

## N-CHANNEL MOSFET

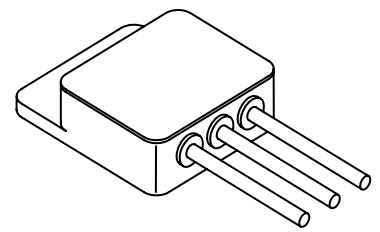
### DEVICES

**APT6017WVR**  
**POWER MOS V<sup>®</sup>**  
**600V      31.5A      0.170Ω**

**LEVELS**  
**TX, TXV, S**  
**CUSTOM SCREENS**  
**AVAILABLE**

### ABSOLUTE MAXIMUM RATINGS ( $T_C = +25^\circ\text{C}$ unless otherwise noted)

Parameters / Test Conditions	Symbol	Value	Unit
Drain – Source Voltage	$V_{DS}$	600	Vdc
Gate – Source Voltage	$V_{GS}$	$\pm 30$	Vdc
Continuous Drain Current $T_C = +25^\circ\text{C}$	$I_{D1}$	31.5	A <sub>dc</sub>
Max. Power Dissipation $T_C = +25^\circ\text{C}$	$P_{tl}$	450 <sup>(1)</sup>	W
Drain to Source On State Resistance	$R_{ds(on)}$	0.170 <sup>(2)</sup>	$\Omega$
Operating & Storage Temperature	$T_{op}, T_{stg}$	-55 to +150	$^\circ\text{C}$
Lead temperature: 0.063" from Case for 10 Se.	$T_L$	300	$^\circ\text{C}$
Avalanche Current <sup>(3)</sup> (Repetitive/ Non-repetitive)	$I_{AR}$	31.5	A <sub>dc</sub>
	$E_{AR}$	50	mJ
	$E_{AS}$	2500	mJ

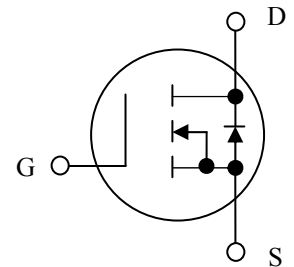


**TO-267**

- Note:** (1) Derated Linearly by 3.6 W/ $^\circ\text{C}$  for  $T_C > +25^\circ\text{C}$   
 (2)  $V_{GS} = 10\text{Vdc}$ ,  $I_D = 15.75\text{A}$   
 (3) Repetitive Rating: Pulse width limited by maximum junction temperature.

### ELECTRICAL CHARACTERISTICS ( $T_A = +25^\circ\text{C}$ , unless otherwise noted)

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Drain-Source Breakdown Voltage $V_{GS} = 0\text{V}$ , $I_D = 1\text{mA}$	$V_{(BR)DSS}$	600		Vdc
Gate-Source Voltage (Threshold) $V_{DS} \geq V_{GS}$ , $I_D = 0.25\text{mA}$	$V_{GS(th)1}$	2.0	4.0	Vdc
Gate Current $V_{GS} = \pm 30\text{V}$ , $V_{DS} = 0\text{V}$ $V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$ , $T_j = +125^\circ\text{C}$	$I_{GSS1}$ $I_{GSS2}$		$\pm 100$ $\pm 200$	nA <sub>dc</sub>
Drain Current $V_{GS} = 0\text{V}$ , $V_{DS} = 600\text{V}$ $V_{GS} = 0\text{V}$ , $V_{DS} = 480\text{V}$ , $T_j = +125^\circ\text{C}$	$I_{DSS1}$ $I_{DSS2}$		25 0.25	$\mu\text{A}$ <sub>dc</sub> mA <sub>dc</sub>
Static Drain-Source On-State Resistance $V_{GS} = 10\text{V}$ , $I_D = 15.75\text{A}$ pulsed	$r_{DS(on)}$		0.170	$\Omega$
Diode Forward Voltage $V_{GS} = 0\text{V}$ , $I_D = 31.5\text{A}$ pulsed	$V_{SD}$		1.3	Vdc



## DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Capacitance:				
Input capacitance	$C_{iss}$		9000	pF
Output Capacitance	$C_{oss}$		1260	
Reverse Transfer Capacitance	$C_{rss}$		480	
Gate Charge:				
On-State Gate Charge	$Q_{g(on)}$		475	nC
Gate to Source Charge	$Q_{gs}$		70	
Gate to Drain Charge	$Q_{gd}$		190	

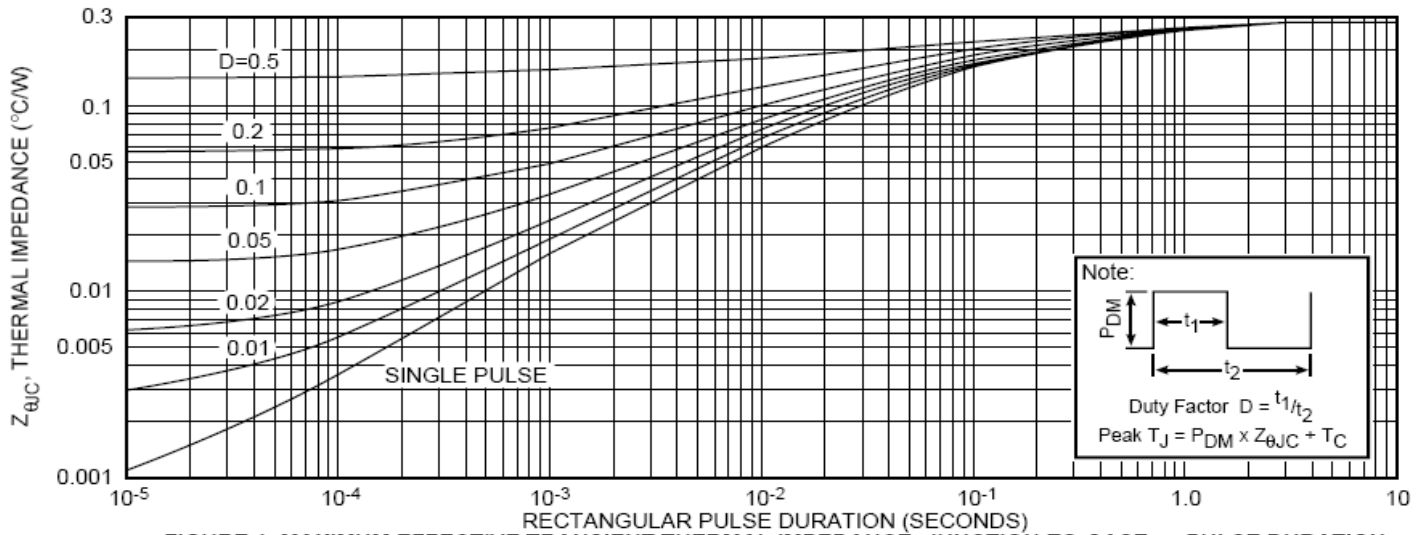
## SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Switching time tests:				
Turn-on delay time	$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$	$I_D = 31.5A, V_{GS} = 15Vdc,$ Gate drive impedance = $0.6\Omega,$ $V_{DD} = 300Vdc$	30	ns
Rinse time			26	
Turn-off delay time			70	
Fall time			10	
Diode Reverse Recovery Time	$t_{rr}$	$di/dt \leq 100A/\mu s, V_{DD} \leq 30V, I_F = 31.5A$	690	ns
Diode Reverse Recovery Charge	$Q_{rr}$	$di/dt \leq 100A/\mu s, V_{DD} \leq 30V, I_F = 31.5A$	15.9	$\mu C$

## THERMAL CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Junction to Case	$R_{\theta JC}$		0.28	$^{\circ}C/W$
Junction to Ambient	$R_{\theta JA}$		40	$^{\circ}C/W$

**GRAPHS**



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

### APT6017WVR

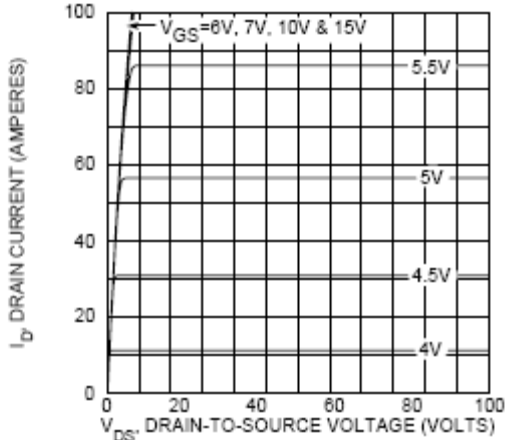


FIGURE 2. TYPICAL OUTPUT CHARACTERISTICS

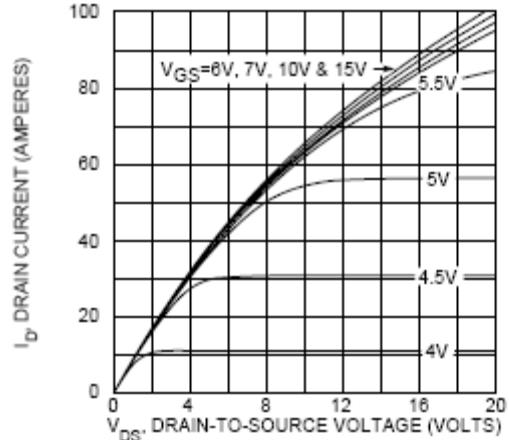


FIGURE 3. TYPICAL OUTPUT CHARACTERISTICS

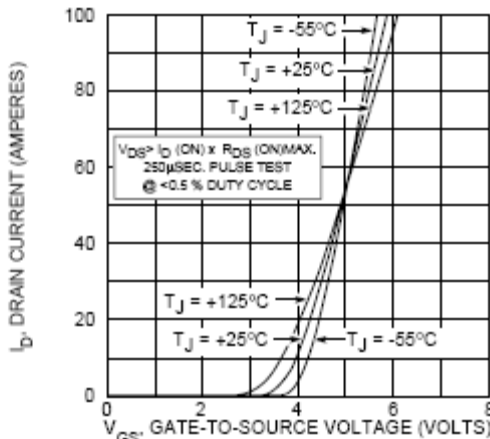


FIGURE 4. TYPICAL TRANSFER CHARACTERISTICS

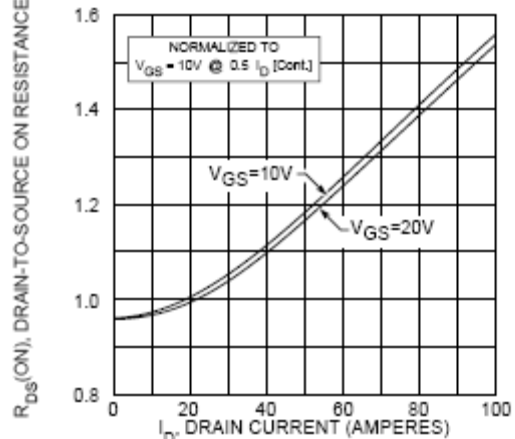


FIGURE 5.  $R_{DS(ON)}$  vs DRAIN CURRENT

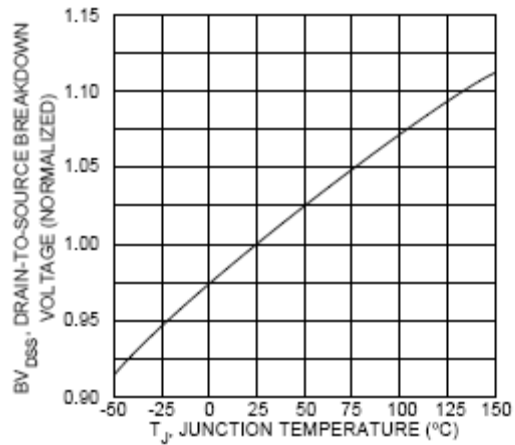
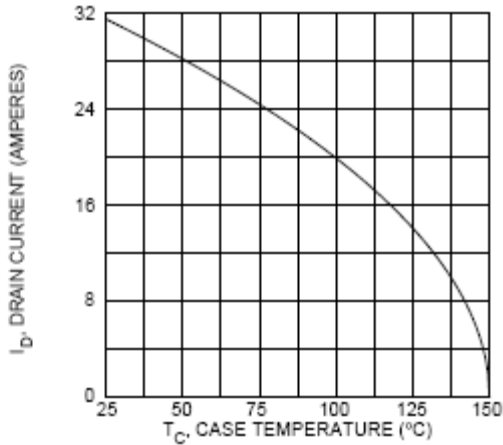


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

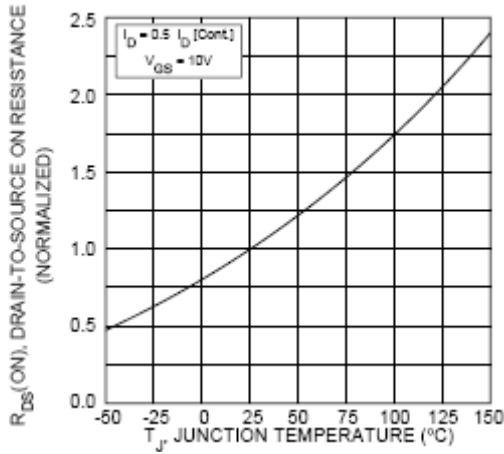


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

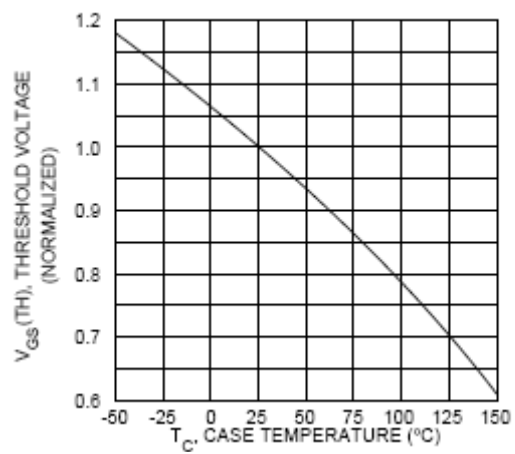


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

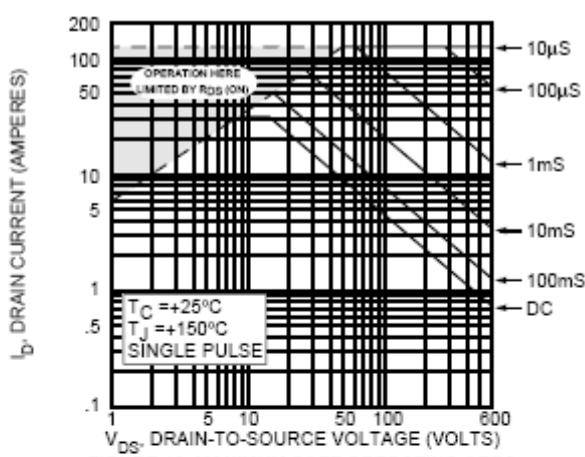


FIGURE 10, MAXIMUM SAFE OPERATING AREA

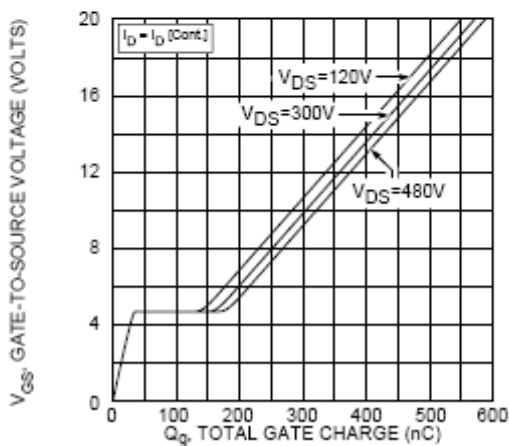


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

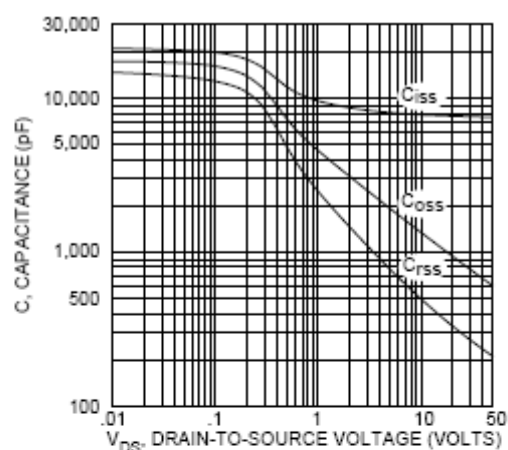


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

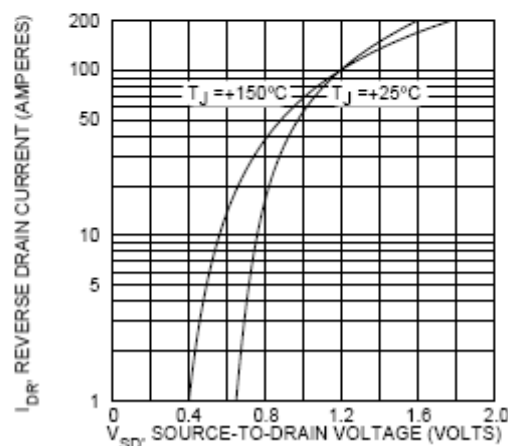
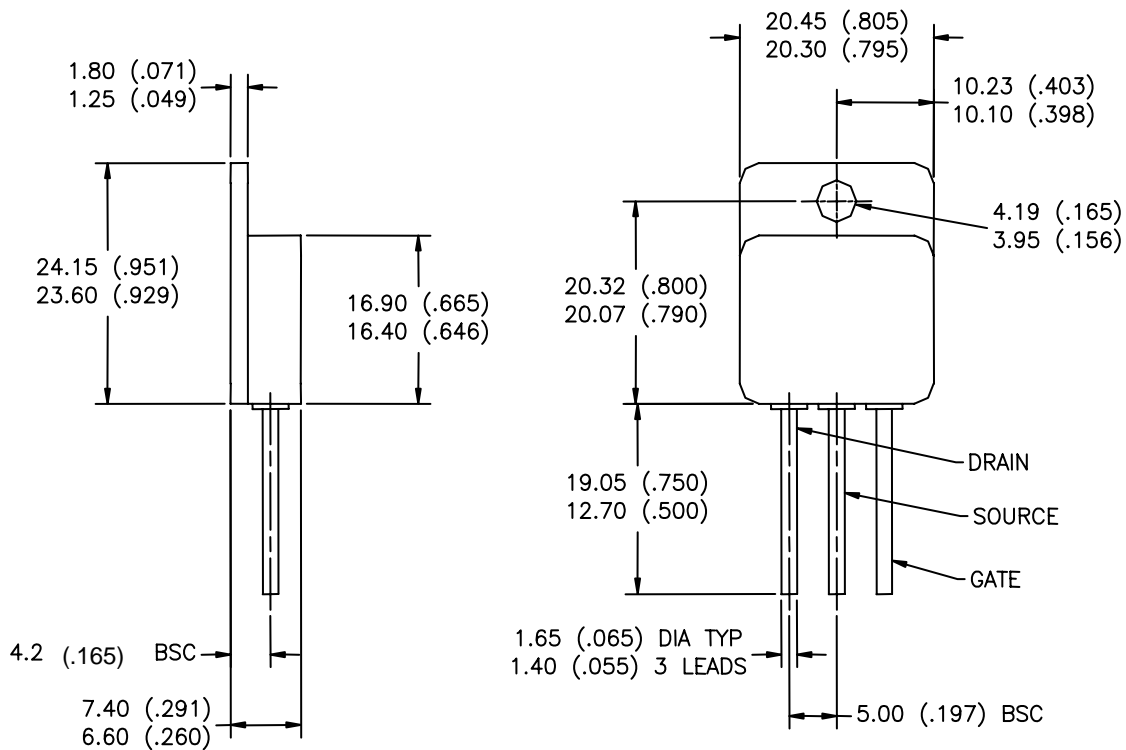


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

**PACKAGE DIMENSIONS**



DIMENSIONS IN MILLIMETERS AND (INCHES)