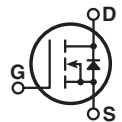
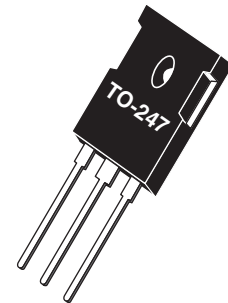



POWER MOS V®

APT20M45BVR(G)

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


FEATURES

- Faster switching
- Lower Leakage
- 100% Avalanche tested
- Popular TO-247 Package
- RoHS compliant 

Absolute Maximum Ratings

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

Symbol	Parameter	Ratings	Unit
V_{DSS}	Drain Source Voltage	200	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	56	Amps
I_{DM}	Pulsed Drain Current ¹	224	
V_{GS}	Gate-Source Voltage Continuous	± 30	Volts
V_{GSM}	Gate-Source Voltage Transient	± 40	
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	300	Watts
	Linear Derating Factor	2.4	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	°C
T_L	Lead Temperature for Soldering: 0.063" from Case for 10 Seconds	300	
I_{AR}	Avalanche Current ¹ (Repetitive and Non-Repetitive)	56	Amps
E_{AR}	Repetitive Avalanche Energy ¹	30	mJ
E_{AS}	Single Pulse Avalanche Energy ⁴	1300	

Static Characteristics
 $T_J = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250\mu\text{A}$)	200			Volts
$I_{D(on)}$	On State Drain Current ² ($V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max, $V_{GS} = 10V$)	56			Amps
$R_{DS(on)}$	Drain-Source On-State Resistance ² ($V_{GS} = 10V, 0.5 I_{D(Cont.)}$)			0.045	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}, V_{GS} = 0V$)			25	μA
	Zero Gate Voltage Collector Current ($V_{GS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$)			250	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$)			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1.0\text{mA}$)	2		4	Volts

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

Dynamic Characteristics

APT20M45BVR(G)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		4050	4860	pF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		980	1375	
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		300	450	
Q_g	Total Gate Charge ¹	$V_{GS} = 10V$		130	195	nC
Q_{ge}	Gate-Source Charge	$V_{DD} = 0.5V_{DSS}$		30	45	
Q_{gd}	Gate- Drain ("Miller") Charge	$I_D = I_{D(cont.)} @ 25^\circ C$		55	80	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 10V$		12	24	ns
t_r	Rise Time	$V_{DD} = 0.5V_{DSS}$		14	28	
$t_{d(off)}$	Turn-off Delay Time	$I_D = I_{D(cont.)} @ 25^\circ C$		43	70	
t_f	Fall Time	$R_G = 1.6\Omega$		7	14	

Source-Drain Diode Ratings and Characteristics

Symbol	Characteristic / Test Conditions	Min	Typ	Max	Unit
I_S	Continuous Source Current (Body Diode)			56	Amps
I_{SM}	Pulse Source Current ¹ (Body Diode)			224	
V_{SD}	Diode Forward Voltage ² ($V_{GS} = 0V, I_S = -I_{D(cont.)}$)			1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_{D(cont.)}^1, di_S/dt = 100A/\mu s$)		280		nS
Q_{rr}	Reverse Recovery Time ($I_S = -I_{D(cont.)}^1, di_S/dt = 100A/\mu s$)		3.5		μC

Thermal Characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction to Case			0.42	C ^o /W
$R_{\theta JA}$	Junction to Ambient			40	

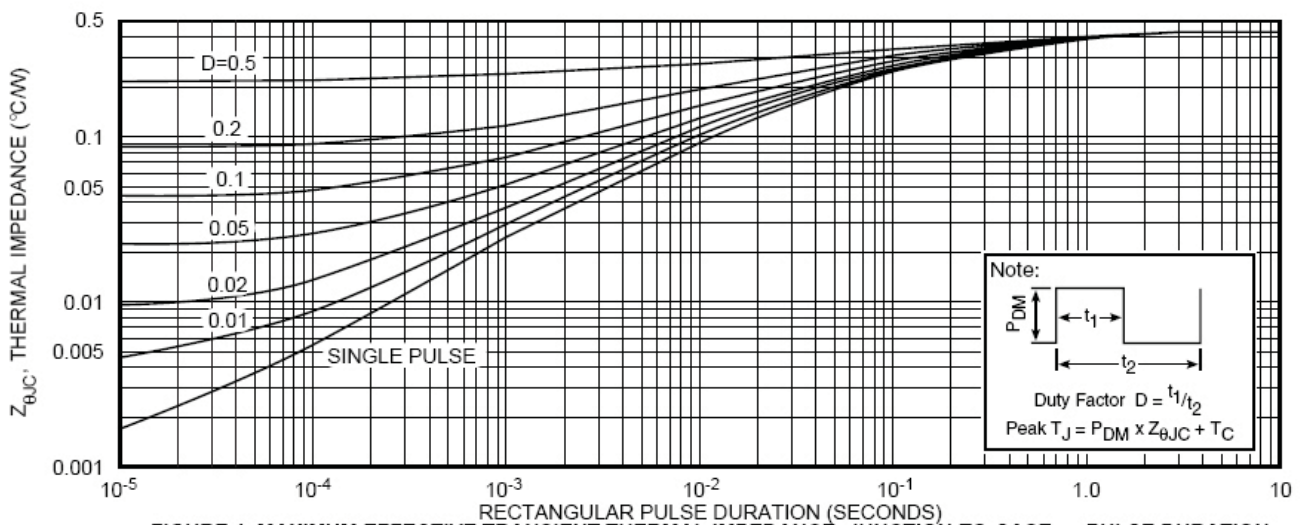
① Repetitive Rating: Pulse width limited by maximum junction temperature.

② Pulse Test: Pulse width < 380 μs , Duty Cycle < 2%

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

③ See MIL-STD-750 Method 3471

④ Starting $T_J = +25^\circ C$, $L = 830\mu H$, $R_G = 25\Omega$, Peak $I_L = 56A$



Typical Performance Curves

APT20M45BVR(G)

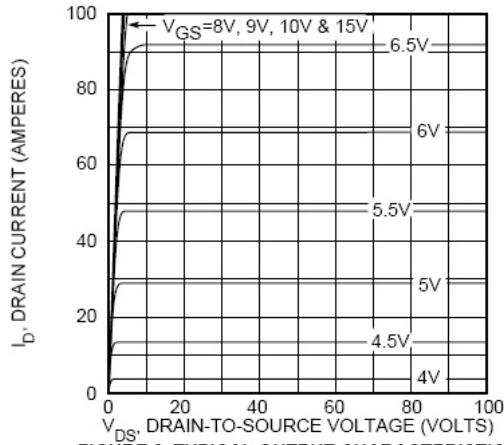


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

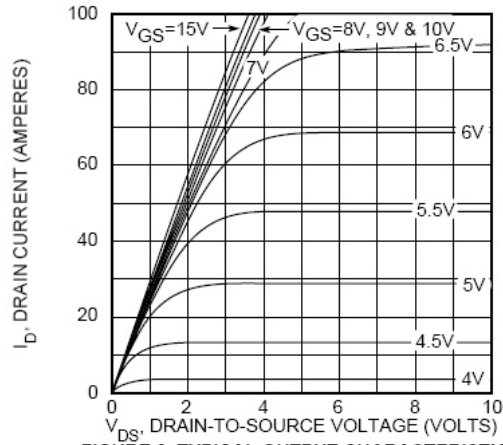


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

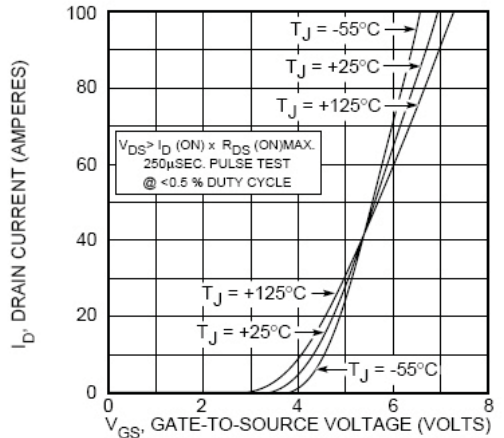


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

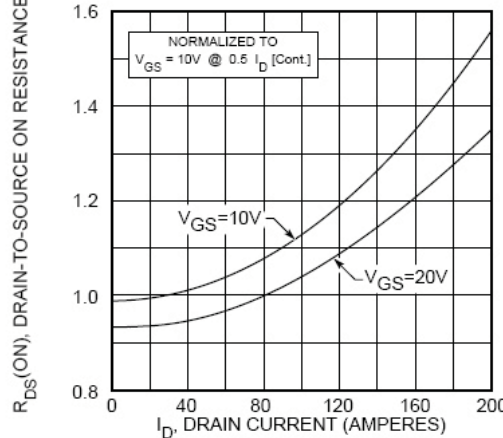


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

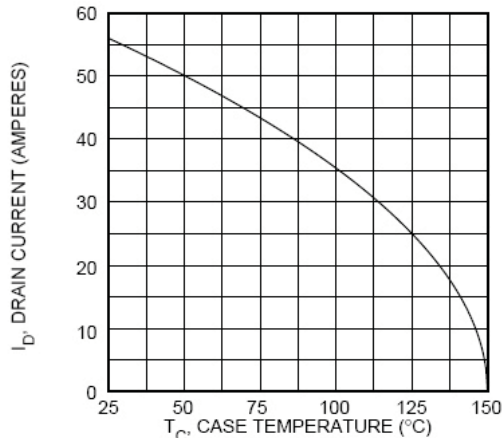


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

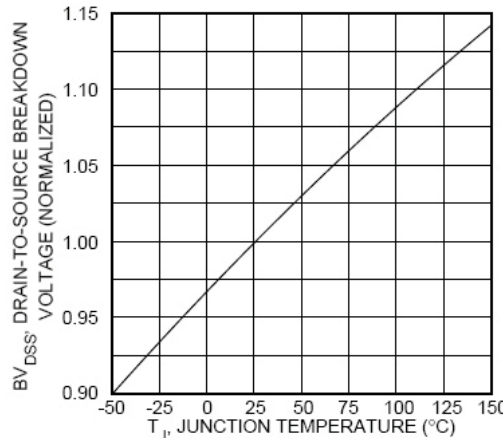


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

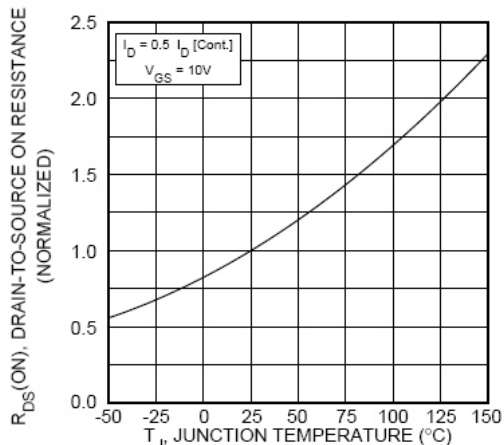


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

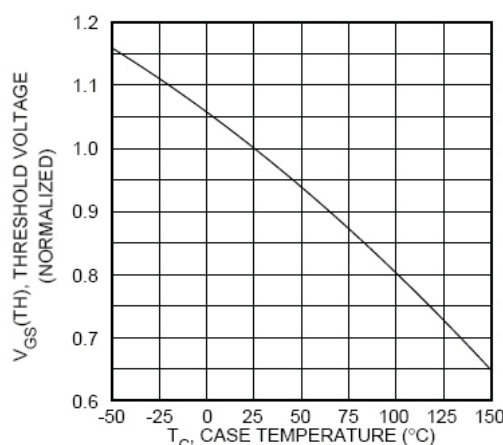


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

Typical Performance Curves

APT20M45BVR(G)

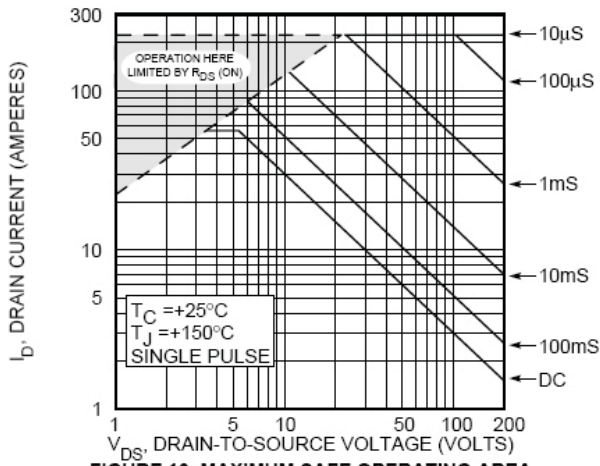


FIGURE 10, MAXIMUM SAFE OPERATING AREA

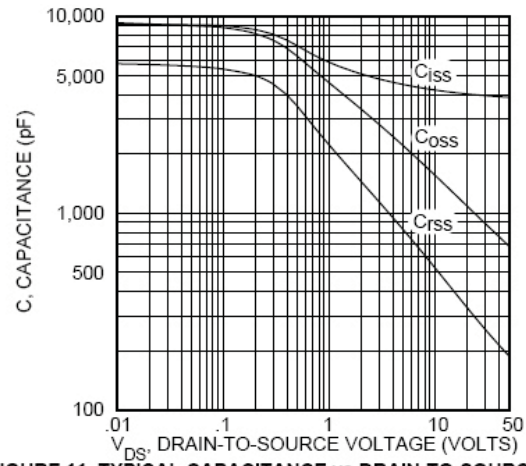


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

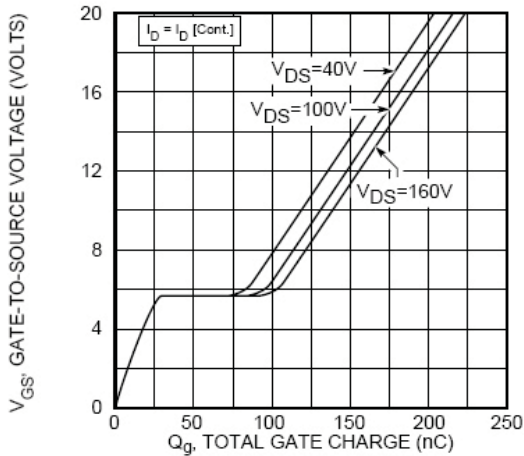


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

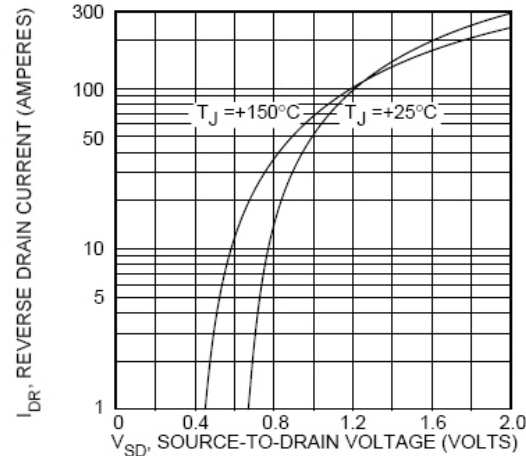
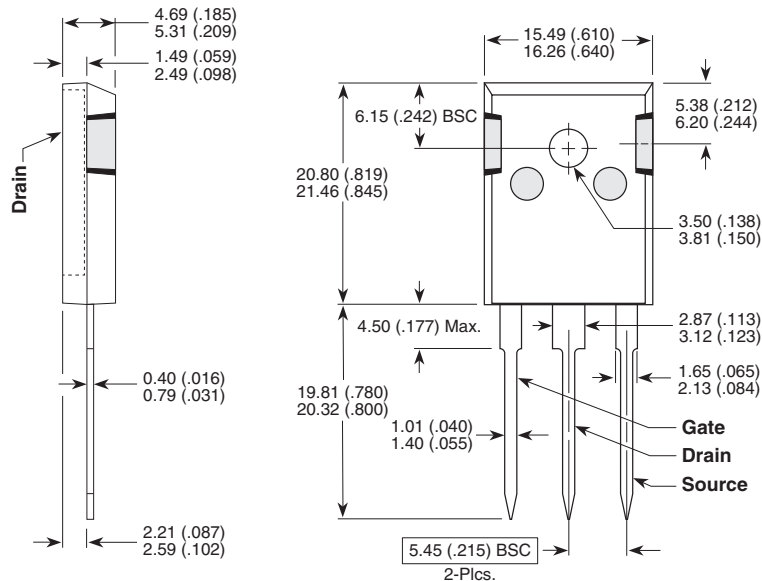


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247 (B) Package Outline

e3 100% Sn Plated



Dimensions in Millimeters and (Inches)