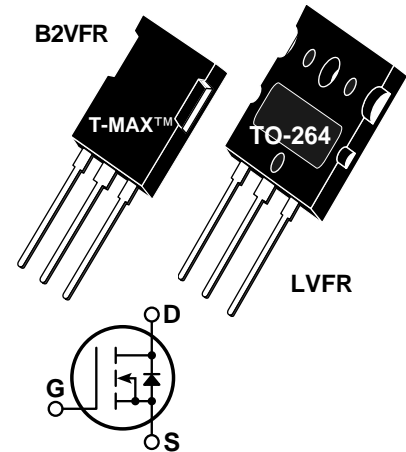


## POWER MOS V®



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.



- Identical Specifications: T-MAX™ or TO-264 Package
- Lower Leakage
- Faster Switching
- Fast Recovery Body Diode

### MAXIMUM RATINGS

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

Symbol	Parameter	APT10040	UNIT
$V_{DSS}$	Drain-Source Voltage	1000	Volts
$I_D$	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	25	Amps
$I_{DM}$	Pulsed Drain Current <sup>①</sup>	100	
$V_{GS}$	Gate-Source Voltage Continuous	±30	Volts
$V_{GSM}$	Gate-Source Voltage Transient	±40	
$P_D$	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	625	Watts
	Linear Derating Factor	5.0	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)	33	Amps
$E_{AR}$	Repetitive Avalanche Energy <sup>①</sup>	50	mJ
$E_{AS}$	Single Pulse Avalanche Energy <sup>④</sup>	3000	

### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$BV_{DSS}$	Drain-Source Breakdown Voltage ( $V_{GS} = 0V, I_D = 250\mu\text{A}$ )	1000			Volts
$I_{D(on)}$	On State Drain Current <sup>②</sup> ( $V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max, $V_{GS} = 10V$ )	25			Amps
$R_{DS(on)}$	Drain-Source On-State Resistance <sup>②</sup> ( $V_{GS} = 10V, 0.5 I_{D[Cont.]}$ )			0.40	Ohms
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{DS} = V_{DSS}, V_{GS} = 0V$ )			250	μA
	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 ( $V_{GS} = \pm 30V, V_{DS} = 0V$ )			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 2.5mA$ )	2		4	Volts

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

APT Website - <http://www.advancedpower.com>

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**DYNAMIC CHARACTERISTICS**

**APT10040 B2VFR - LVFR**

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V		7830	9400	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> = 25V		715	1010	
C <sub>rss</sub>	Reverse Transfer Capacitance	f = 1 MHz		386	580	
Q <sub>g</sub>	Total Gate Charge <sup>③</sup>	V <sub>GS</sub> = 10V		415	630	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DD</sub> = 0.5 V <sub>DSS</sub>		37	45	
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	I <sub>D</sub> = I <sub>D</sub> [Cont.] @ 25°C		216	330	
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>GS</sub> = 15V		13	26	ns
t <sub>r</sub>	Rise Time	V <sub>DD</sub> = 0.5 V <sub>DSS</sub>		13	26	
t <sub>d(off)</sub>	Turn-off Delay Time	I <sub>D</sub> = I <sub>D</sub> [Cont.] @ 25°C		57	86	
t <sub>f</sub>	Fall Time	R <sub>G</sub> = 0.6Ω		9	20	

**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS**

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I <sub>S</sub>	Continuous Source Current (Body Diode)			25	Amps
I <sub>SM</sub>	Pulsed Source Current <sup>①</sup> (Body Diode)			100	
V <sub>SD</sub>	Diode Forward Voltage <sup>②</sup> (V <sub>GS</sub> = 0V, I <sub>S</sub> = -I <sub>D</sub> [Cont.])			1.3	Volts
dv/dt	Peak Diode Recovery dv/dt <sup>⑤</sup>			18	V/ns
t <sub>rr</sub>	Reverse Recovery Time (I <sub>S</sub> = -I <sub>D</sub> [Cont.], di/dt = 100A/μs)	T <sub>j</sub> = 25°C		320	ns
		T <sub>j</sub> = 125°C		650	
Q <sub>rr</sub>	Reverse Recovery Charge (I <sub>S</sub> = -I <sub>D</sub> [Cont.], di/dt = 100A/μs)	T <sub>j</sub> = 25°C		3.1	μC
		T <sub>j</sub> = 125°C		8.7	
I <sub>RRM</sub>	Peak Recovery Current (I <sub>S</sub> = -I <sub>D</sub> [Cont.], di/dt = 100A/μs)	T <sub>j</sub> = 25°C		15.8	Amps
		T <sub>j</sub> = 125°C		24.8	

**THERMAL CHARACTERISTICS**

Symbol	Characteristic	MIN	TYP	MAX	UNIT
R <sub>θJC</sub>	Junction to Case			0.20	°C/W
R <sub>θJA</sub>	Junction to Ambient			40	

- ① Repetitive Rating: Pulse width limited by maximum junction temperature.
- ② Pulse Test: Pulse width < 380 μs, Duty Cycle < 2%
- ③ See MIL-STD-750 Method 3471
- ④ Starting T<sub>j</sub> = +25°C, L = 9.60mH, R<sub>G</sub> = 25Ω, Peak I<sub>L</sub> = 25A
- ⑤ I<sub>S</sub> ≤ -I<sub>D</sub> [Cont.], di/dt = 700A/μs, T<sub>j</sub> ≤ 150°C, R<sub>G</sub> = 2.0Ω, V<sub>R</sub> = 200V.

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

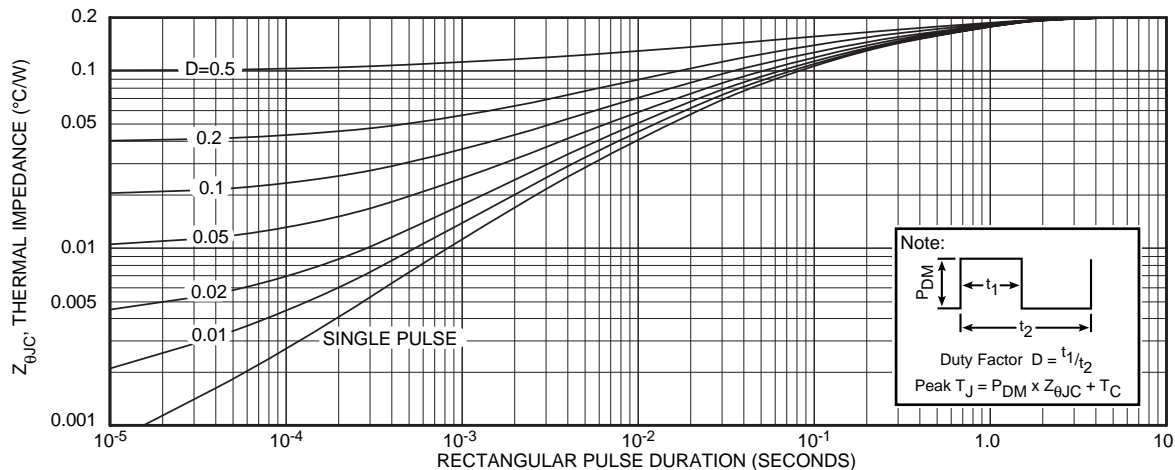
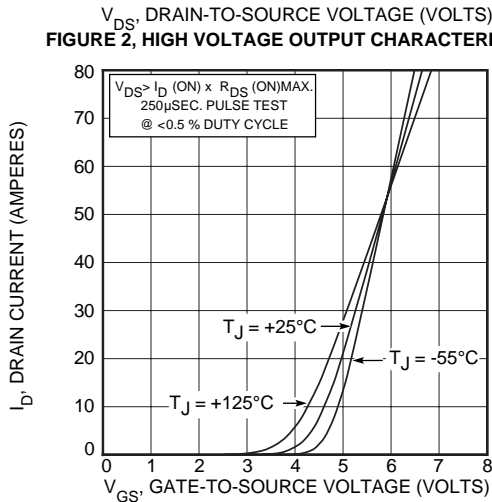


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

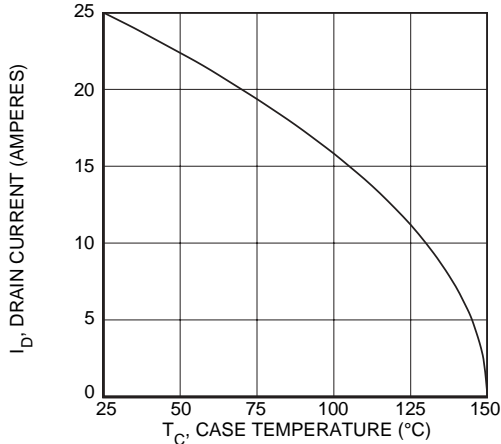
# Typical Performance Curves

Graph Deleted

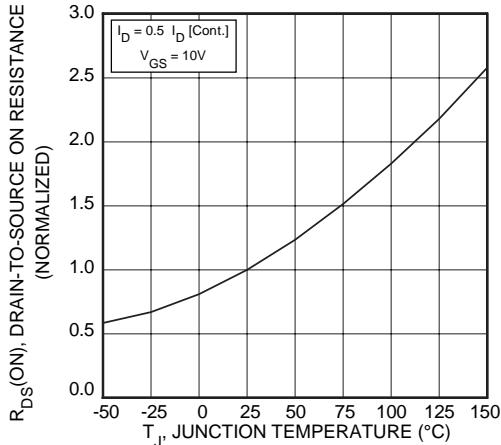
**FIGURE 2, HIGH VOLTAGE OUTPUT CHARACTERISTICS**



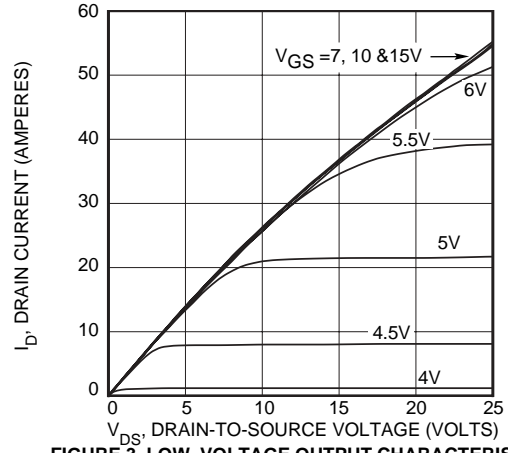
**FIGURE 4, TRANSFER CHARACTERISTICS**



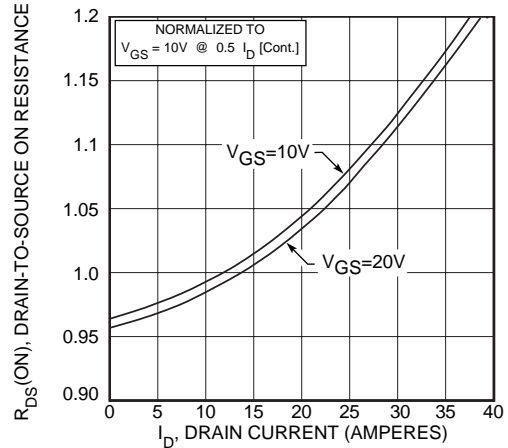
**FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE**



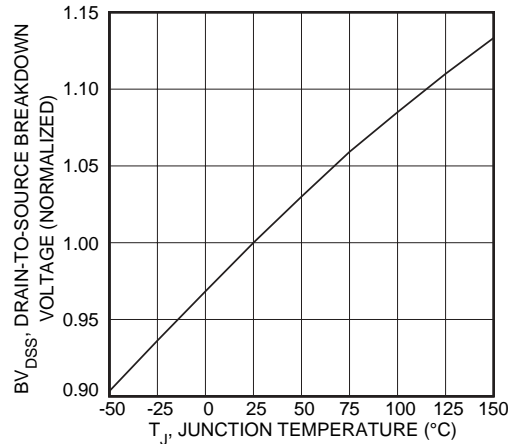
**FIGURE 8, ON-RESISTANCE vs. TEMPERATURE**



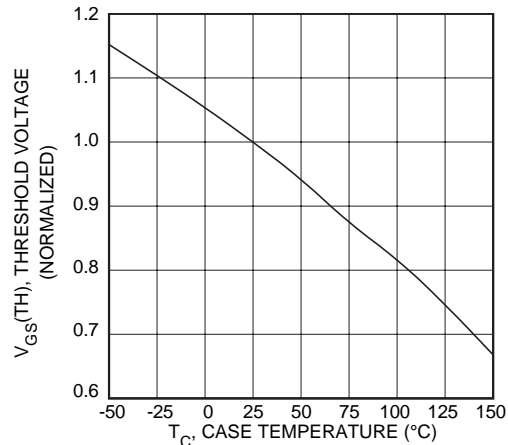
**FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS**



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



**FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE**



**FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE**

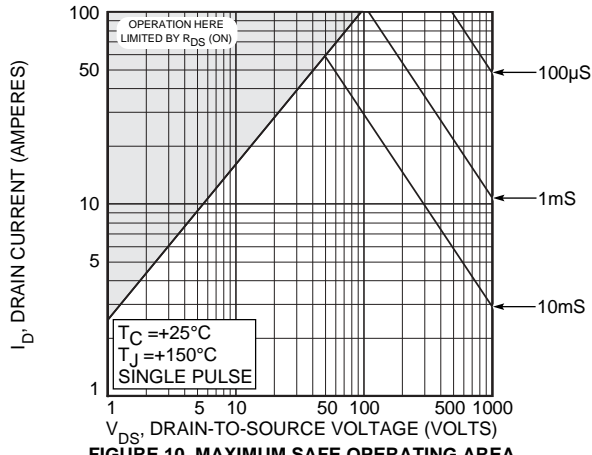


FIGURE 10, MAXIMUM SAFE OPERATING AREA

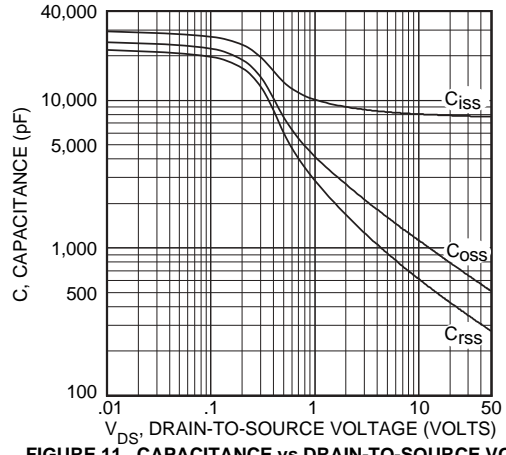


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

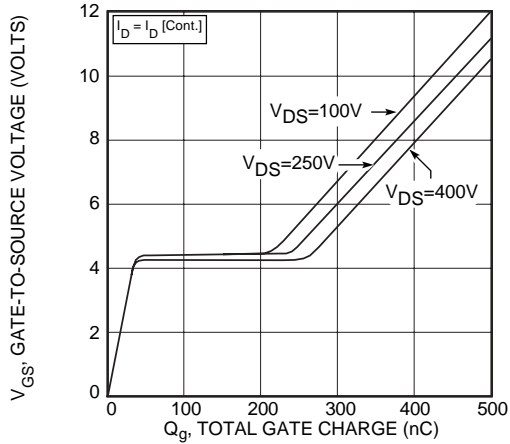


FIGURE 12, GATE CHARGE vs GATE-TO-SOURCE VOLTAGE

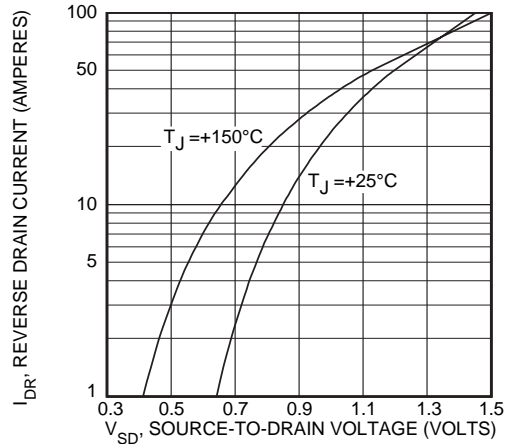
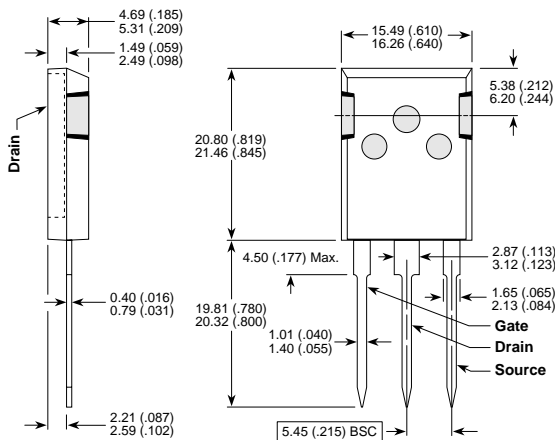


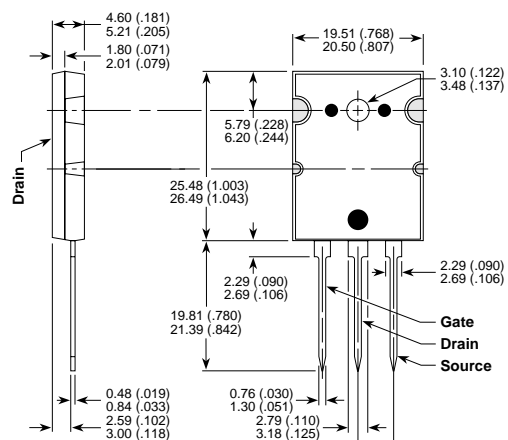
FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

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 devices are covered by one or more of the following U.S. patents: 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336  
5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058