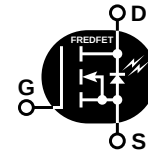
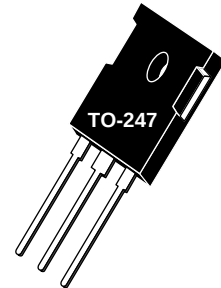


**POWER MOS V®**
**FREDFET**

Power MOS V® is a new generation of high voltage N-Channel enhancement mode power MOSFETs. This new technology minimizes the JFET effect, increases packing density and reduces the on-resistance. Power MOS V® also achieves faster switching speeds through optimized gate layout.



- Fast Recovery Body Diode
- Lower Leakage
- Faster Switching
- 100% Avalanche Tested
- Popular TO-247 Package

**MAXIMUM RATINGS**

 All Ratings:  $T_C = 25^\circ\text{C}$  unless otherwise specified.

| Symbol         | Parameter                                                      | APT30M70BVFR(G) | UNIT                |
|----------------|----------------------------------------------------------------|-----------------|---------------------|
| $V_{DSS}$      | Drain-Source Voltage                                           | 300             | Volts               |
| $I_D$          | Continuous Drain Current @ $T_C = 25^\circ\text{C}$            | 48              | Amps                |
| $I_{DM}$       | Pulsed Drain Current <sup>①</sup>                              | 192             |                     |
| $V_{GS}$       | Gate-Source Voltage Continuous                                 | $\pm 30$        | Volts               |
| $V_{GSM}$      | Gate-Source Voltage Transient                                  | $\pm 40$        |                     |
| $P_D$          | Total Power Dissipation @ $T_C = 25^\circ\text{C}$             | 370             | Watts               |
|                | Linear Derating Factor                                         | 2.96            | W/ $^\circ\text{C}$ |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range               | -55 to 150      | $^\circ\text{C}$    |
| $T_L$          | Lead Temperature: 0.063" from Case for 10 Sec.                 | 300             |                     |
| $I_{AR}$       | Avalanche Current <sup>①</sup> (Repetitive and Non-Repetitive) | 48              | Amps                |
| $E_{AR}$       | Repetitive Avalanche Energy <sup>①</sup>                       | 30              | mJ                  |
| $E_{AS}$       | Single Pulse Avalanche Energy <sup>④</sup>                     | 1300            |                     |

**STATIC ELECTRICAL CHARACTERISTICS**

| Symbol       | Characteristic / Test Conditions                                                                   | MIN | TYP | MAX       | UNIT    |
|--------------|----------------------------------------------------------------------------------------------------|-----|-----|-----------|---------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage ( $V_{GS} = 0V, I_D = 250\mu A$ )                                   | 300 |     |           | Volts   |
| $I_{D(on)}$  | On State Drain Current <sup>②</sup> ( $V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max, $V_{GS} = 10V$ ) | 48  |     |           | Amps    |
| $R_{DS(on)}$ | Drain-Source On-State Resistance <sup>②</sup> ( $V_{GS} = 10V, 0.5 I_{D[Cont.]}$ )                 |     |     | 0.070     | Ohms    |
| $I_{DSS}$    | Zero Gate Voltage Drain Current ( $V_{DS} = V_{DSS}, V_{GS} = 0V$ )                                |     |     | 250       | $\mu A$ |
|              | Zero Gate Voltage Drain Current ( $V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$ )   |     |     | 1000      |         |
| $I_{GSS}$    | Gate-Source Leakage Current ( $V_{GS} = \pm 30V, V_{DS} = 0V$ )                                    |     |     | $\pm 100$ | nA      |
| $V_{GS(th)}$ | Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 1.0mA$ )                                          | 2   |     | 4         | Volts   |

 **CAUTION:** These Devices are Sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

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FAX: (33) 5 56 47 97 61

# DYNAMIC CHARACTERISTICS

APT30M70BVFR(G)

| Symbol       | Characteristic               | Test Conditions                                                                                                | MIN | TYP  | MAX  | UNIT |
|--------------|------------------------------|----------------------------------------------------------------------------------------------------------------|-----|------|------|------|
| $C_{iss}$    | Input Capacitance            | $V_{GS} = 0V$<br>$V_{DS} = 25V$<br>$f = 1\text{ MHz}$                                                          |     | 4890 | 5870 | pF   |
| $C_{oss}$    | Output Capacitance           |                                                                                                                |     | 882  | 1235 |      |
| $C_{rss}$    | Reverse Transfer Capacitance |                                                                                                                |     | 277  | 415  |      |
| $Q_g$        | Total Gate Charge ③          | $V_{GS} = 10V$<br>$V_{DD} = 0.5 V_{DSS}$<br>$I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$                      |     | 152  | 225  | nC   |
| $Q_{gs}$     | Gate-Source Charge           |                                                                                                                |     | 35   | 52   |      |
| $Q_{gd}$     | Gate-Drain ("Miller") Charge |                                                                                                                |     | 66   | 99   |      |
| $t_{d(on)}$  | Turn-on Delay Time           | $V_{GS} = 15V$<br>$V_{DD} = 0.5 V_{DSS}$<br>$I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$<br>$R_G = 1.6\Omega$ |     | 14   | 28   | ns   |
| $t_r$        | Rise Time                    |                                                                                                                |     | 21   | 42   |      |
| $t_{d(off)}$ | Turn-off Delay Time          |                                                                                                                |     | 57   | 85   |      |
| $t_f$        | Fall Time                    |                                                                                                                |     | 10   | 20   |      |

# SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol    | Characteristic / Test Conditions                                                  | MIN                       | TYP | MAX | UNIT          |
|-----------|-----------------------------------------------------------------------------------|---------------------------|-----|-----|---------------|
| $I_S$     | Continuous Source Current (Body Diode)                                            |                           |     | 48  | Amps          |
| $I_{SM}$  | Pulsed Source Current ① (Body Diode)                                              |                           |     | 192 |               |
| $V_{SD}$  | Diode Forward Voltage ② ( $V_{GS} = 0V$ , $I_S = -I_D [\text{Cont.}]$ )           |                           |     | 1.3 | Volts         |
| $dv/dt$   | Peak Diode Recovery $dv/dt$ ⑤                                                     |                           |     | 5   | V/ns          |
| $t_{rr}$  | Reverse Recovery Time<br>( $I_S = -I_D [\text{Cont.}]$ , $di/dt = 100A/\mu s$ )   | $T_j = 25^\circ\text{C}$  |     | 225 | ns            |
|           |                                                                                   | $T_j = 125^\circ\text{C}$ |     | 400 |               |
| $Q_{rr}$  | Reverse Recovery Charge<br>( $I_S = -I_D [\text{Cont.}]$ , $di/dt = 100A/\mu s$ ) | $T_j = 25^\circ\text{C}$  | 1.0 |     | $\mu\text{C}$ |
|           |                                                                                   | $T_j = 125^\circ\text{C}$ | 4.2 |     |               |
| $I_{RRM}$ | Peak Recovery Current<br>( $I_S = -I_D [\text{Cont.}]$ , $di/dt = 100A/\mu s$ )   | $T_j = 25^\circ\text{C}$  | 10  |     | Amps          |
|           |                                                                                   | $T_j = 125^\circ\text{C}$ | 20  |     |               |

# THERMAL CHARACTERISTICS

| Symbol          | Characteristic      | MIN | TYP | MAX  | UNIT               |
|-----------------|---------------------|-----|-----|------|--------------------|
| $R_{\theta JC}$ | Junction to Case    |     |     | 0.34 | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ | Junction to Ambient |     |     | 40   |                    |

① Repetitive Rating: Pulse width limited by maximum junction temperature.

② Pulse Test: Pulse width < 380  $\mu\text{s}$ , Duty Cycle < 2%

③ See MIL-STD-750 Method 3471

④ Starting  $T_j = +25^\circ\text{C}$ ,  $L = 1.13\text{mH}$ ,  $R_G = 25\Omega$ , Peak  $I_L = 48\text{A}$

⑤  $I_S \leq -I_D [\text{Cont.}]$ ,  $di/dt = 100A/\mu s$ ,  $V_{DD} \leq V_{DSS}$ ,  $T_j \leq 150^\circ\text{C}$ ,  $R_G = 2.0\Omega$ ,  $V_R = 200V$ .

APT Reserves the right to change, without notice, the specifications and information contained herein.

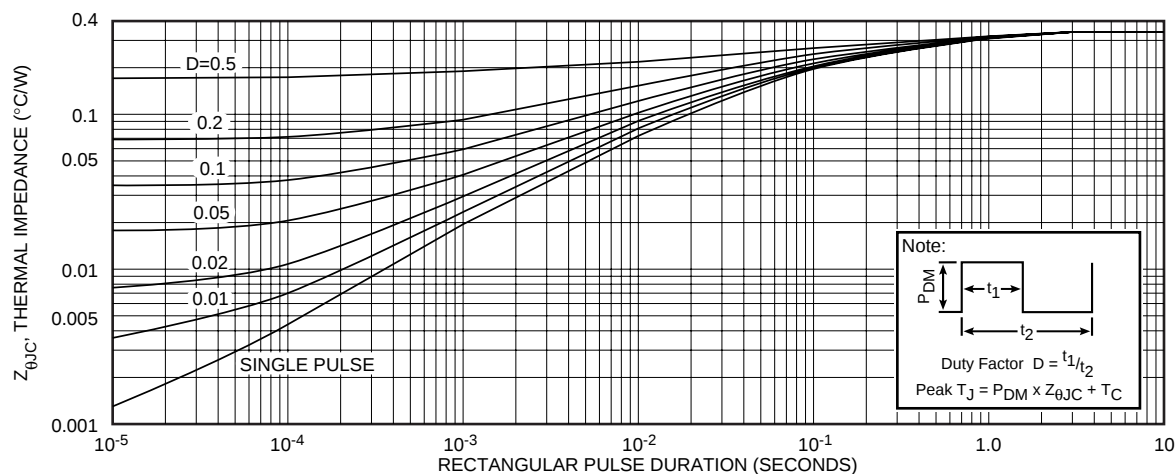


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

# APT30M70BVFR(G)

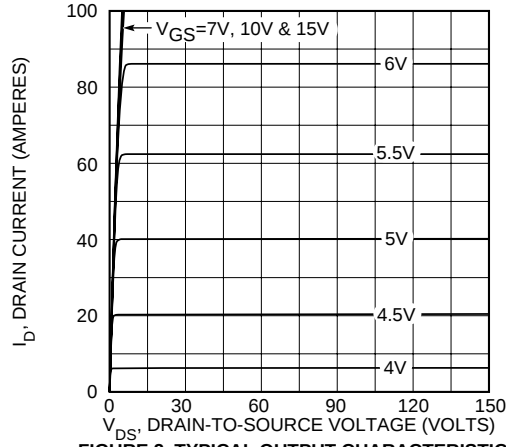


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

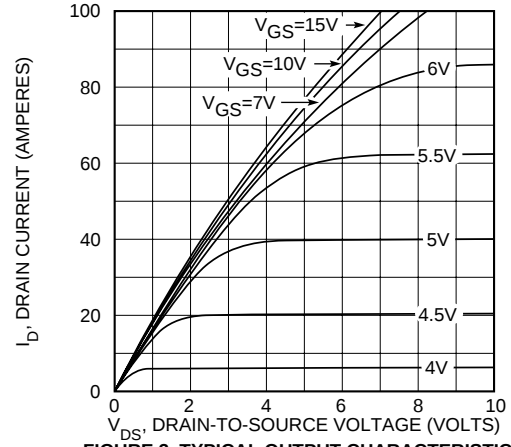


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

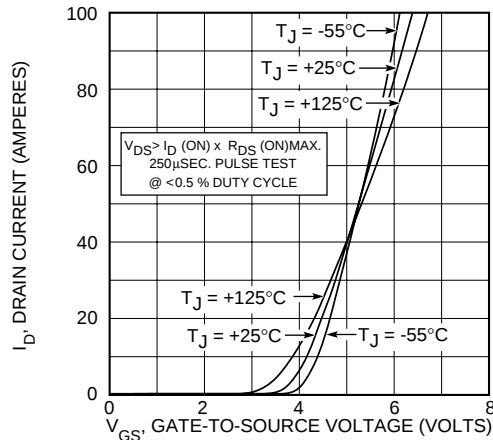


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

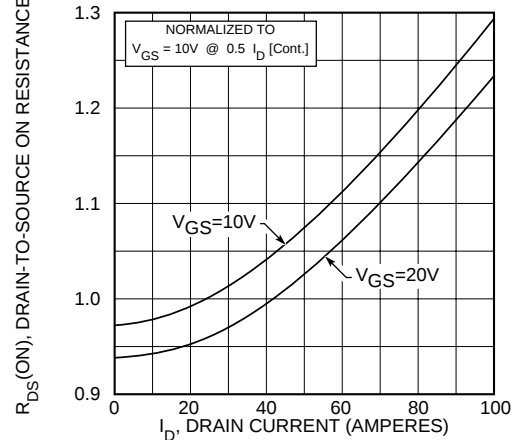


FIGURE 5,  $R_{DS(ON)}$  vs DRAIN CURRENT

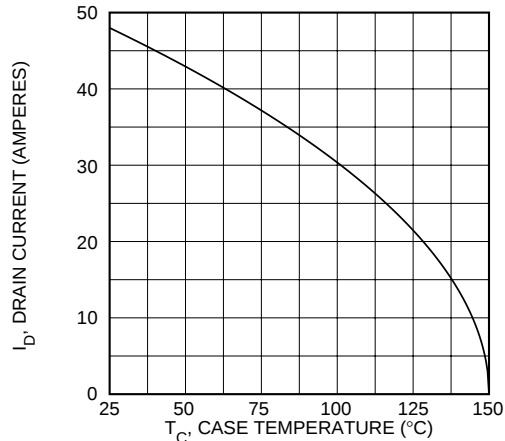


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

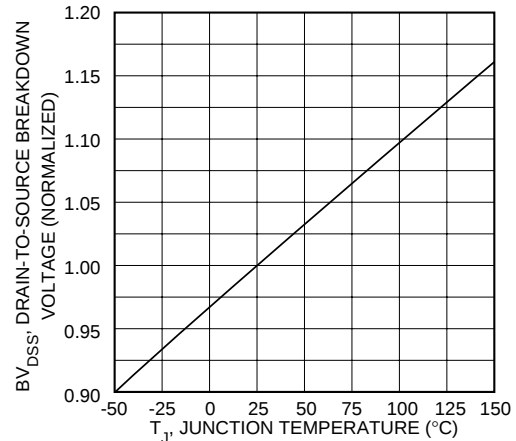


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

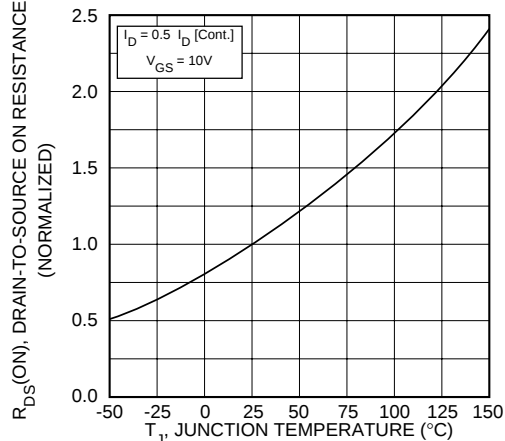


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

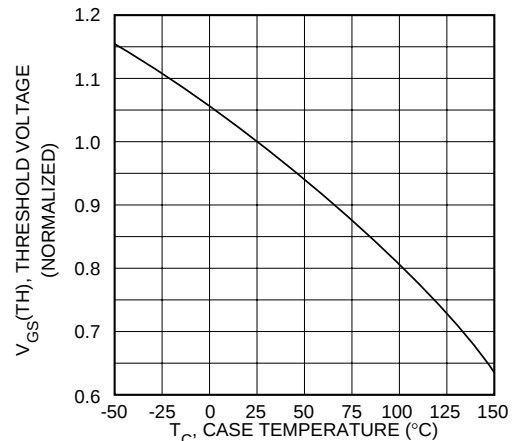


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

# APT30M70BVF(R)(G)

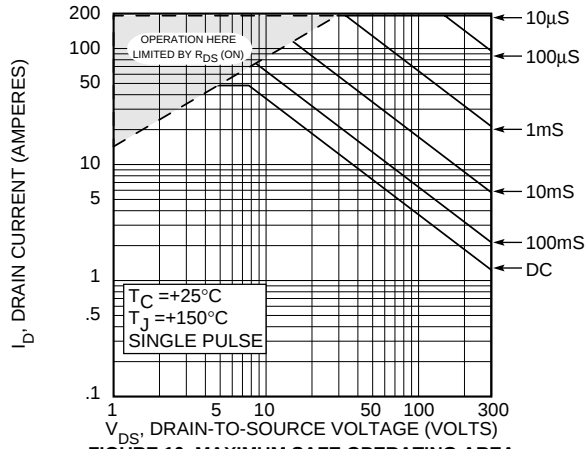


FIGURE 10, MAXIMUM SAFE OPERATING AREA

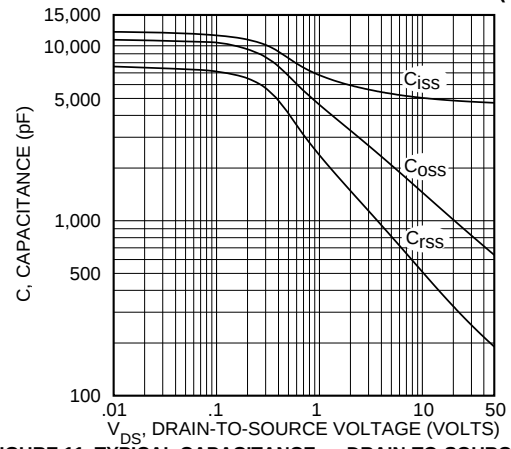


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

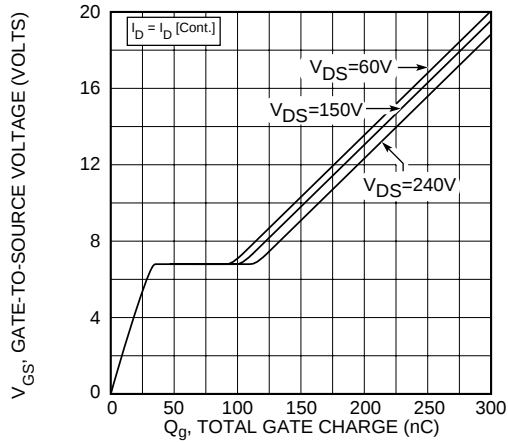


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

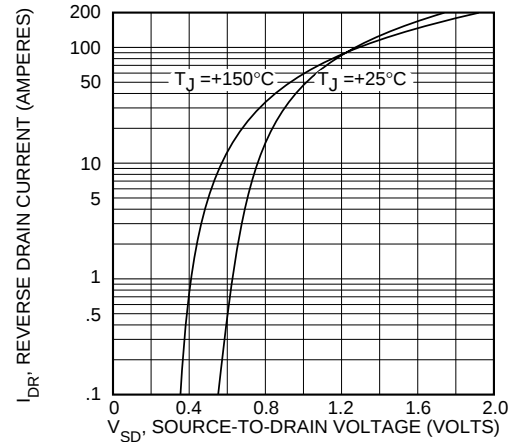
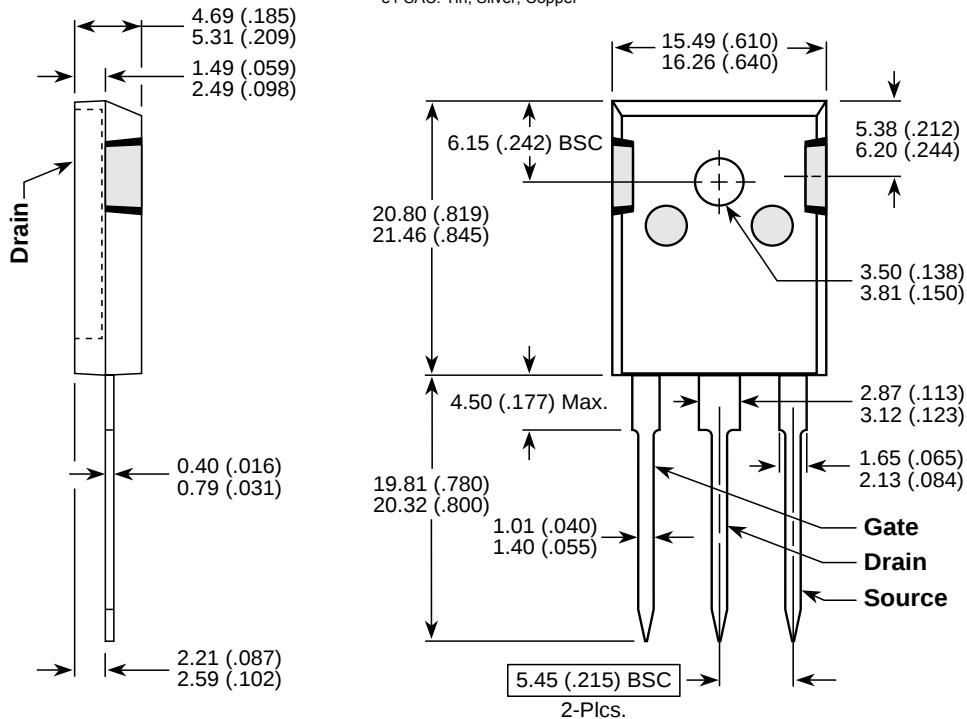


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

## TO-247 Package Outline

e1 SAC: Tin, Silver, Copper



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