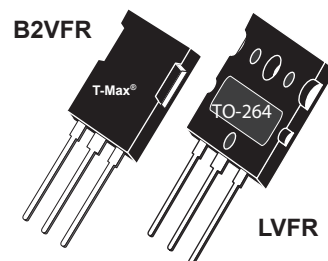
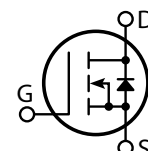


### POWER MOS V<sup>®</sup> FREDFET

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



- T-MAX<sup>™</sup> or TO-264 Package
- Avalanche Energy Rated
- Faster Switching
- **FAST RECOVERY BODY DIODE**
- Lower Leakage



#### MAXIMUM RATINGS

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

Symbol	Parameter	APT20M18B2VFR_LVFR	UNIT
$V_{DSS}$	Drain-Source Voltage	200	Volts
$I_D$	Continuous Drain Current <sup>⑥</sup> @ $T_C = 25^\circ\text{C}$	100	Amps
$I_{DM}$	Pulsed Drain Current <sup>①</sup>	400	
$V_{GS}$	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 <sup>①</sup> (Repetitive and Non-Repetitive)	100	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 ( $V_{GS} = 0V, I_D = 250\mu A$ )	200			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance <sup>②</sup> ( $V_{GS} = 15V, I_D = 50A$ )			0.018	Ohms
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{DS} = 200V, V_{GS} = 0V$ )			250	$\mu A$
	Zero Gate Voltage Drain Current ( $V_{DS} = 160V, V_{GS} = 0V, T_C = 125^\circ\text{C}$ )			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.

# DYNAMIC CHARACTERISTICS

APT20M18B2VFR\_LVFR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$		9880		pF
$C_{oss}$	Output Capacitance			2320		
$C_{rss}$	Reverse Transfer Capacitance			700		
$Q_g$	Total Gate Charge <sup>③</sup>	$V_{GS} = 10V$ $V_{DD} = 150V$ $I_D = 100A @ 25^\circ C$		330		nC
$Q_{gs}$	Gate-Source Charge			55		
$Q_{gd}$	Gate-Drain ("Miller") Charge			145		
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 150V$ $I_D = 100A @ 25^\circ C$ $R_G = 0.6\Omega$		18		ns
$t_r$	Rise Time			27		
$t_{d(off)}$	Turn-off Delay Time			55		
$t_f$	Fall Time			6		

# SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$I_S$	Continuous Source Current (Body Diode)			100	Amps
$I_{SM}$	Pulsed Source Current <sup>①</sup> (Body Diode)			400	
$V_{SD}$	Diode Forward Voltage <sup>②</sup> ( $V_{GS} = 0V$ , $I_S = -100A$ )			1.3	Volts
$dv/dt$	Peak Diode Recovery $dv/dt$ <sup>⑤</sup>			8	V/ns
$t_{rr}$	Reverse Recovery Time ( $I_S = -100A$ , $di/dt = 100A/\mu s$ )	$T_j = 25^\circ C$		230	ns
		$T_j = 125^\circ C$		450	
$Q_{rr}$	Reverse Recovery Charge ( $I_S = -100A$ , $di/dt \leq 100A/\mu s$ )	$T_j = 25^\circ C$	0.9		$\mu C$
		$T_j = 125^\circ C$	3.4		
$I_{RRM}$	Peak Recovery Current ( $I_S = -100A$ , $di/dt = 100A/\mu s$ )	$T_j = 25^\circ C$	11		Amps
		$T_j = 125^\circ C$	20		

# THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.20	$^\circ C/W$
$R_{\theta JA}$	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  $T_j = +25^\circ C$ ,  $L = 600\mu H$ ,  $R_G = 25\Omega$ , Peak  $I_L = 100A$

⑤  $dv/dt$  numbers reflect the limitations of the test circuit rather than the device itself.  $I_S \leq -I_D 100A$ ,  $di/dt \leq 200A/\mu s$ ,  $V_R \leq 200V$ ,  $T_j \leq 150^\circ C$

⑥ The maximum current is limited by lead temperature.

Microsemi reserves the right to change, without notice, the specifications and information contained herein.

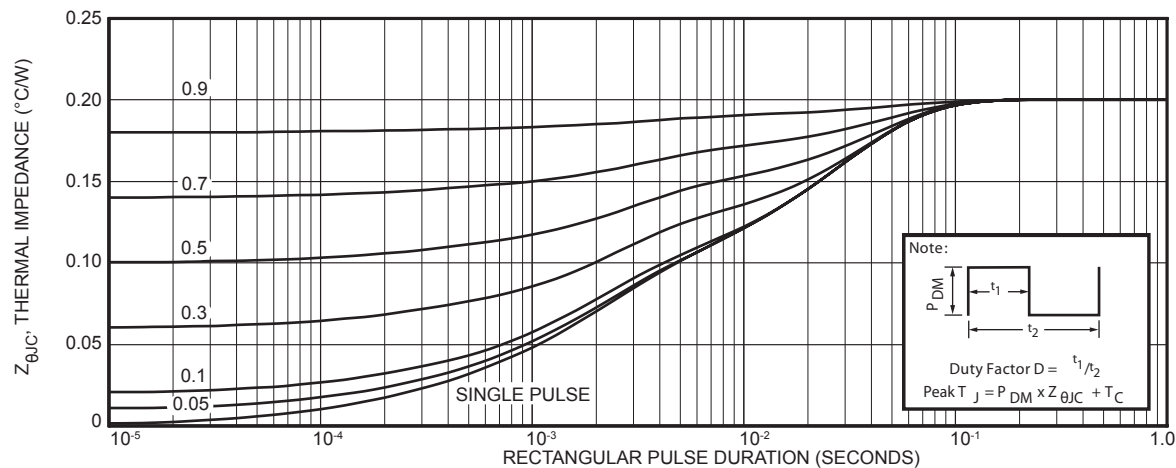


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

## Typical Performance Curves

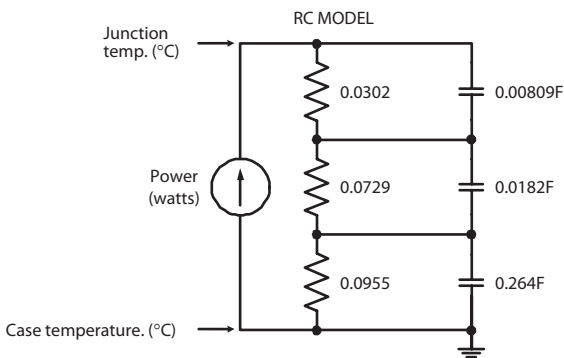


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

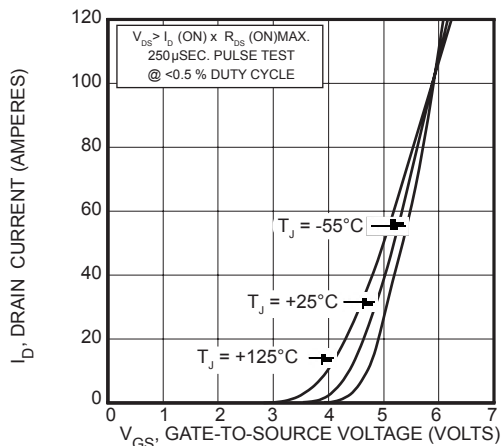


FIGURE 4, TRANSFER CHARACTERISTICS

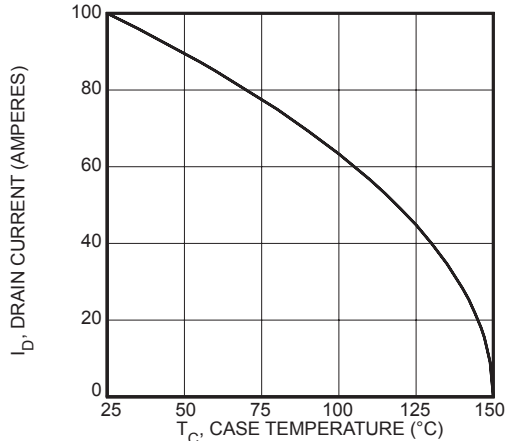


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

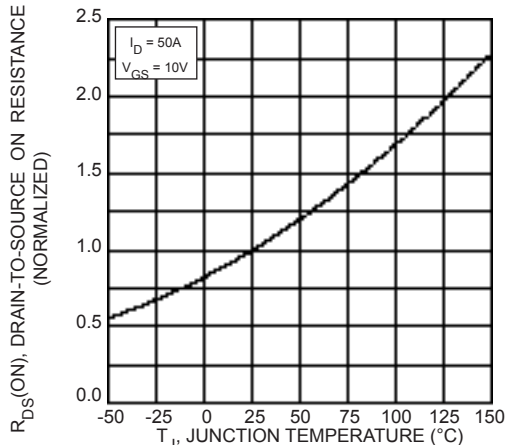


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

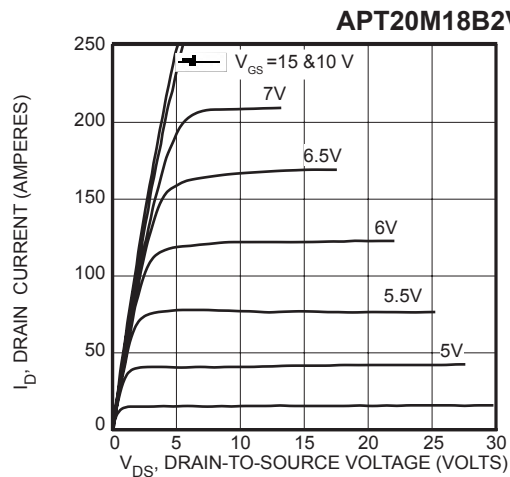


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

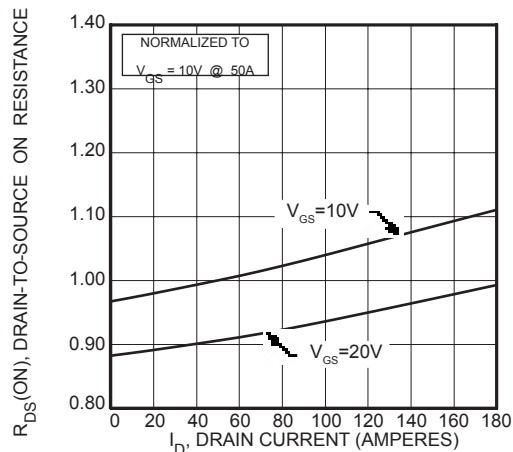


FIGURE 5,  $R_{DS(\text{ON})}$  vs DRAIN CURRENT

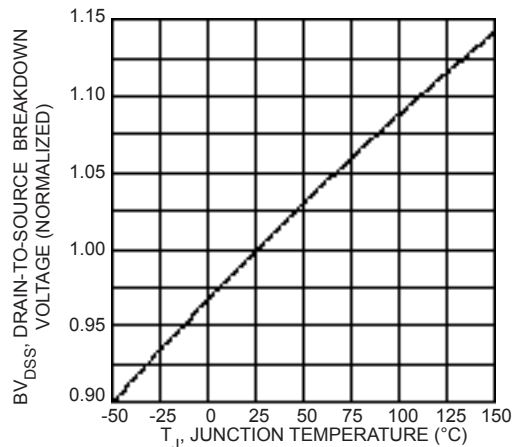


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

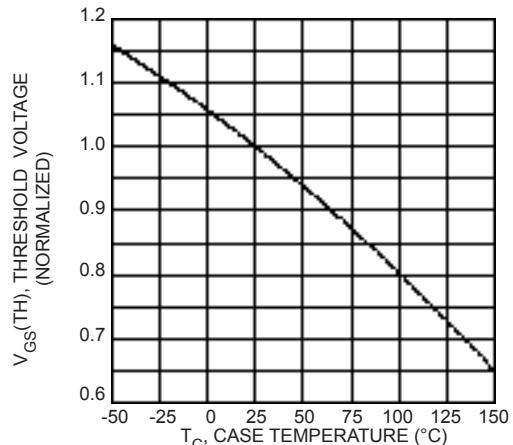
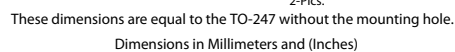
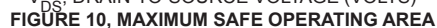


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

## 050-5906 Rev B 6-2015



**Disclaimer:**

The information contained in the document (unless it is publicly available on the Web without access restrictions) is PROPRIETARY AND CONFIDENTIAL information of Microsemi and cannot be copied, published, uploaded, posted, transmitted, distributed or disclosed or used without the express duly signed written consent of Microsemi. If the recipient of this document has entered into a disclosure agreement with Microsemi, then the terms of such Agreement will also apply. This document and the information contained herein may not be modified, by any person other than authorized personnel of Microsemi. No license under any patent, copyright, trade secret or other intellectual property right is granted to or conferred upon you by disclosure or delivery of the information, either expressly, by implication, inducement, estoppels or otherwise. Any license under such intellectual property rights must be approved by Microsemi in writing signed by an officer of Microsemi.

Microsemi reserves the right to change the configuration, functionality and performance of its products at anytime without any notice. This product has been subject to limited testing and should not be used in conjunction with life-support or other mission-critical equipment or applications. Microsemi assumes no liability whatsoever, and Microsemi disclaims any express or implied warranty, relating to sale and/or use of Microsemi products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright or other intellectual property right. Any performance specifications believed to be reliable but are not verified and customer or user must conduct and complete all performance and other testing of this product as well as any user or customers final application. User or customer shall not rely on any data and performance specifications or parameters provided by Microsemi. It is the customer's and user's responsibility to independently determine suitability of any Microsemi product and to test and verify the same. The information contained herein is provided "AS IS, WHERE IS" and with all faults, and the entire risk associated with such information is entirely with the User. Microsemi specifically disclaims any liability of any kind including for consequential, incidental and punitive damages as well as lost profit. The product is subject to other terms and conditions which can be located on the web at <http://www.microsemi.com/legal/tnc.asp>