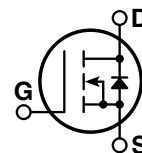
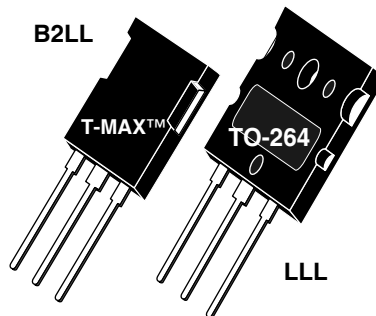


## POWER MOS 7<sup>®</sup> MOSFET

Power MOS 7<sup>®</sup> is a new generation of low loss, high voltage, N-Channel enhancement mode power MOSFETS. Both conduction and switching losses are addressed with Power MOS 7<sup>®</sup> by significantly lowering  $R_{DS(ON)}$  and  $Q_g$ . Power MOS 7<sup>®</sup> combines lower conduction and switching losses along with exceptionally fast switching speeds inherent with APT's patented metal gate structure.



- Lower Input Capacitance
- Lower Miller Capacitance
- Lower Gate Charge,  $Q_g$
- Increased Power Dissipation
- Easier To Drive
- Popular T-MAX™ or TO-264 Package

### MAXIMUM RATINGS

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

| Symbol         | Parameter  | APT5010B2LL_LLL | UNIT  |
|----------------|--|-----------------|-------|
| $V_{DSS}$      | Drain-Source Voltage   | 500             | Volts |
| $I_D$          | Continuous Drain Current @ $T_C = 25^\circ\text{C}$            | 46              | Amps  |
| $I_{DM}$       | Pulsed Drain Current <sup>①</sup>                              | 184             |       |
| $V_{GS}$       | Gate-Source Voltage Continuous                                 | $\pm 30$        | Volts |
| $V_{GSM}$      | Gate-Source Voltage Transient                                  | $\pm 40$        |       |
| $P_D$          | Total Power Dissipation @ $T_C = 25^\circ\text{C}$             | 520             | Watts |
|                | Linear Derating Factor   | 4.0             | W/°C  |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range               | -55 to 150      | °C    |
| $T_L$          | Lead Temperature: 0.063" from Case for 10 Sec.                 | 300             |       |
| $I_{AR}$       | Avalanche Current <sup>①</sup> (Repetitive and Non-Repetitive) | 50              | Amps  |
| $E_{AR}$       | Repetitive Avalanche Energy <sup>①</sup>                       | 50              | mJ    |
| $E_{AS}$       | Single Pulse Avalanche Energy <sup>④</sup>                     | 1600            |       |

### STATIC ELECTRICAL CHARACTERISTICS

| Symbol       | Characteristic / Test Conditions  | MIN | TYP | MAX       | UNIT    |
|--------------|---|-----|-----|-----------|---------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage ( $V_{GS} = 0V, I_D = 250\mu A$ )                          | 500 |     |           | Volts   |
| $R_{DS(on)}$ | Drain-Source On-State Resistance <sup>②</sup> ( $V_{GS} = 10V, I_D = 23A$ )               |     |     | 0.100     | Ohms    |
| $I_{DSS}$    | Zero Gate Voltage Drain Current ( $V_{DS} = 500V, V_{GS} = 0V$ )                          |     |     | 100       | $\mu A$ |
|              | Zero Gate Voltage Drain Current ( $V_{DS} = 400V, V_{GS} = 0V, T_C = 125^\circ\text{C}$ ) |     |     | 500       |         |
| $I_{GSS}$    | Gate-Source Leakage Current ( $V_{GS} = \pm 30V, V_{DS} = 0V$ )                           |     |     | $\pm 100$ | nA      |
| $V_{GS(th)}$ | Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 2.5mA$ )                                 | 3   |     | 5         | Volts   |



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

**DYNAMIC CHARACTERISTICS**

APT5010B2LL\_LLL

| Symbol       | Characteristic               | Test Conditions  | MIN | TYP  | MAX | UNIT    |
|--------------|------------------------------|--|-----|------|-----|---------|
| $C_{iss}$    | Input Capacitance            | $V_{GS} = 0V$<br>$V_{DS} = 25V$<br>$f = 1\text{ MHz}$  |     | 4360 |     | pF      |
| $C_{oss}$    | Output Capacitance           |  |     | 895  |     |         |
| $C_{riss}$   | Reverse Transfer Capacitance |  |     | 60   |     |         |
| $Q_g$        | Total Gate Charge ③          | $V_{GS} = 10V$<br>$V_{DD} = 250V$<br>$I_D = 46A @ 25^\circ C$  |     | 95   |     | nC      |
| $Q_{gs}$     | Gate-Source Charge           |  |     | 24   |     |         |
| $Q_{gd}$     | Gate-Drain ("Miller") Charge |  |     | 50   |     |         |
| $t_{d(on)}$  | Turn-on Delay Time           | <b>RESISTIVE SWITCHING</b><br>$V_{GS} = 15V$<br>$V_{DD} = 250V$<br>$I_D = 46A @ 25^\circ C$<br>$R_G = 0.6\Omega$ |     | 11   |     | ns      |
| $t_r$        | Rise Time                    |  |     | 15   |     |         |
| $t_{d(off)}$ | Turn-off Delay Time          |  |     | 25   |     |         |
| $t_f$        | Fall Time                    |  |     | 3    |     |         |
| $E_{on}$     | Turn-on Switching Energy ⑥   | <b>INDUCTIVE SWITCHING @ 25°C</b><br>$V_{DD} = 333V, V_{GS} = 15V$<br>$I_D = 46A, R_G = 5\Omega$                 |     | 545  |     | $\mu J$ |
| $E_{off}$    | Turn-off Switching Energy    |  |     | 510  |     |         |
| $E_{on}$     | Turn-on Switching Energy ⑥   | <b>INDUCTIVE SWITCHING @ 125°C</b><br>$V_{DD} = 333V, V_{GS} = 15V$<br>$I_D = 46A, R_G = 5\Omega$                |     | 845  |     |         |
| $E_{off}$    | Turn-off Switching Energy    |  |     | 595  |     |         |

**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS**

| Symbol   | Characteristic / Test Conditions                               | MIN | TYP  | MAX | UNIT    |
|----------|--|-----|------|-----|---------|
| $I_S$    | Continuous Source Current (Body Diode)                         |     |      | 46  | Amps    |
| $I_{SM}$ | Pulsed Source Current ① (Body Diode)                           |     |      | 184 |         |
| $V_{SD}$ | Diode Forward Voltage ② ( $V_{GS} = 0V, I_S = -46A$ )          |     |      | 1.3 | Volts   |
| $t_{rr}$ | Reverse Recovery Time ( $I_S = -46A, di_S/dt = 100A/\mu s$ )   |     | 608  |     | ns      |
| $Q_{rr}$ | Reverse Recovery Charge ( $I_S = -46A, di_S/dt = 100A/\mu s$ ) |     | 11.0 |     | $\mu C$ |
| $dv/dt$  | Peak Diode Recovery $dv/dt$ ⑤                                  |     |      | 8   | V/ns    |

**THERMAL CHARACTERISTICS**

| Symbol          | Characteristic      | MIN | TYP | MAX  | UNIT         |
|-----------------|---------------------|-----|-----|------|--------------|
| $R_{\theta JC}$ | Junction to Case    |     |     | 0.25 | $^\circ C/W$ |
| $R_{\theta JA}$ | Junction to Ambient |     |     | 40   |              |

① Repetitive Rating: Pulse width limited by maximum junction temperature

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

③ See MIL-STD-750 Method 3471

④ Starting  $T_J = +25^\circ C$ ,  $L = 1.51mH$ ,  $R_G = 25\Omega$ , Peak  $I_L = 46A$

⑤  $dv/dt$  numbers reflect the limitations of the test circuit rather than the device itself.  $I_S \leq -I_D 46A$   $di/dt \leq 700A/\mu s$   $V_R \leq V_{DSS}$   $T_J \leq 150^\circ C$

⑥  $E_{on}$  includes diode reverse recovery. See figures 18, 20.

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

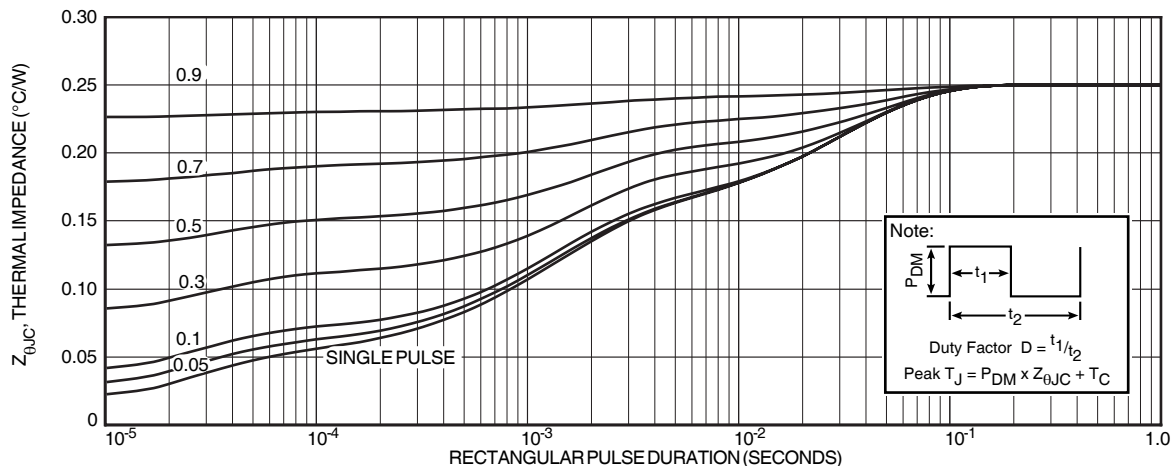


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

# Typical Performance Curves

APT5010B2LL\_LLL

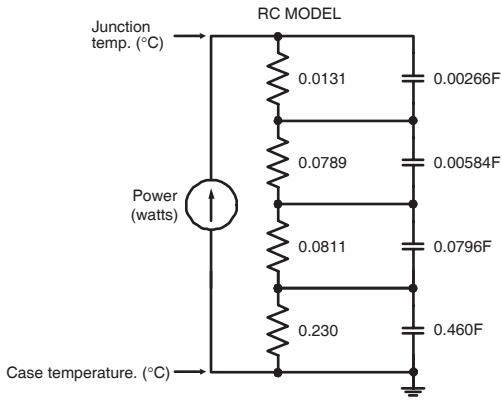


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

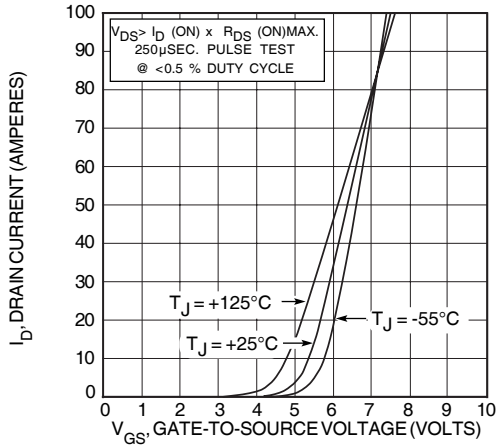


FIGURE 4, TRANSFER CHARACTERISTICS

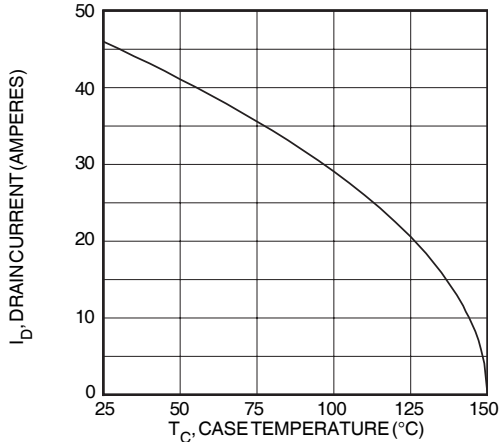


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

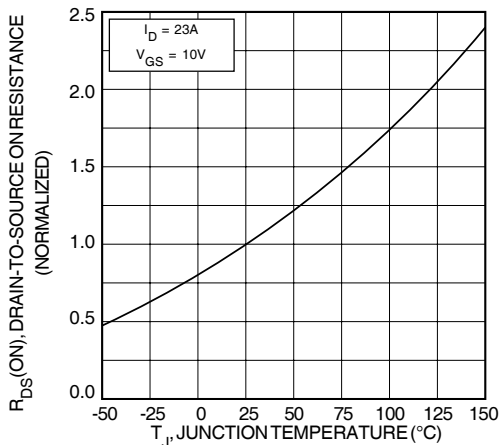


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

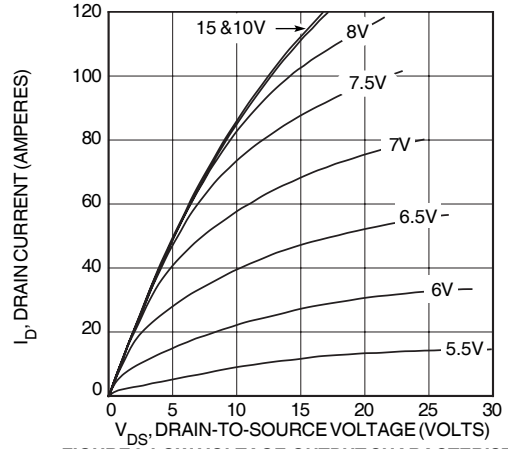


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

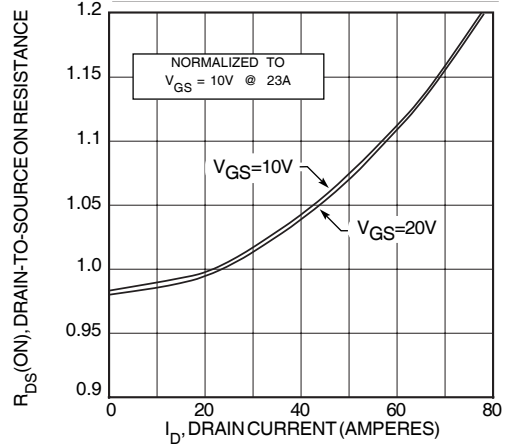


FIGURE 5,  $R_{DS(ON)}$  vs DRAIN CURRENT

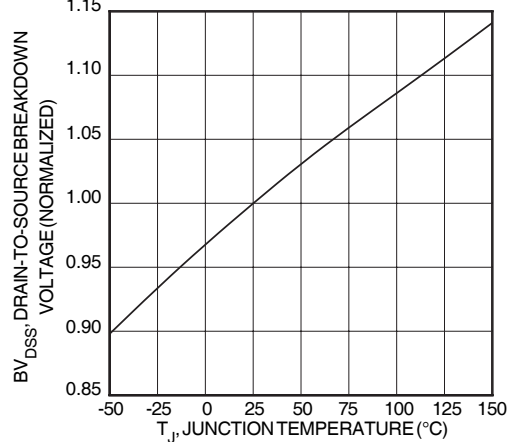


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

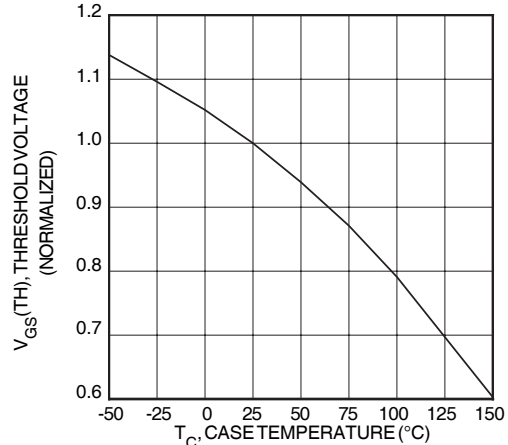


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

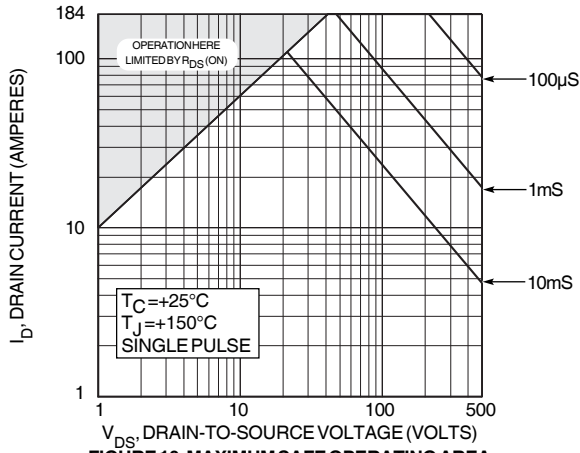


FIGURE 10, MAXIMUM SAFE OPERATING AREA

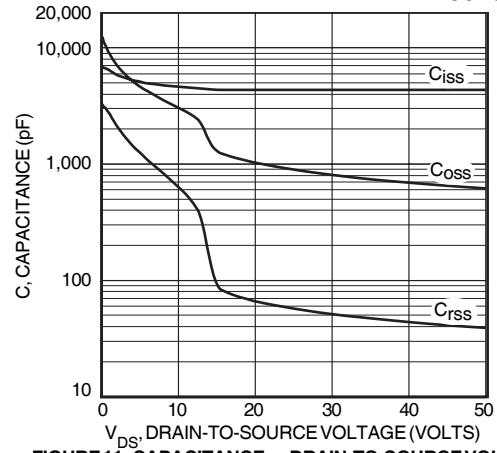


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

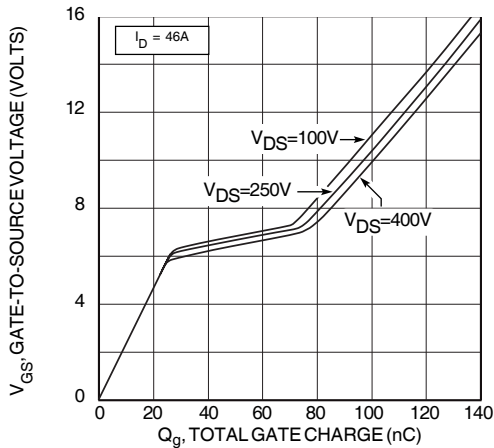


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

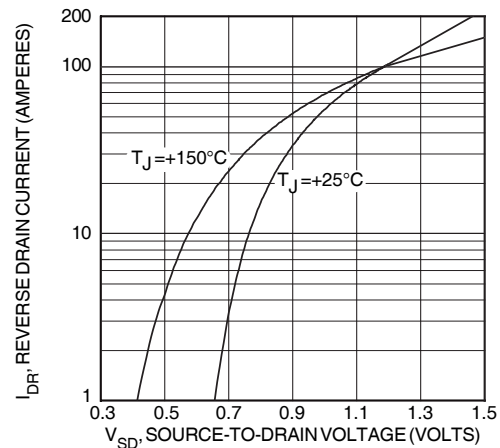


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

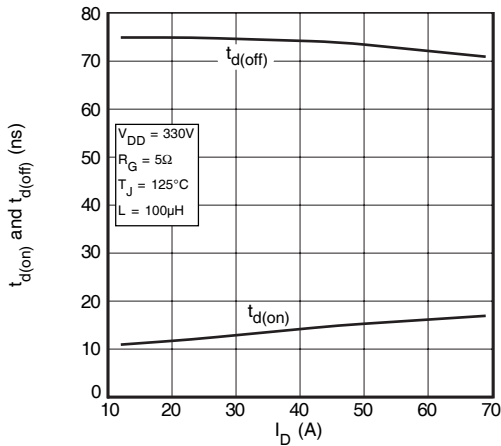


FIGURE 14, DELAY TIMES vs CURRENT

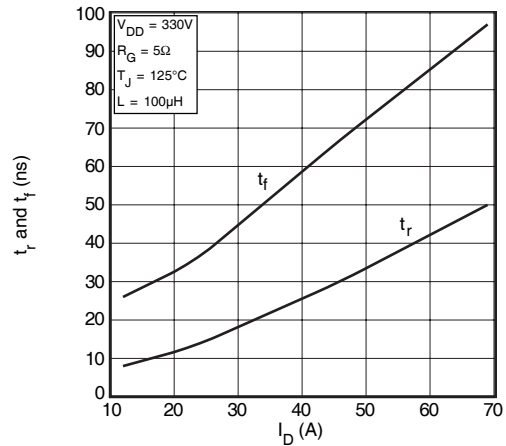


FIGURE 15, RISE AND FALL TIMES vs CURRENT

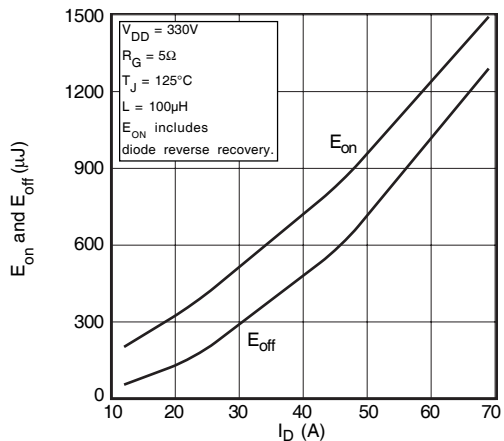


FIGURE 16, SWITCHING ENERGY vs CURRENT

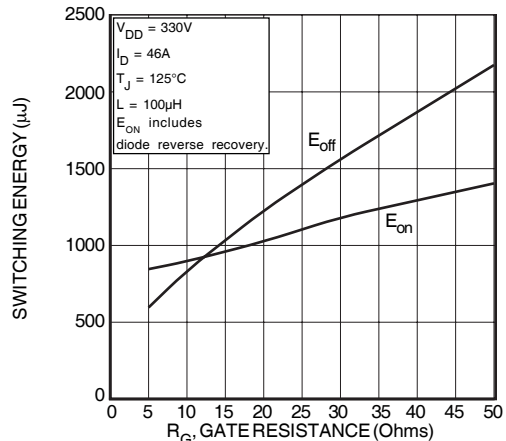


FIGURE 17, SWITCHING ENERGY vs. GATE RESISTANCE

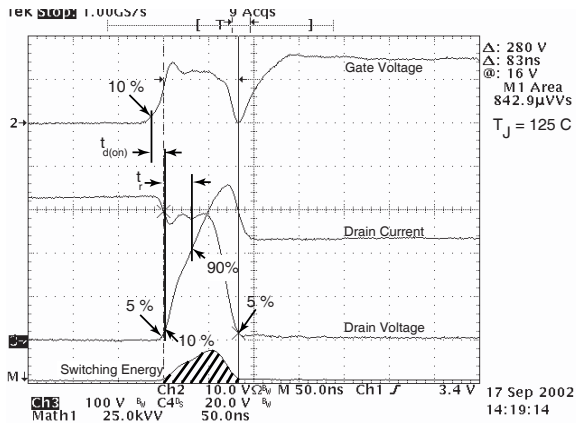


Figure 18, Turn-on Switching Waveforms and Definitions

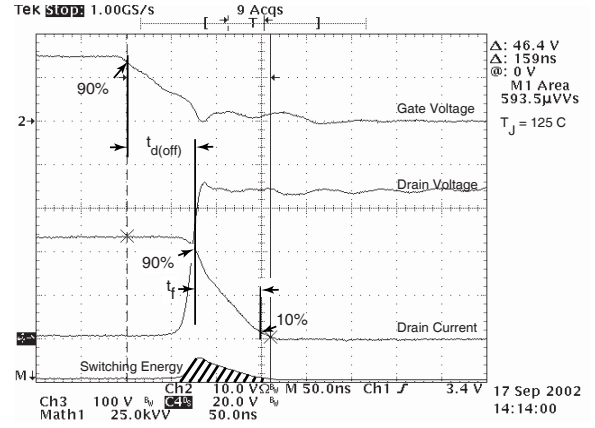


Figure 19, Turn-off Switching Waveforms and Definitions

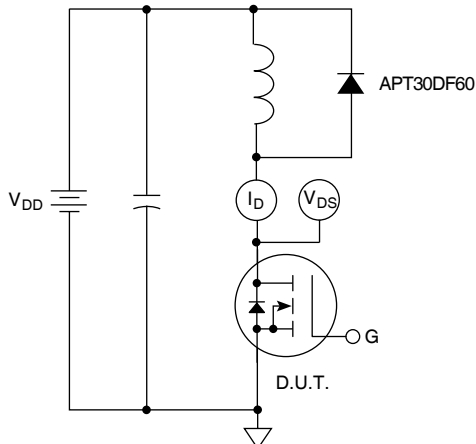
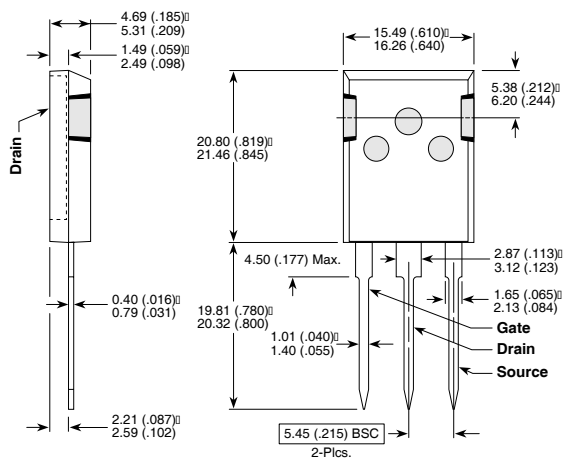


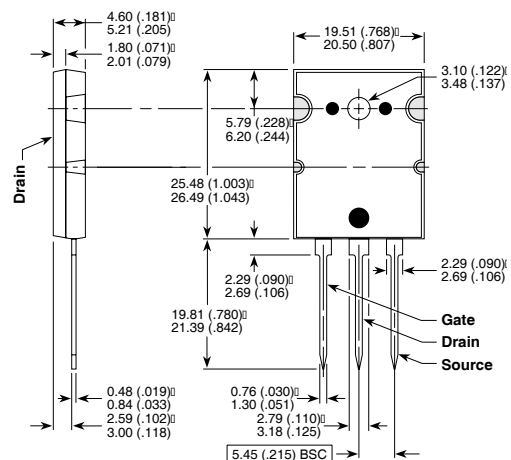
Figure 20, Inductive Switching Test Circuit

T-MAX™ (B2) Package Outline



These dimensions are equal to the TO-247 without the mounting hole.  
Dimensions in Millimeters and (Inches)

TO-264 (L) Package Outline



Dimensions in Millimeters and (Inches)

APT's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522

5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 and foreign patents. US and Foreign patents pending. All Rights Reserved.

## Данный компонент на территории Российской Федерации

### Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9