

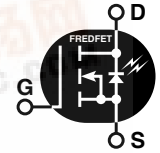


APT12045L2VFR

1200V 28A 0.450Ω

POWER MOS V[®]

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
- Avalanche Energy Rated
- Lower Leakage
- TO-264 MAX

MAXIMUM RATINGS

All Ratings: T_C = 25°C unless otherwise specified.

Symbol	Parameter	APT12045L2VFR	UNIT
V _{DSS}	Drain-Source Voltage	1200	Volts
I _D	Continuous Drain Current @ T _C = 25°C	28	Amps
I _{DM}	Pulsed Drain Current ^①	112	
V _{GS}	Gate-Source Voltage Continuous	±30	Volts
V _{GSM}	Gate-Source Voltage Transient	±40	
P _D	Total Power Dissipation @ T _C = 25°C	833	Watts
	Linear Derating Factor	6.67	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)	28	Amps
E _{AR}	Repetitive Avalanche Energy ^①	50	mJ
E _{AS}	Single Pulse Avalanche Energy ^②	3200	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV _{DSS}	Drain-Source Breakdown Voltage (V _{GS} = 0V, I _D = 250μA)	1200			Volts
R _{DS(on)}	Drain-Source On-State Resistance ^② (V _{GS} = 10V, I _D = 14A)			0.450	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°C)			1000	
I _{GSS}	Gate-Source Leakage Current (V _{GS} = ±30V, V _{DS} = 0V)			±100	nA
V _{GS(th)}	Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 5mA)	2		4	Volts

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

DYNAMIC CHARACTERISTICS

APT12045L2VFR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 \text{ MHz}$		11370		pF
C_{oss}	Output Capacitance			950		
C_{rss}	Reverse Transfer Capacitance			495		
Q_g	Total Gate Charge ^③	$V_{GS} = 10V$ $V_{DD} = 600V$ $I_D = 28A @ 25^\circ C$		605		nC
Q_{gs}	Gate-Source Charge			42		
Q_{gd}	Gate-Drain ("Miller") Charge			310		
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 600V$ $I_D = 28A @ 25^\circ C$ $R_G = 0.6\Omega$		16		ns
t_r	Rise Time			15		
$t_{d(off)}$	Turn-off Delay Time			85		
t_f	Fall Time			14		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)			28	Amps
I_{SM}	Pulsed Source Current ^① (Body Diode)			112	
V_{SD}	Diode Forward Voltage ^② ($V_{GS} = 0V, I_S = -I_D 28A$)			1.3	Volts
dv/dt	Peak Diode Recovery dv/dt ^⑤			18	V/ns
t_{rr}	Reverse Recovery Time ($I_S = -I_D 28A, di/dt = 100A/\mu s$)	$T_j = 25^\circ C$		310	ns
		$T_j = 125^\circ C$		625	
Q_{rr}	Reverse Recovery Charge ($I_S = -I_D 28A, di/dt = 100A/\mu s$)	$T_j = 25^\circ C$		2	μC
		$T_j = 125^\circ C$		6	
I_{FRM}	Peak Recovery Current ($I_S = -I_D 28A, di/dt = 100A/\mu s$)	$T_j = 25^\circ C$		14	Amps
		$T_j = 125^\circ C$		24	

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.15	$^\circ C/W$
$R_{\theta JA}$	Junction to Ambient			40	

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

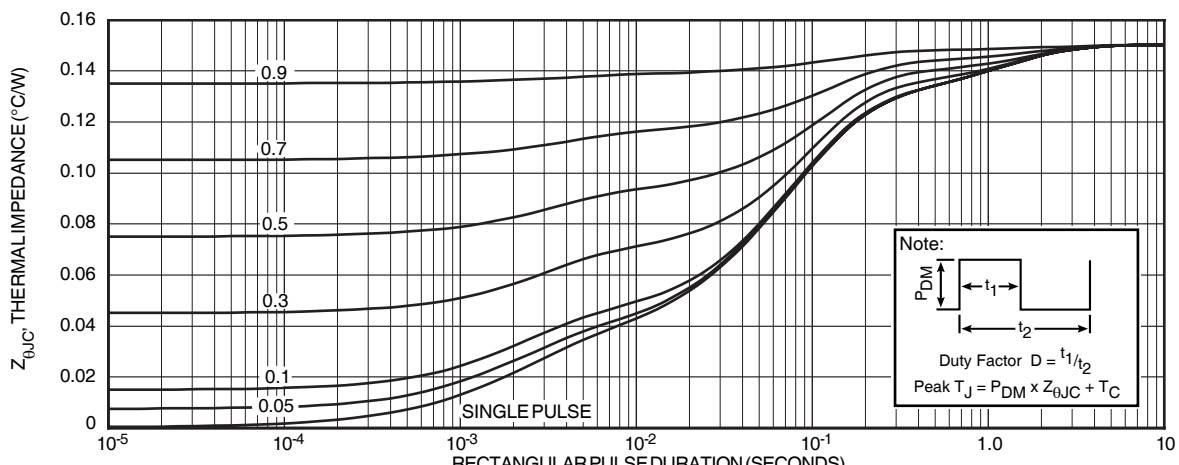
③ See MIL-STD-750 Method 3471

④ Starting $T_j = +25^\circ C$, $L = 8.16mH$, $R_G = 25\Omega$, Peak $I_L = 28A$

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

⑤ $I_S \leq I_D$ [Cont.], $di/dt = 100A/\mu s$, $T_j \leq 150^\circ C$, $R_G = 2.0\Omega$, $V_R = 200V$.

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



Typical Performance Curves

APT12045L2VFR

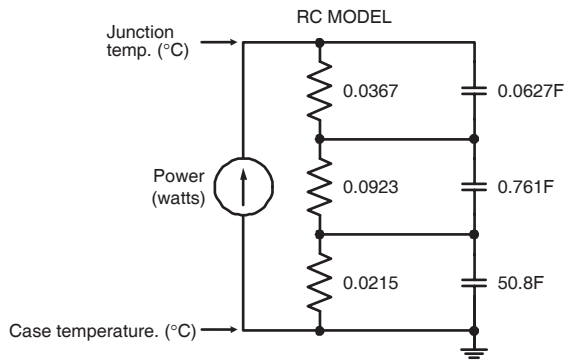


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

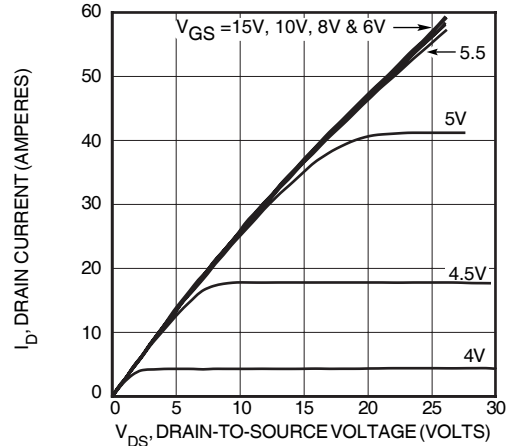


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

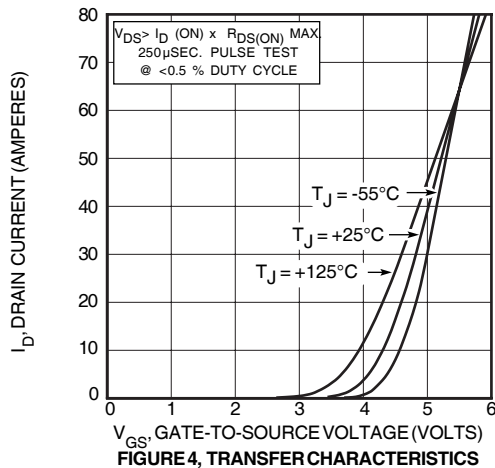


FIGURE 4, TRANSFER CHARACTERISTICS

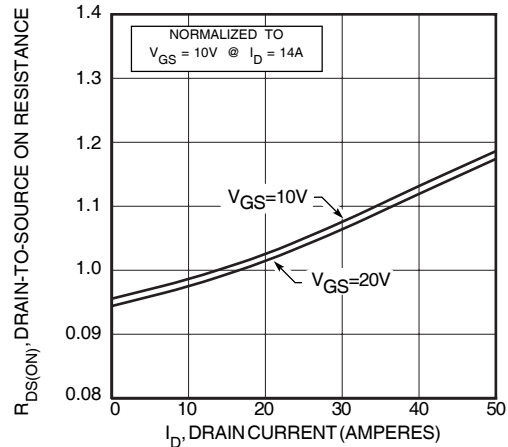


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

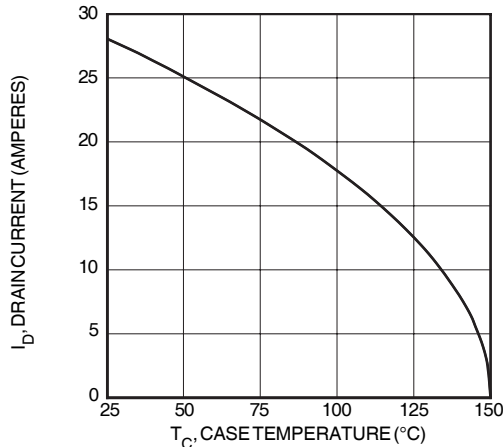


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

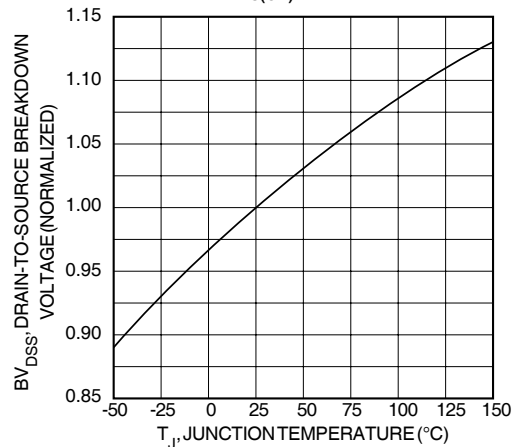


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

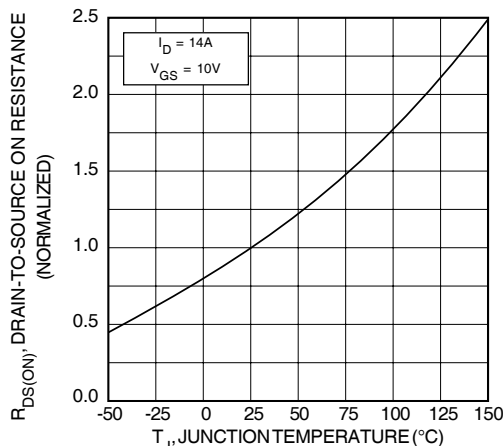


FIGURE 8, $R_{DS(ON)}$ vs. TEMPERATURE

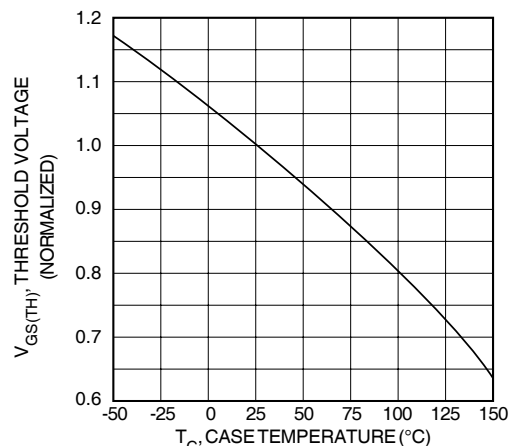


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

Typical Performance Curves

APT12045L2VFR

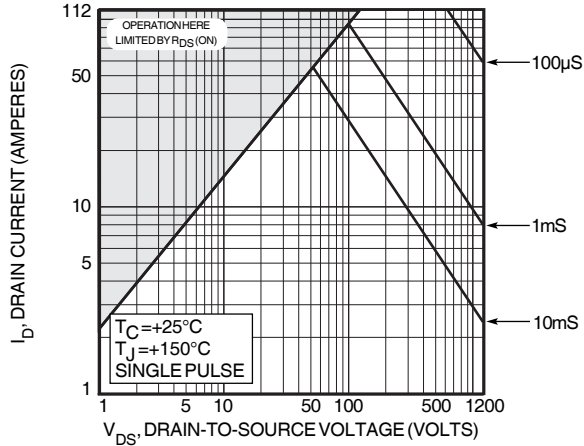


FIGURE 10, MAXIMUM SAFE OPERATING AREA

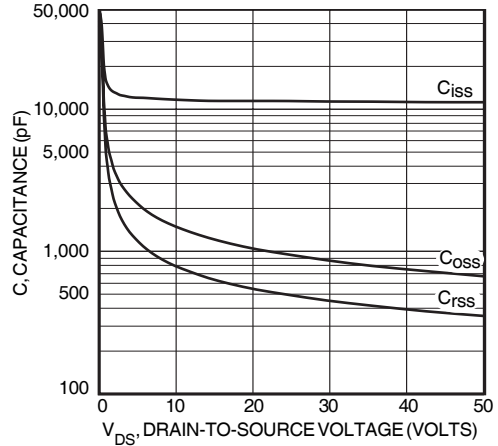


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

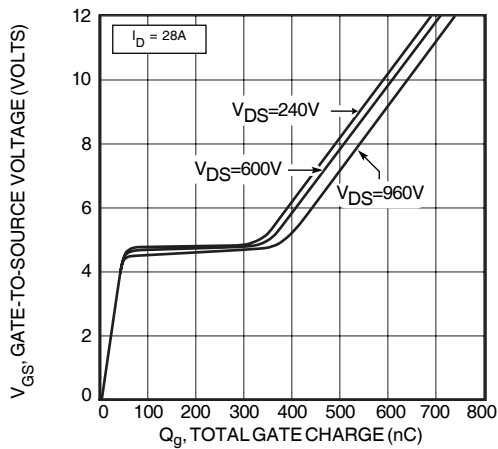


FIGURE 12, GATE CHARGE vs GATE-TO-SOURCE VOLTAGE

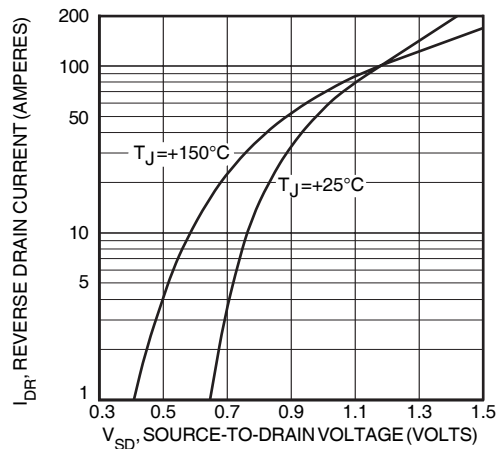
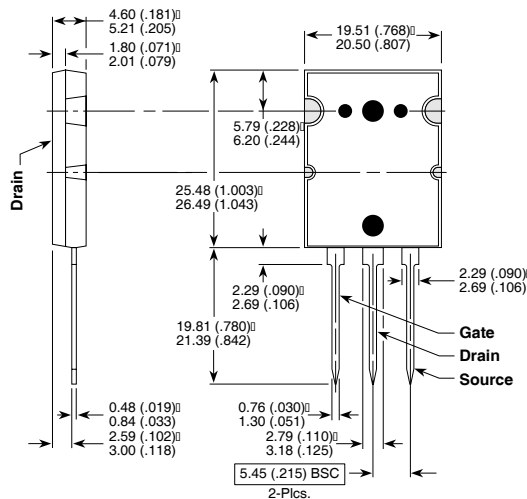


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-264 MAX™(L2) Package Outline



Dimensions in Millimeters and (Inches)