drive Requirement**
- ▼ **Fast Switching Performance**
- ▼ **Two Independent Device**
- ▼ **Halogen Free & RoHS Compliant Product**

| | |
|---|---|
| $BV_{DSS}$ | 40V |
| $R_{DS(ON)}$ | 13mΩ |
| $I_D$ | 37A |

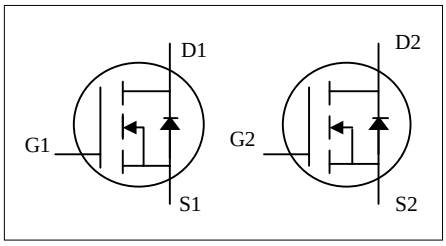
## Description

Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, ruggedized device design, ultra low on-resistance and cost-effectiveness.

SDPAK™ used APEC innovated package and provides two independent device that is suitable and optimum for DC/DC power application.




**SDPAK™**




## Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 40 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25℃ | Continuous Drain Current | 37 | A |
| $I_D$@$T_A$=25℃ | Continuous Drain Current[3] | 11.5 | A |
| $I_D$@$T_A$=70℃ | Continuous Drain Current[3] | 9.2 | A |
| $I_{DM}$ | Pulsed Drain Current[1] | 50 | A |
| $P_D$@$T_A$=25℃ | Total Power Dissipation | 3 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |

## Thermal Data

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| Rthj-c | Maximum Thermal Resistance, Junction-case | 4.0 | ℃/W |
| Rthj-a | Maximum Thermal Resistance, Junction-ambient[3] | 42 | ℃/W |

## Electrical Characteristics@$T_j$=25°C(unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250uA | 40 | - | - | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V, $I_D$=10A | - | - | 13 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=7A | - | - | 22 | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 1 | - | 3 | V |
| $g_{fs}$ | Forward Transconductance | $V_{DS}$=10V, $I_D$=10A | - | 21 | - | S |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=40V, $V_{GS}$=0V | - | - | 10 | uA |
| $I_{GSS}$ | Gate-Source Leakage | $V_{GS}$=±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| $Q_g$ | Total Gate Charge[2] | $I_D$=10A | - | 9.5 | 15 | nC |
| $Q_{gs}$ | Gate-Source Charge | $V_{DS}$=32V | - | 2 | - | nC |
| $Q_{gd}$ | Gate-Drain ("Miller") Charge | $V_{GS}$=4.5V | - | 6 | - | nC |
| $t_{d(on)}$ | Turn-on Delay Time[2] | $V_{DS}$=20V | - | 7 | - | ns |
| $t_r$ | Rise Time | $I_D$=10A | - | 21 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | $R_G$=3.3Ω,$V_{GS}$=10V | - | 18 | - | ns |
| $t_f$ | Fall Time | $R_D$=2Ω | - | 5.5 | - | ns |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V | - | 640 | 1020 | pF |
| $C_{oss}$ | Output Capacitance | $V_{DS}$=25V | - | 140 | - | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | f=1.0MHz | - | 80 | - | pF |
| $R_g$ | Gate Resistance | f=1.0MHz | - | 2 | 3 | Ω |

## Source-Drain Diode

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $V_{SD}$ | Forward On Voltage[2] | $I_S$=2.5A, $V_{GS}$=0V | - | - | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time[2] | Is=10A, $V_{GS}$=0V, | - | 25 | - | ns |
| $Q_{rr}$ | Reverse Recovery Charge | dI/dt=100A/μs | - | 22 | - | nC |

### Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

3.Rthja is determined with the device, mounted on 2oz FR4 board t ≦10s.

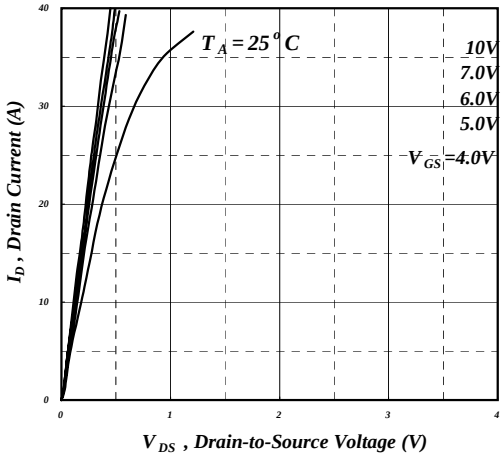



**Fig 1. Typical Output Characteristics**

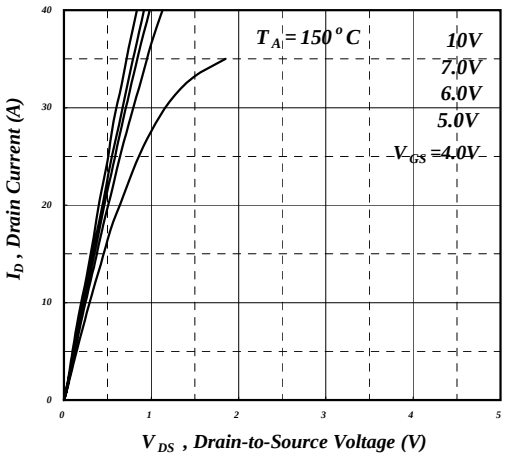



**Fig 2. Typical Output Characteristics**

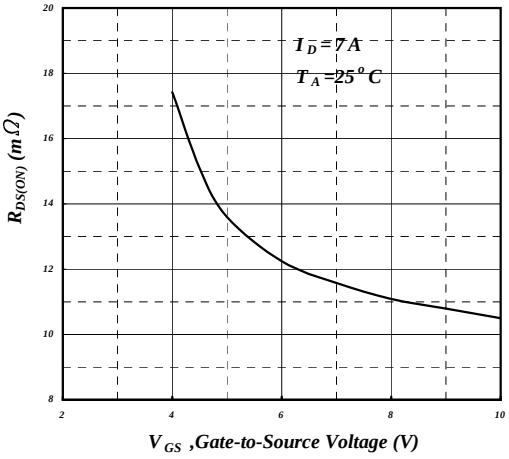



**Fig 3. On-Resistance v.s. Gate Voltage**

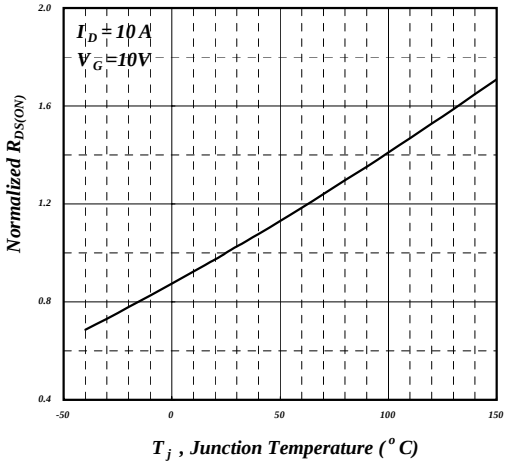



**Fig 4. Normalized On-Resistance v.s. Junction Temperature**

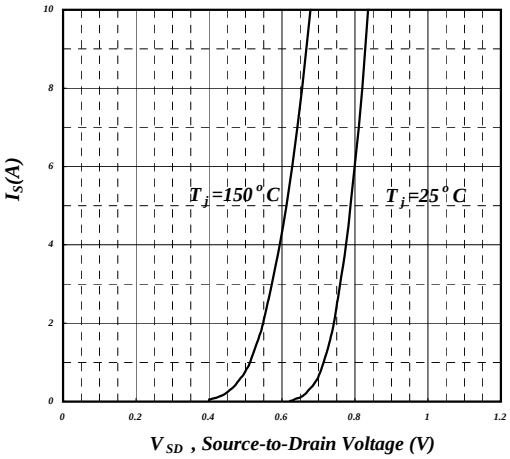



**Fig 5. Forward Characteristic of Reverse Diode**

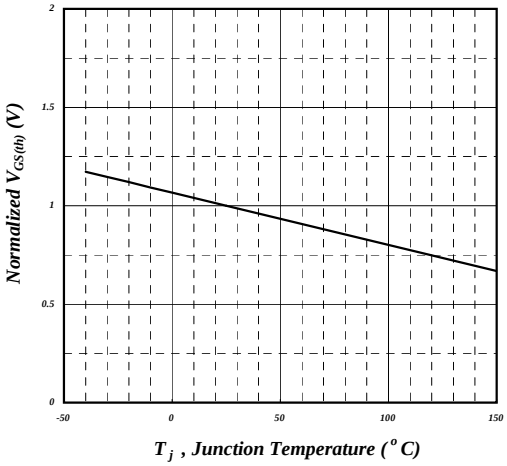



**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**

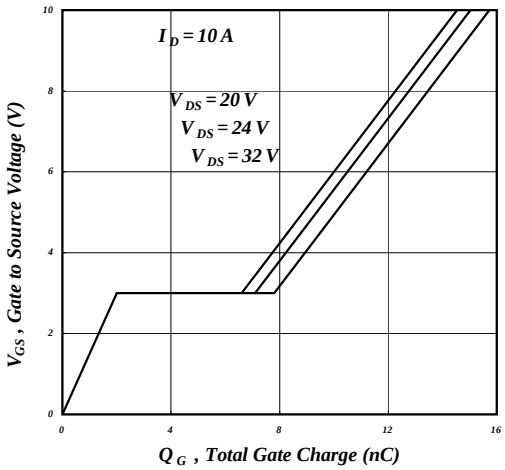



Fig 7. Gate Charge Characteristics

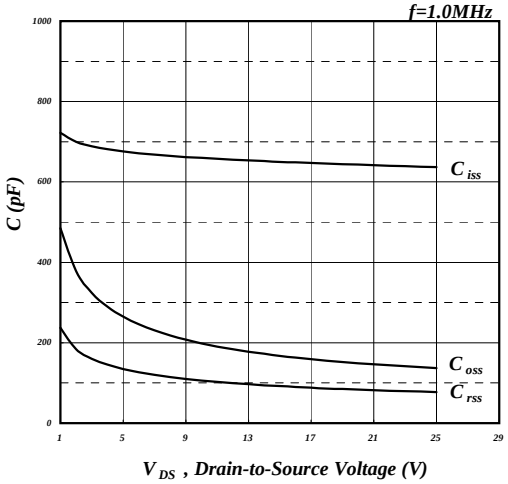



Fig 8. Typical Capacitance Characteristics

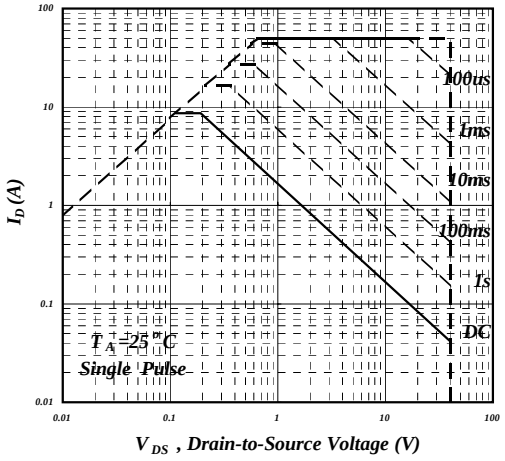



Fig 9. Maximum Safe Operating Area

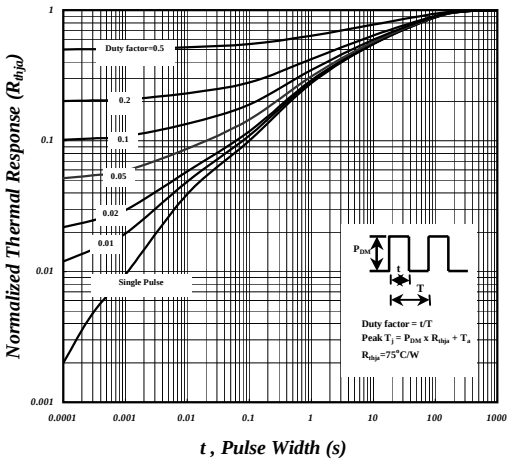



Fig 10. Effective Transient Thermal Impedance

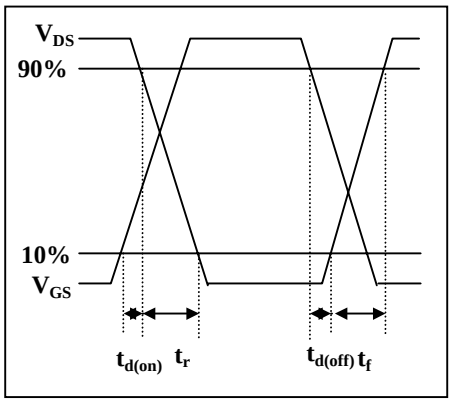



Fig 11. Switching Time Waveform

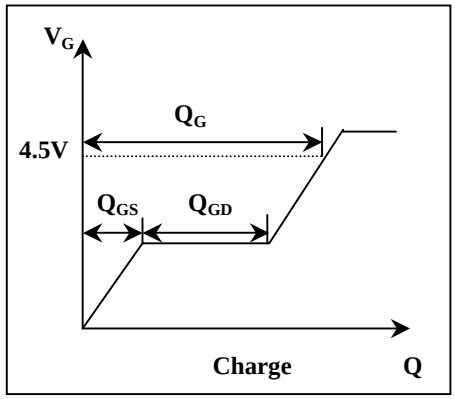



Fig 12. Gate Charge Waveform