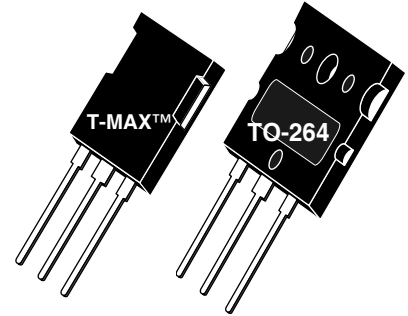
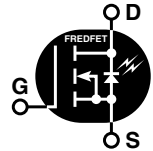




Power MOS V® is a new generation of high voltage N-Channel enhancement mode power MOSFETs. This new technology minimizes the JFET effect, increases packing density and reduces the on-resistance. Power MOS V® also achieves faster switching speeds through optimized gate layout.



- **Faster Switching**
- **Lower Leakage**
- **Avalanche Energy Rated**
- **Popular T-MAX™ or TO-264 Package**



MAXIMUM RATINGS

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

Symbol	Parameter	APT12060B2VFR_LVFR	UNIT
V_{DSS}	Drain-Source Voltage	1200	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	20	Amps
I_{DM}	Pulsed Drain Current ^①	80	
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	5.00	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 ^① (Repetitive and Non-Repetitive)	20	Amps
E_{AR}	Repetitive Avalanche Energy ^①	50	mJ
E_{AS}	Single Pulse Avalanche Energy ^④	3000	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250\mu A$)	1200			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ^② ($V_{GS} = 10V, I_D = 10A$)			0.600	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = 1200, V_{GS} = 0V$)			250	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 960V, V_{GS} = 0V, T_C = 125^\circ\text{C}$)			1000	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$)			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1mA$)	2		4	Volts

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

DYNAMIC CHARACTERISTICS

APT12060B2VFR_LVFR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C _{iss}	Input Capacitance	V _{GS} = 0V		7545	9500	pF
C _{oss}	Output Capacitance	V _{DS} = 25V		650	980	
C _{rss}	Reverse Transfer Capacitance	f = 1 MHz		350	490	
Q _g	Total Gate Charge ^③	V _{GS} = 10V		431	650	nC
Q _{gs}	Gate-Source Charge	V _{DD} = 0.5 V _{DSS}		34	41	
Q _{gd}	Gate-Drain ("Miller") Charge	I _D = I _D [Cont.] @ 25°C		210	320	
t _{d(on)}	Turn-on Delay Time	V _{GS} = 15V		13	26	ns
t _r	Rise Time	V _{DD} = 0.5 V _{DSS}		12	24	
t _{d(off)}	Turn-off Delay Time	I _D = I _D [Cont.] @ 25°C		63	95	
t _f	Fall Time	R _G = 0.6Ω		12	25	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I _S	Continuous Source Current (Body Diode)			20	Amps
I _{SM}	Pulsed Source Current ^① (Body Diode)			80	
V _{SD}	Diode Forward Voltage ^② (V _{GS} = 0V, I _S = -I _D [Cont.])			1.3	Volts
dv/dt	Peak Diode Recovery ^③ dv/dt			18	V/ns
t _{rr}	Reverse Recovery Time (I _S = -I _D [Cont.], di/dt = 100A/μs)	T _J = 25°C		320	ns
		T _J = 125°C		650	
Q _{rr}	Reverse Recovery Charge (I _S = -I _D [Cont.], di/dt = 100A/μs)	T _J = 25°C		3	μC
		T _J = 125°C		9	
I _{RFM}	Peak Recovery Current (I _S = -I _D [Cont.], di/dt = 100A/μs)	T _J = 25°C		15	Amps
		T _J = 125°C		25	

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
R _{θJC}	Junction to Case			0.20	°C/W
R _{θJA}	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_J = +25°C, L = 15mH, R_G = 25Ω, Peak I_L = 20A
 - ⑤ I_S ≤ I_D [Cont.], di/dt = 100A/μs, T_J ≤ 150°C, R_G = 2.0Ω V_R = 200V.
- APT Reserves the right to change, without notice, the specifications and information contained herein.

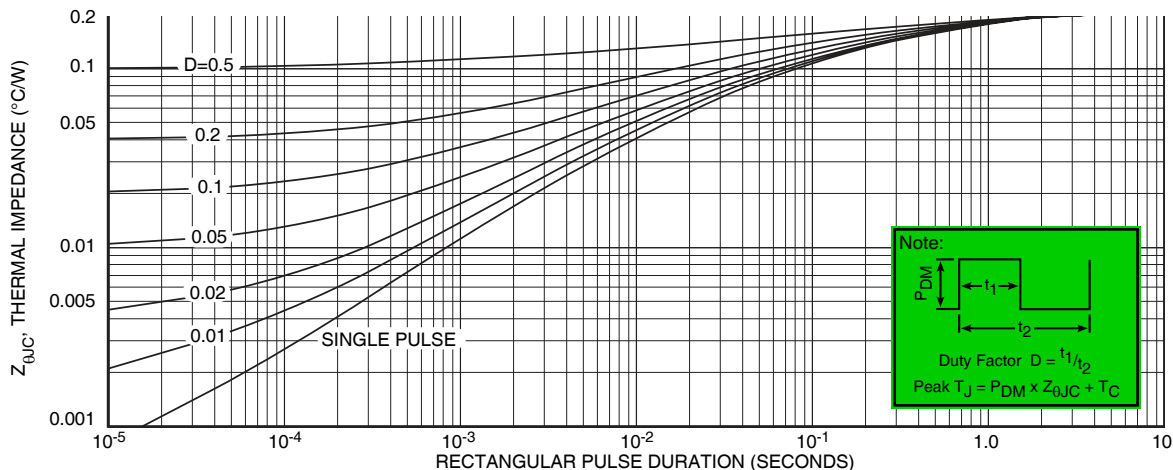


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

Graph Deleted

FIGURE 2, HIGH VOLTAGE OUTPUT CHARACTERISTICS

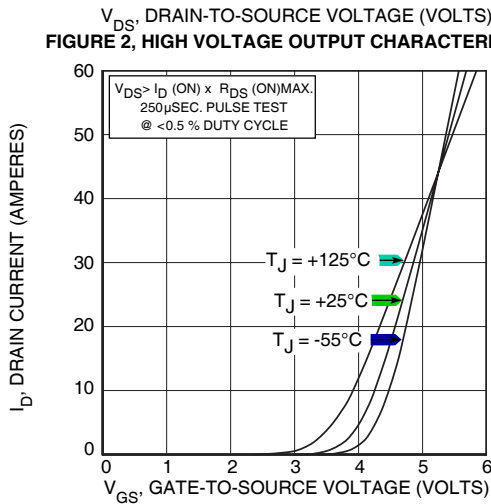


FIGURE 4, TRANSFER CHARACTERISTICS

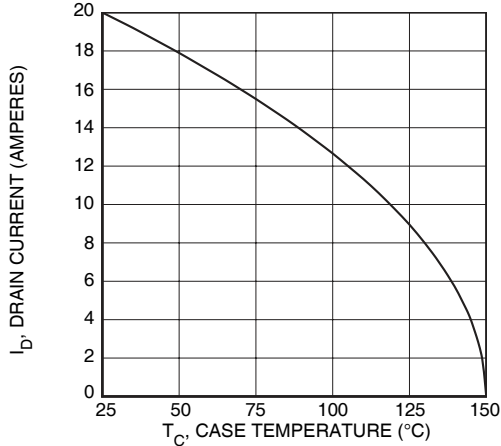


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

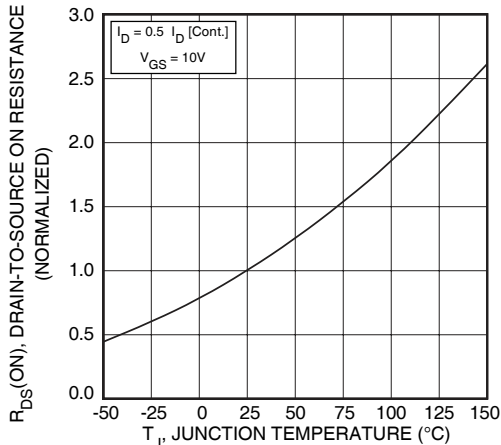


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

FIGURE 5, RDS(ON) vs DRAIN CURRENT

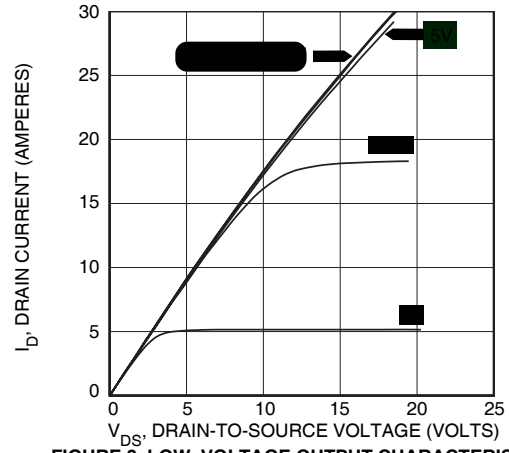


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

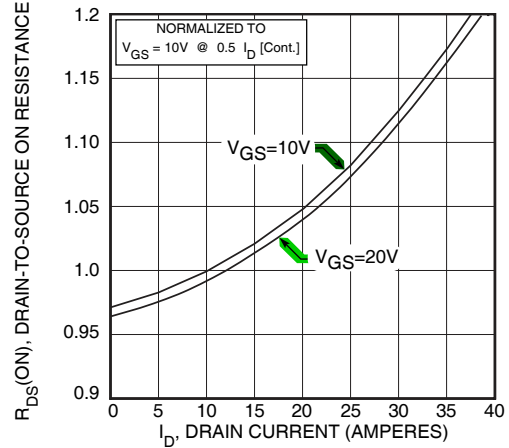


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

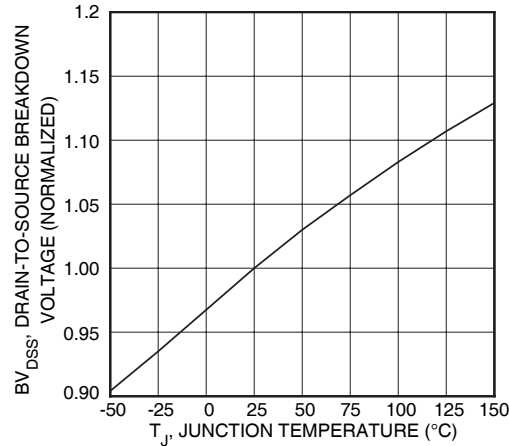


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

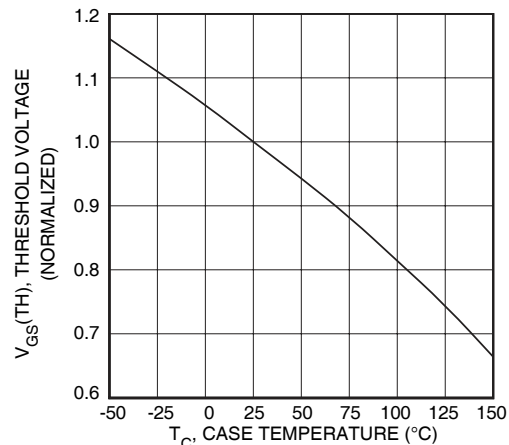


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

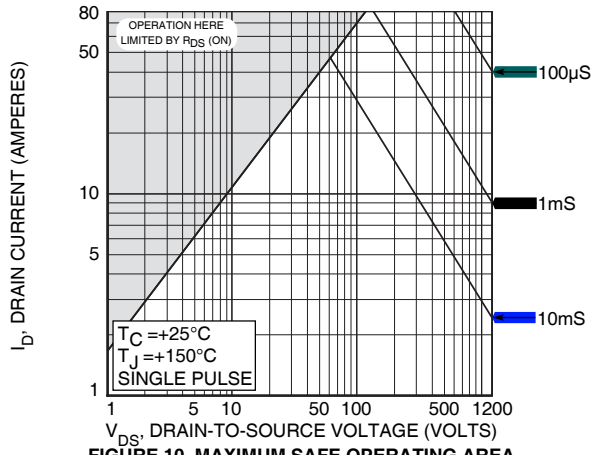


FIGURE 10, MAXIMUM SAFE OPERATING AREA

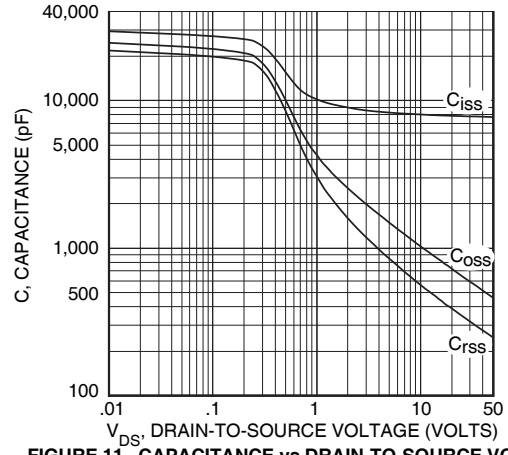


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

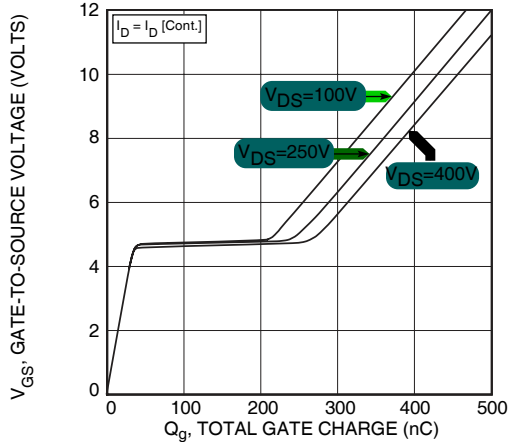


FIGURE 12, GATE CHARGE vs GATE-TO-SOURCE VOLTAGE

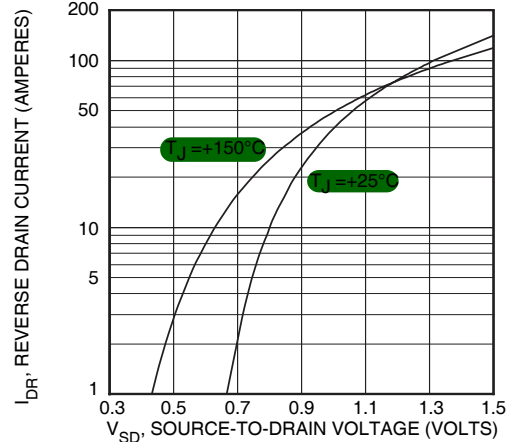
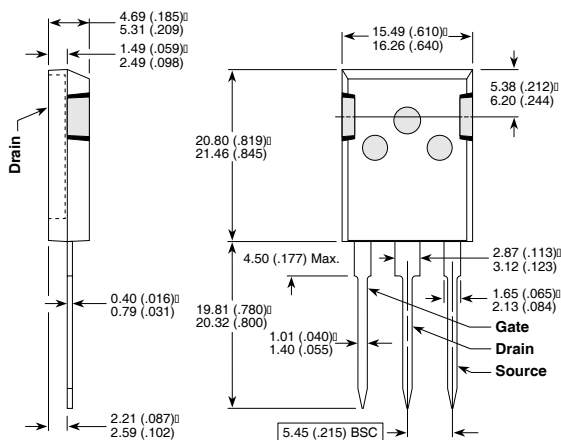


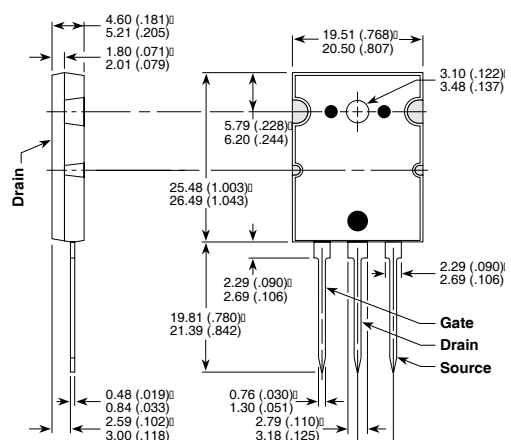
FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

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)