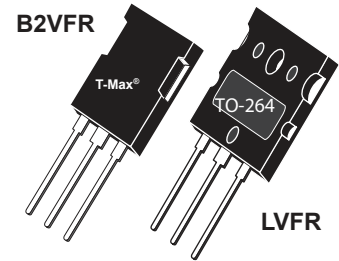
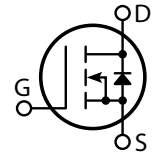


POWER MOS V[®] FREDFET

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.



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



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 ^⑥ @ $T_C = 25^\circ\text{C}$	100	Amps
I_{DM}	Pulsed Drain Current ^①	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 ^① (Repetitive and Non-Repetitive)	100	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 ($V_{GS} = 0V, I_D = 250\mu\text{A}$)	200			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ^② ($V_{GS} = 15V, I_D = 50A$)			0.018	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = 200V, V_{GS} = 0V$)			250	μA
	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 MHz		9880		pF
C _{oss}	Output Capacitance			2320		
C _{rss}	Reverse Transfer Capacitance			700		
Q _g	Total Gate Charge ^③	V _{GS} = 10V V _{DD} = 150V I _D = 100A @ 25°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°C R _G = 0.6Ω		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 ^① (Body Diode)			400	Amps
V _{SD}	Diode Forward Voltage ^② (V _{GS} = 0V, I _S = -100A)			1.3	Volts
dv _i /dt	Peak Diode Recovery dv _i /dt ^⑤			8	V/ns
t _{rr}	Reverse Recovery Time (I _S = -100A, di _i /dt = 100A/μs)	T _j = 25°C		230	ns
		T _j = 125°C		450	
Q _{rr}	Reverse Recovery Charge (I _S = -100A, di _i /dt ≤ 100A/μs)	T _j = 25°C		0.9	μC
		T _j = 125°C		3.4	
I _{RRM}	Peak Recovery Current (I _S = -100A, di _i /dt = 100A/μs)	T _j = 25°C		11	Amps
		T _j = 125°C		20	

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 = 600μH, R_G = 25Ω, Peak I_L = 100A

⑤ dv_i/dt numbers reflect the limitations of the test circuit rather than the device itself. I_S ≤ -I_D100A di_i/dt ≤ 200A/μs V_R ≤ 200V T_j ≤ 150°C

⑥ The maximum current is limited by lead temperature.

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

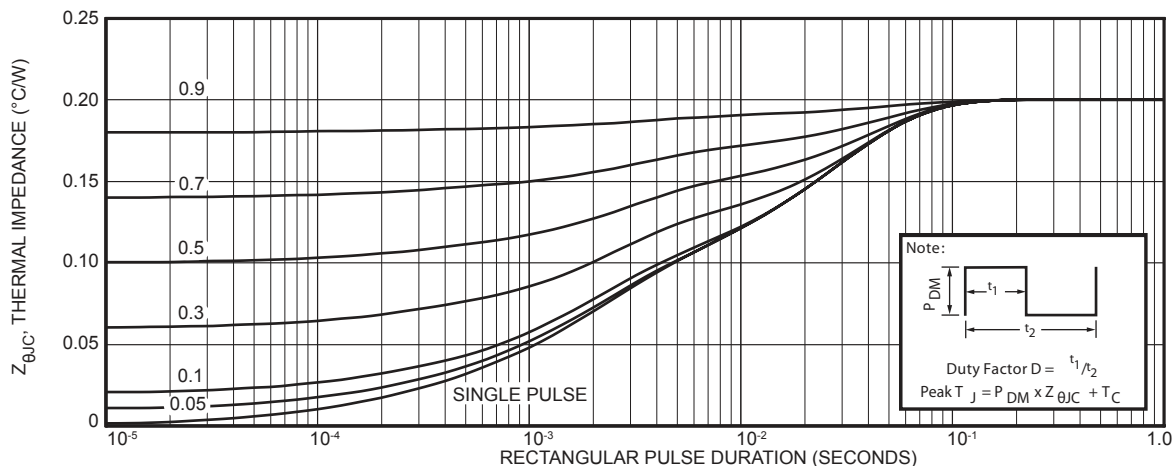


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

Typical Performance Curves

APT20M18B2VFR_LVFR

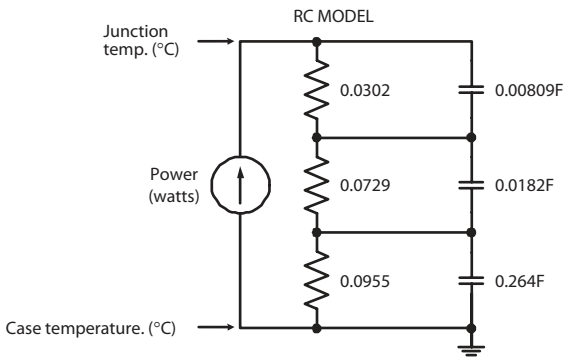


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

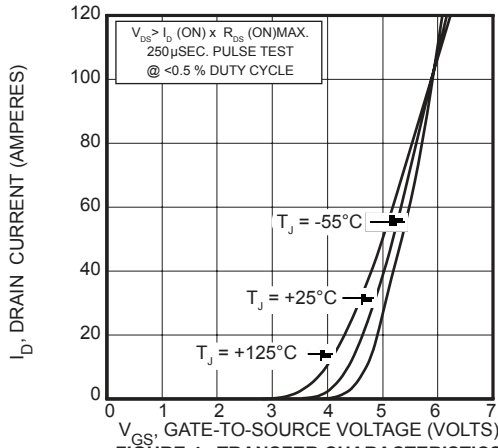


FIGURE 4, TRANSFER CHARACTERISTICS

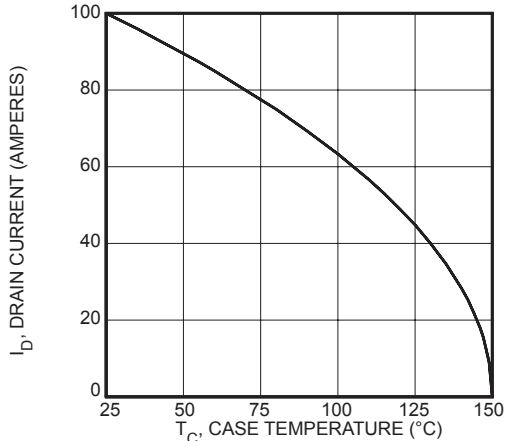


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

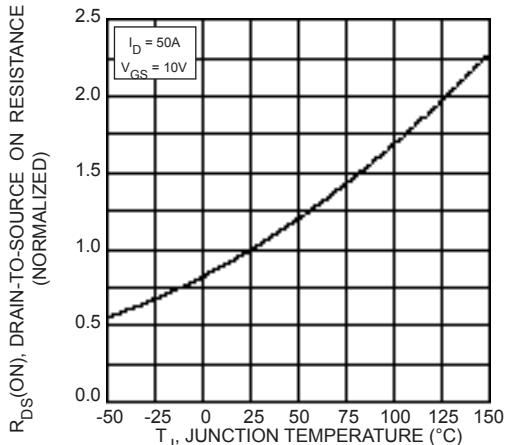


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

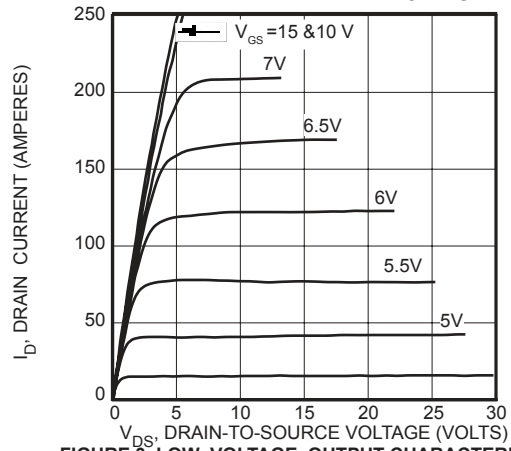


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

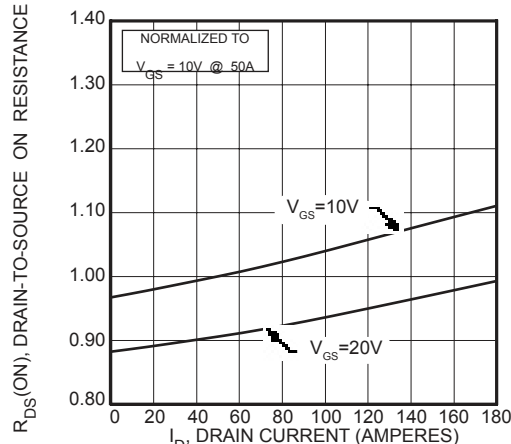


FIGURE 5, $R_{DS(\text{ON})}$ vs DRAIN CURRENT

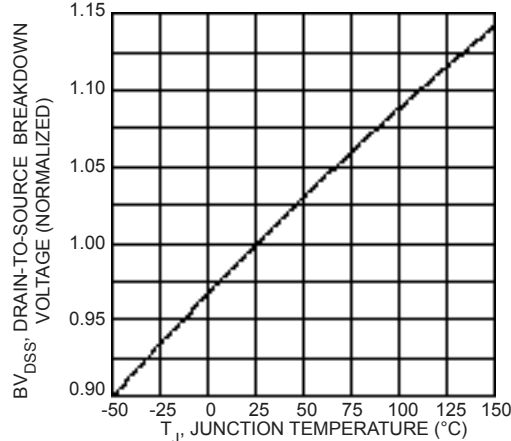


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

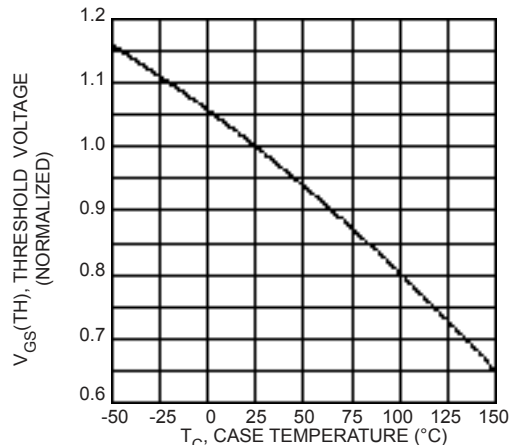


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

Typical Performance Curves

APT20M18B2VFR_LVFR

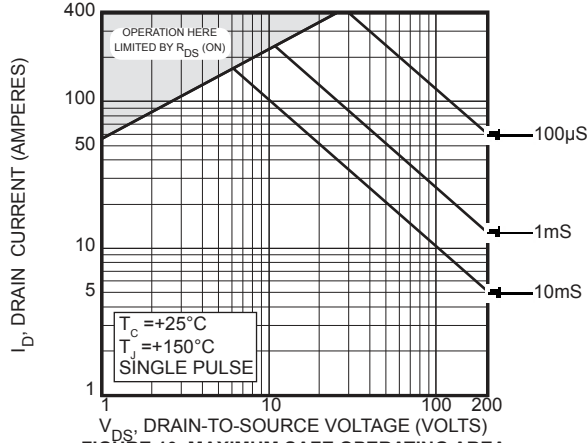


FIGURE 10, MAXIMUM SAFE OPERATING AREA

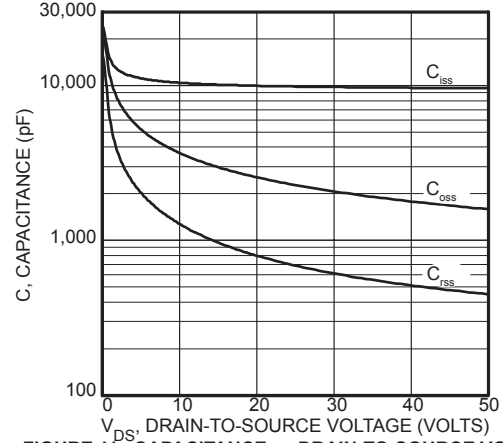


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

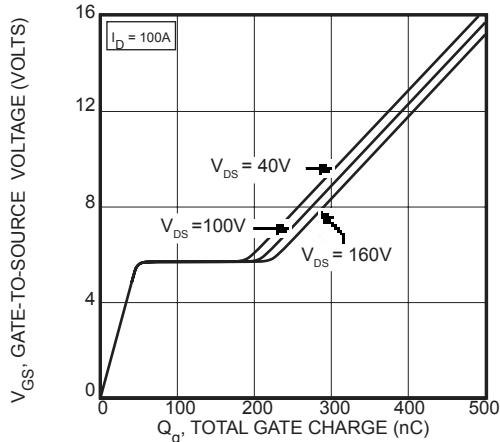


FIGURE 12, GATE CHARGE vs GATE-TO-SOURCE VOLTAGE

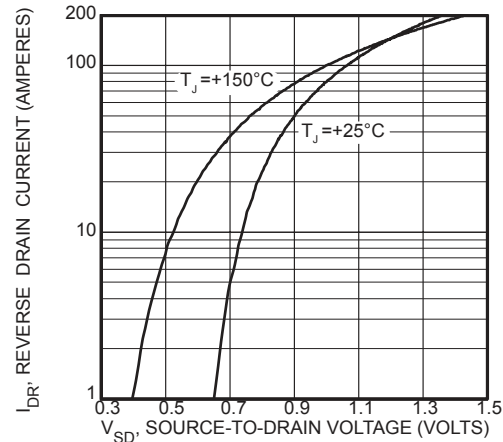
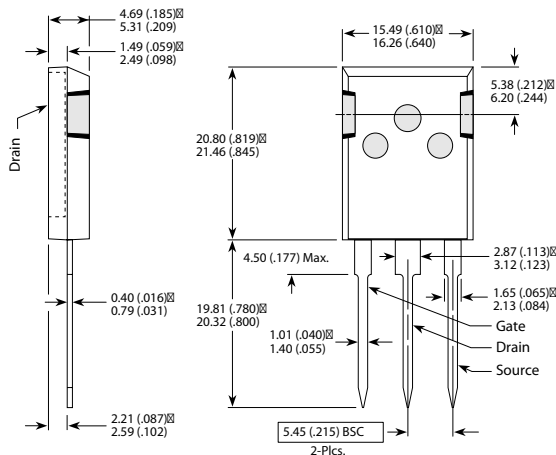


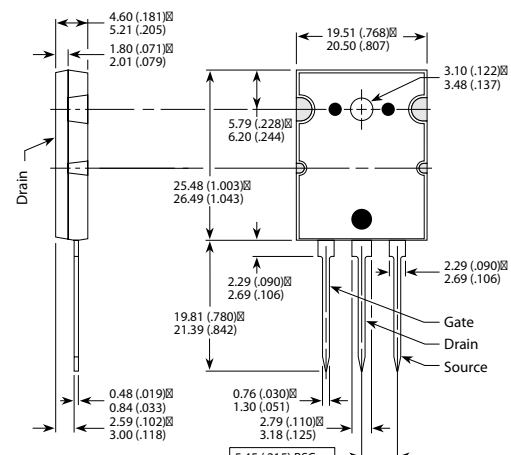
FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

T-MAX™ (B2) Package Outline (B2VFR)



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

TO-264 (L) Package Outline (LVFR)



Dimensions in Millimeters and (Inches)

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