



Advanced Power  
Electronics Corp.

AP85U03GMT

RoHS-compliant Product

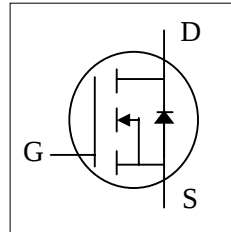
N-CHANNEL ENHANCEMENT MODE

POWER MOSFET

▼ Simple Drive Requirement

▼ SO-8 Compatible

▼ Low On-resistance

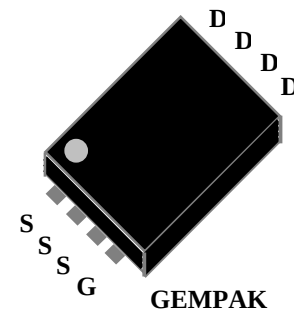


|              |             |
|--------------|-------------|
| $BV_{DSS}$   | 30V         |
| $R_{DS(ON)}$ | 5m $\Omega$ |
| $I_D$        | 82A         |

## Description

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

The GEMPAK package is special for DC-DC converters application and the foot print is compatible with SO-8 with backside heat sink.



## Absolute Maximum Ratings

| Symbol                      | Parameter                                  | Rating     | Units            |
|-----------------------------|--------------------------------------------|------------|------------------|
| $V_{DS}$                    | Drain-Source Voltage                       | 30         | V                |
| $V_{GS}$                    | Gate-Source Voltage                        | $\pm 20$   | V                |
| $I_D@T_C=25^\circ\text{C}$  | Continuous Drain Current                   | 82         | A                |
| $I_D@T_A=25^\circ\text{C}$  | Continuous Drain Current <sup>3</sup>      | 24         | A                |
| $I_D@T_A=100^\circ\text{C}$ | Continuous Drain Current <sup>3</sup>      | 15         | A                |
| $I_{DM}$                    | Pulsed Drain Current <sup>1</sup>          | 200        | A                |
| $P_D@T_C=25^\circ\text{C}$  | Total Power Dissipation                    | 50         | W                |
| $P_D@T_A=25^\circ\text{C}$  | Total Power Dissipation                    | 5          | W                |
| $E_{AS}$                    | Single Pulse Avalanche Energy <sup>4</sup> | 57.6       | mJ               |
| $T_{STG}$                   | Storage Temperature Range                  | -55 to 150 | $^\circ\text{C}$ |
| $T_J$                       | Operating Junction Temperature Range       | -55 to 150 | $^\circ\text{C}$ |

## Thermal Data

| Symbol | Parameter                                        | Value    | Units                     |
|--------|--------------------------------------------------|----------|---------------------------|
| Rthj-c | Thermal Resistance Junction-case                 | Max. 2.5 | $^\circ\text{C}/\text{W}$ |
| Rthj-a | Thermal Resistance Junction-ambient <sup>3</sup> | Max. 25  | $^\circ\text{C}/\text{W}$ |



# AP85U03GMT

## Electrical Characteristics@T<sub>j</sub>=25°C(unless otherwise specified)

| Symbol              | Parameter                                      | Test Conditions                                          | Min. | Typ. | Max. | Units |
|---------------------|------------------------------------------------|----------------------------------------------------------|------|------|------|-------|
| BV <sub>DSS</sub>   | Drain-Source Breakdown Voltage                 | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA               | 30   | -    | -    | V     |
| R <sub>DS(ON)</sub> | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                | -    | -    | 5    | mΩ    |
|                     |                                                | V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A               | -    | -    | 10   | mΩ    |
| V <sub>GS(th)</sub> | Gate Threshold Voltage                         | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA | 1    | -    | 3    | V     |
| g <sub>fs</sub>     | Forward Transconductance                       | V <sub>DS</sub> =10V, I <sub>D</sub> =20A                | -    | 19.5 | -    | S     |
| I <sub>DSS</sub>    | Drain-Source Leakage Current                   | V <sub>DS</sub> =24V, V <sub>GS</sub> =0V                | -    | -    | 1    | uA    |
| I <sub>GSS</sub>    | Gate-Source Leakage                            | V <sub>GS</sub> =±20V                                    | -    | -    | ±100 | nA    |
| Q <sub>g</sub>      | Total Gate Charge <sup>2</sup>                 | I <sub>D</sub> =30A                                      | -    | 29   | 46   | nC    |
| Q <sub>gs</sub>     | Gate-Source Charge                             | V <sub>DS</sub> =24V                                     | -    | 6.4  | -    | nC    |
| Q <sub>gd</sub>     | Gate-Drain ("Miller") Charge                   | V <sub>GS</sub> =4.5V                                    | -    | 19   | -    | nC    |
| t <sub>d(on)</sub>  | Turn-on Delay Time <sup>2</sup>                | V <sub>DS</sub> =15V                                     | -    | 10   | -    | ns    |
| t <sub>r</sub>      | Rise Time                                      | I <sub>D</sub> =30A                                      | -    | 84   | -    | ns    |
| t <sub>d(off)</sub> | Turn-off Delay Time                            | R <sub>G</sub> =3.3Ω, V <sub>GS</sub> =10V               | -    | 27   | -    | ns    |
| t <sub>f</sub>      | Fall Time                                      | R <sub>D</sub> =0.5Ω                                     | -    | 83   | -    | ns    |
| C <sub>iss</sub>    | Input Capacitance                              | V <sub>GS</sub> =0V                                      | -    | 2400 | 3840 | pF    |
| C <sub>oss</sub>    | Output Capacitance                             | V <sub>DS</sub> =25V                                     | -    | 395  | -    | pF    |
| C <sub>rss</sub>    | Reverse Transfer Capacitance                   | f=1.0MHz                                                 | -    | 390  | -    | pF    |
| R <sub>g</sub>      | Gate Resistance                                | f=1.0MHz                                                 | -    | 1.2  | 1.8  | Ω     |

## Source-Drain Diode

| Symbol          | Parameter                          | Test Conditions                           | Min. | Typ. | Max. | Units |
|-----------------|------------------------------------|-------------------------------------------|------|------|------|-------|
| V <sub>SD</sub> | Forward On Voltage <sup>2</sup>    | I <sub>S</sub> =30A, V <sub>GS</sub> =0V  | -    | -    | 1.2  | V     |
| t <sub>rr</sub> | Reverse Recovery Time <sup>2</sup> | I <sub>S</sub> =10A, V <sub>GS</sub> =0V, | -    | 33   | -    | ns    |
| Q <sub>rr</sub> | Reverse Recovery Charge            | dI/dt=100A/μs                             | -    | 30   | -    | nC    |

### Notes:

- 1.Pulse width limited by Max. junction temperature
- 2.Pulse test
- 3.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board, t ≤10sec
- 4.Starting T<sub>j</sub>=25°C , V<sub>DD</sub>=20V , L=0.1mH , R<sub>G</sub>=25Ω.

THIS PRODUCT IS AN ELECTROSTATIC SENSITIVE, PLEASE HANDLE WITH CAUTION.

THIS PRODUCT HAS BEEN QUALIFIED FOR CONSUMER MARKET. APPLICATIONS OR USES AS CRITERIAL COMPONENT IN LIFE SUPPORT DEVICE OR SYSTEM ARE NOT AUTHORIZED.

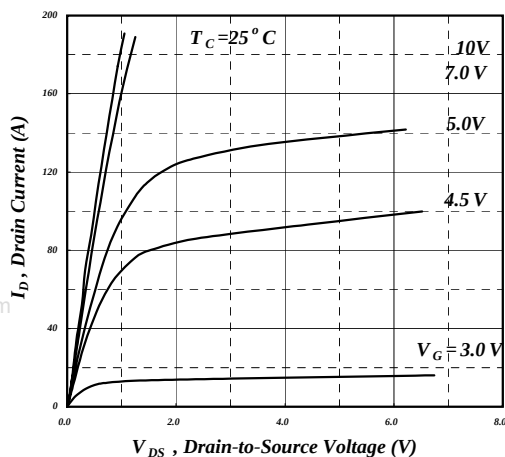


Fig 1. Typical Output Characteristics

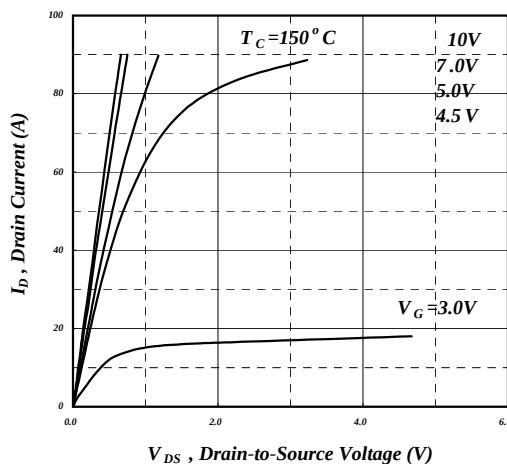


Fig 2. Typical Output Characteristics

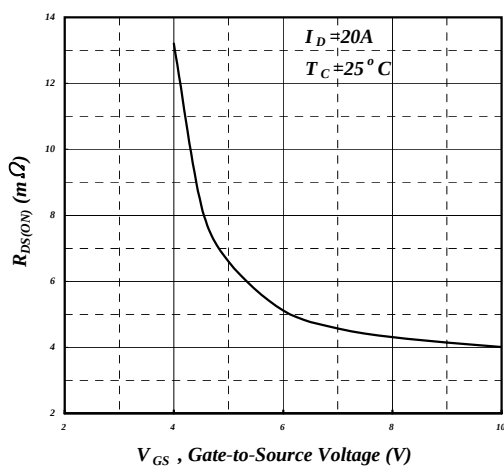


Fig 3. On-Resistance v.s. Gate Voltage

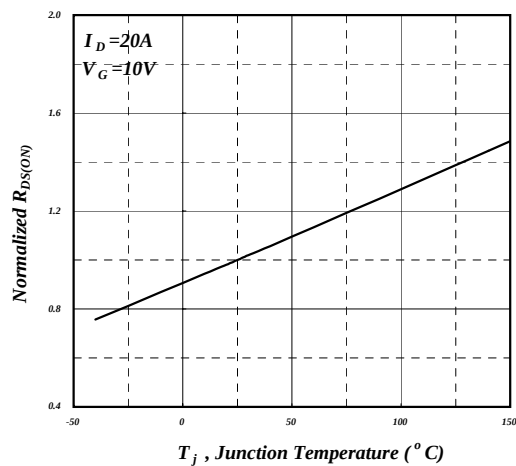


Fig 4. Normalized On-Resistance v.s. Junction Temperature

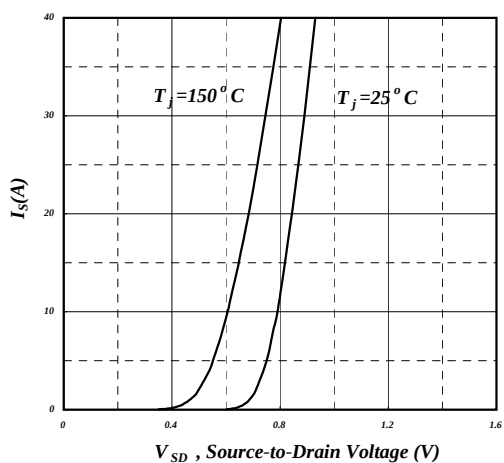


Fig 5. Forward Characteristic of Reverse Diode

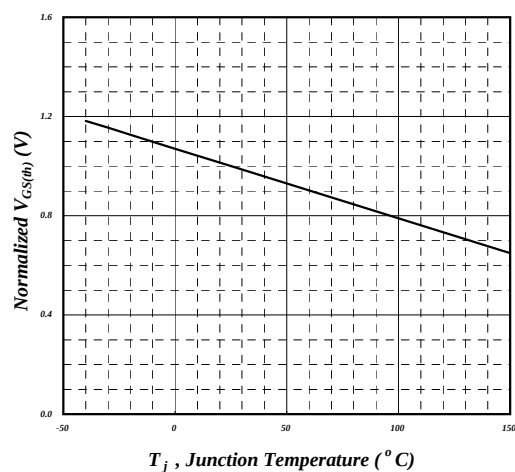


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

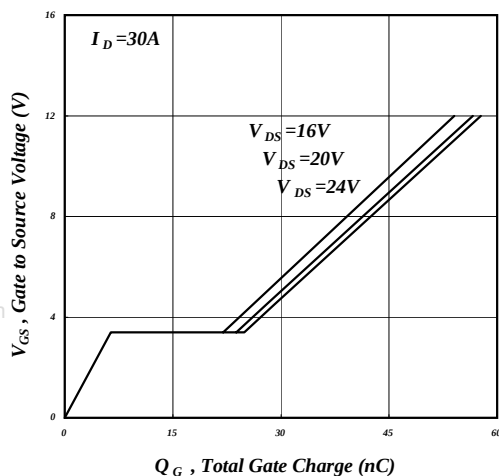


Fig 7. Gate Charge Characteristics

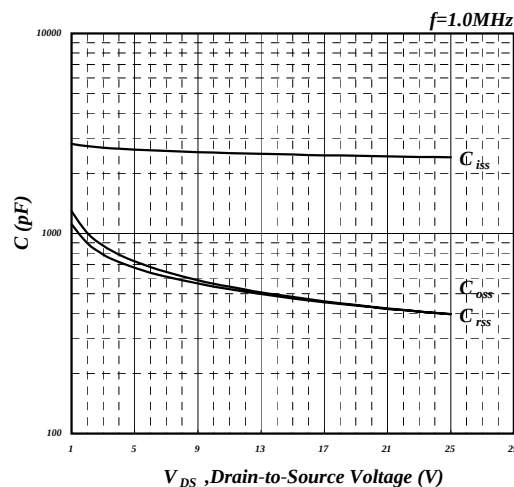


Fig 8. Typical Capacitance Characteristics

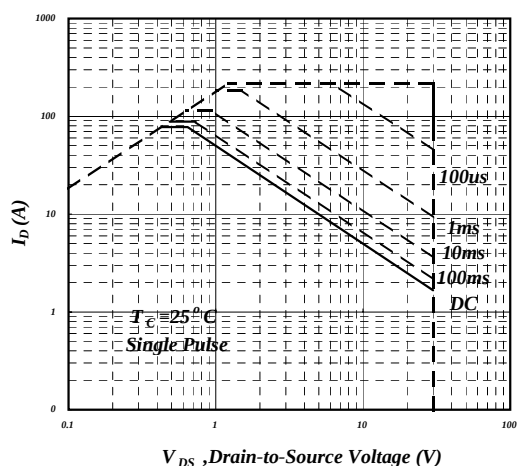


Fig 9. Maximum Safe Operating Area

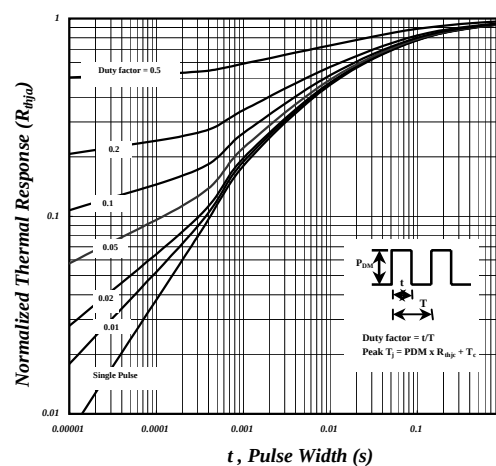


Fig 10. Effective Transient Thermal Impedance

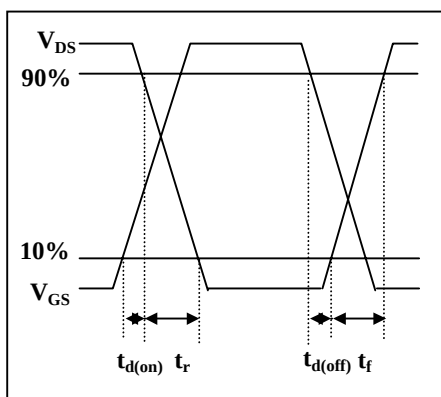


Fig 11. Switching Time Waveform

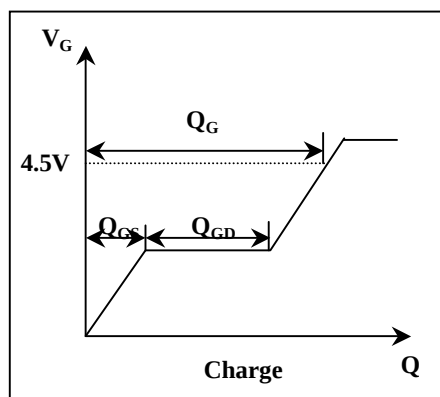
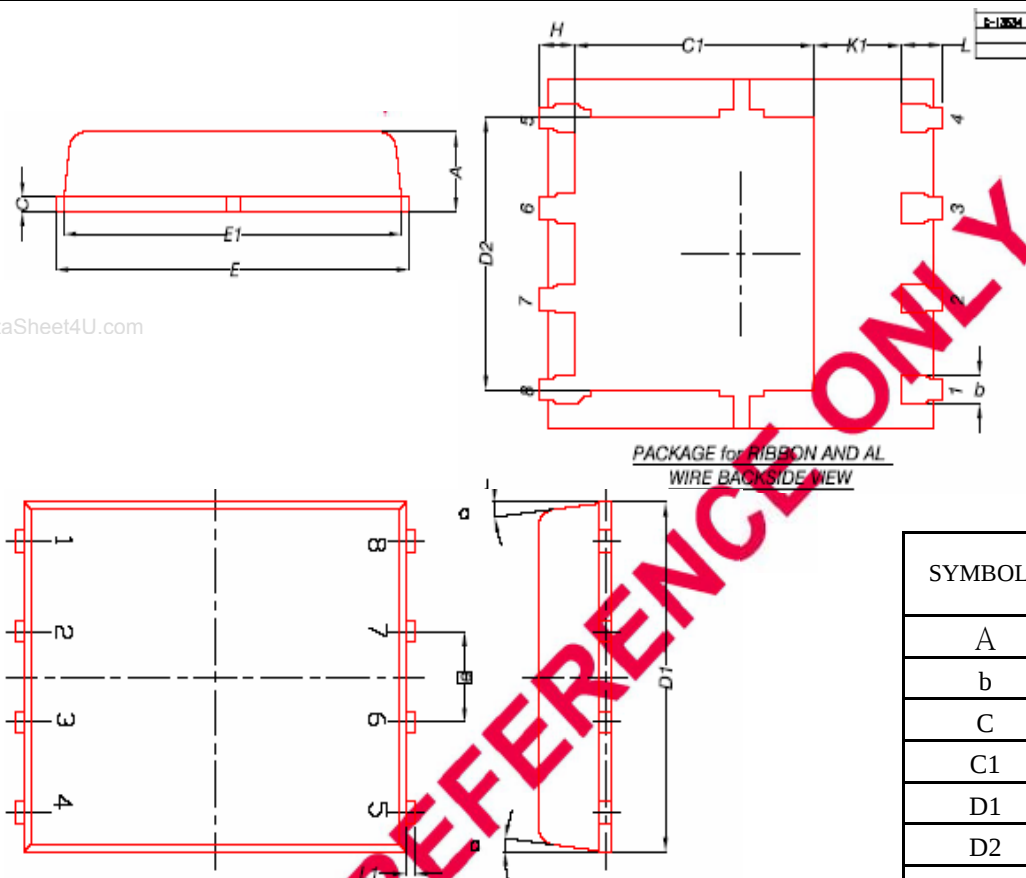


Fig 12. Gate Charge Waveform



## Package Outline : GEM-PAK



| SYMBOLS  | Millimeters |      |      |
|----------|-------------|------|------|
|          | MIN         | NOM  | MAX  |
| A        | 0.90        | 1.00 | 1.10 |
| b        | 0.33        | 0.41 | 0.51 |
| C        | 0.20        | 0.25 | 0.30 |
| C1       | 3.48        | 3.58 | 3.68 |
| D1       | 4.80        | 4.90 | 5.00 |
| D2       | 3.61        | 3.81 | 3.96 |
| E        | 5.90        | 6.00 | 6.10 |
| E1       | 5.70        | 5.75 | 5.80 |
| E2       | 3.63        | 3.83 | 4.03 |
| e        | 1.27 BSC    |      |      |
| H        | 0.41        | 0.51 | 0.61 |
| K1       | 1.10        | -    | -    |
| L        | 0.51        | 0.61 | 0.71 |
| L1       | 0.06        | 0.13 | 0.20 |
| $\alpha$ | 0°          | -    | 12°  |

- 1.All Dimension Are In Millimeters.
- 2.Dimension Does Not Include Mold Protrusions.

## Part Marking Information & Packing : GEM-PAK

