

APT30M85BNFR 300V 40A 0.085Ω
APT3010BNFR 300V 35A 0.100Ω

POWER MOS IV®

AVALANCHE RATED FREDFET

N-CHANNEL ENHANCEMENT MODE LOW VOLTAGE POWER FREDFETS

MAXIMUM RATINGS

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

Symbol	Parameter	APT30M85BNFR	APT3010BNFR	UNIT
V _{DSS}	Drain-Source Voltage	300	300	Volts
I _D	Continuous Drain Current @ T _C = 25°C	40	35	Amps
I _{DM}	Pulsed Drain Current ^①	160	140	
V _{GS}	Gate-Source Voltage Continuous	±20		Volts
V _{GSM}	Gate-Source Voltage Transient	±30		
P _D	Total Power Dissipation @ T _C = 25°C	360		Watts
	Linear Derating Factor	2.9		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)	40		Amps
E _{AR}	Repetitive Avalanche Energy	30		mJ
E _{AS}	Single Pulse Avalanche Energy ^③	1300		

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 1.0mA$)	300			Volts
$I_{D(ON)}$	On State Drain Current ^④ ($V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max, $V_{GS} = 10V$)	APT30M85BNFR	40		Amps
		APT3010BNFR	35		
$R_{DS(ON)}$	Drain-Source On-State Resistance ^④ ($V_{GS} = 10V, 0.5 I_{D(ON)}$)	APT30M85BNFR		0.085	Ohms
		APT3010BNFR		0.100	
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V$)			250	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$)			1000	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 20V, V_{DS} = 0V$)			± 100	nA
$V_{GS(TH)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1.0mA$)	2		4	Volts

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.34	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction to Ambient			40	

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

USA
 405 S.W. Columbia Street
EUROPE

Avenue J.F. Kennedy Bât B4 Parc Cadéra Nord F-33700 Merignac - France
 Bend, Oregon 97702-1035 Phone: (503) 382-8028 FAX: (503) 388-0364
 Phone: (33) 56 34 34 71 FAX: (33) 56 47 97 61
 Page 28

0257909 0001432 2T1

DYNAMIC CHARACTERISTICS

APT30M85/3010BNFR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 \text{ MHz}$		5590	6500	pF
C_{oss}	Output Capacitance			850	1200	
C_{rss}	Reverse Transfer Capacitance			200	300	
Q_g	Total Gate Charge	$V_{GS} = 10V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = 0.5 I_D [\text{Cont.}] @ 25^\circ\text{C}$		173	220	nC
Q_{gs}	Gate-Source Charge			28	50	
Q_{gd}	Gate-Drain ("Miller") Charge			72	100	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = 0.5 I_D [\text{Cont.}] @ 25^\circ\text{C}$ $R_G = 1.8\Omega$		25	35	ns
t_r	Rise Time			30	60	
$t_{d(off)}$	Turn-off Delay Time			140	180	
t_f	Fall Time			50	90	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	APT30M85BNFR		40	Amps
		APT3010BNFR		35	
I_{SM}	Pulsed Source Current ^① (Body Diode)	APT30M85BNFR		160	Amps
		APT3010BNFR		140	
V_{SD}	Diode Forward Voltage ^④ ($V_{GS} = 0V$, $I_S = -I_D [\text{Cont.}]$)			1.5	Volts
dv/dt	Peak Diode Recovery dv/dt ^②			5	V/ns
t_{rr}	Reverse Recovery Time ($I_S = -I_D [\text{Cont.}]$, $di/dt = 100A/\mu s$)	$T_j = 25^\circ\text{C}$	160	200	ns
		$T_j = 125^\circ\text{C}$	310	400	
Q_{rr}	Reverse Recovery Charge ($I_S = -I_D [\text{Cont.}]$, $di/dt = 100A/\mu s$)	$T_j = 25^\circ\text{C}$	1.1		μC
		$T_j = 125^\circ\text{C}$	3.8		
I_{RRM}	Peak Recovery Current ($I_S = -I_D [\text{Cont.}]$, $di/dt = 100A/\mu s$)	$T_j = 25^\circ\text{C}$	14		Amps
		$T_j = 125^\circ\text{C}$	25		

SAFE OPERATING AREA CHARACTERISTICS

Symbol	Characteristic	Test Conditions / Part Number	MIN	TYP	MAX	UNIT
SOA1	Safe Operating Area	$V_{DS} = 0.4 V_{DSS}$, $I_{DS} = P_D / 0.4 V_{DSS}$, $t = 1 \text{ Sec.}$	360			Watts
SOA2	Safe Operating Area	$I_{DS} = I_D [\text{Cont.}]$, $V_{DS} = P_D / I_D [\text{Cont.}]$, $t = 1 \text{ Sec.}$	360			
I_{LM}	Inductive Current Clamped	APT30M85BNFR	160			Amps
		APT3010BNFR	140			

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

② $I_S \leq -I_D [\text{Cont.}]$, $di/dt = 100A/\mu s$, $V_{DD} \leq V_{DSS}$, $T_j \leq 150^\circ\text{C}$,

$R_G = 1.8\Omega$, $V_R = 200V$.

③ Starting $T_j = 25^\circ\text{C}$, $L = 1.63\text{mH}$, $R_G = 25\Omega$, Peak $I_L = 40A$

④ Pulse Test: Pulse width $< 380 \mu s$, Duty Cycle $< 2\%$

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

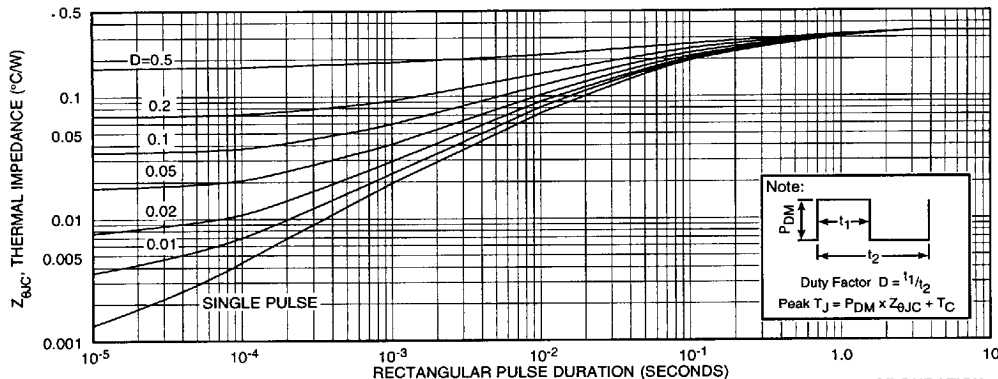


FIGURE 1. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

Page 29

0257909 0001433 138

APT30M85/3010BNFR

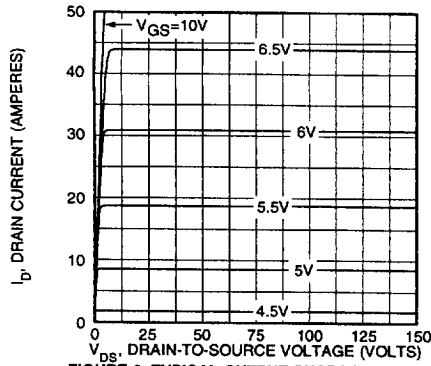


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

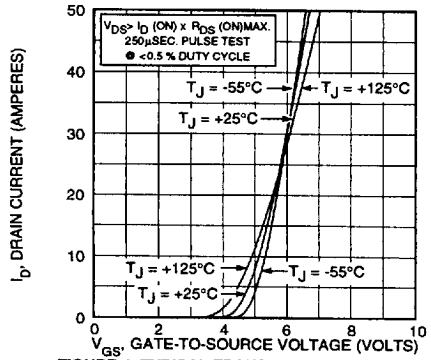


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

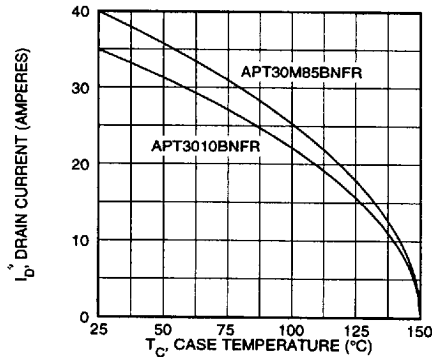


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

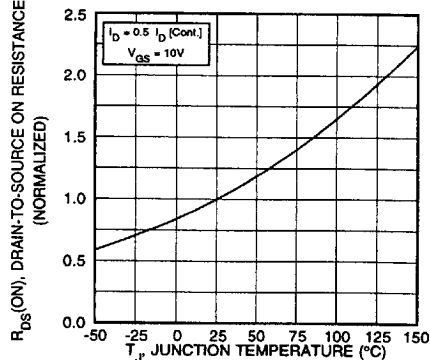


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

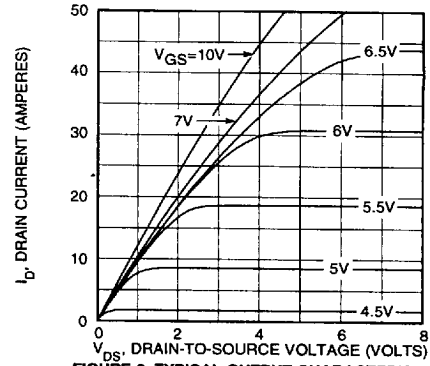


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

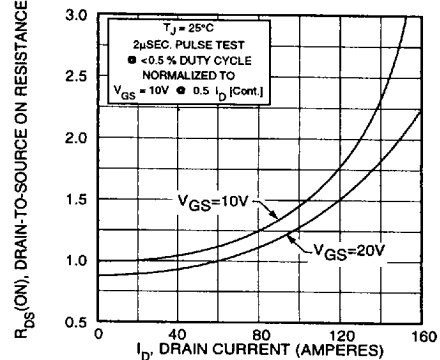


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

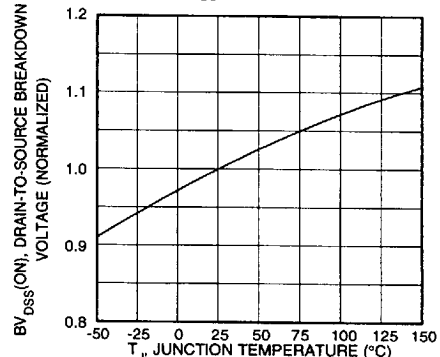


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

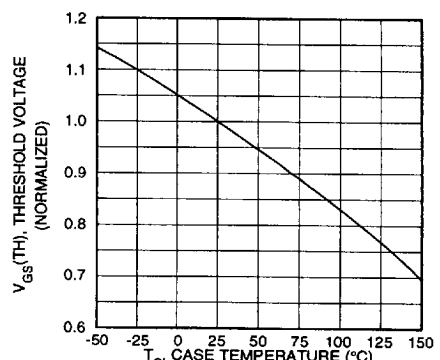


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

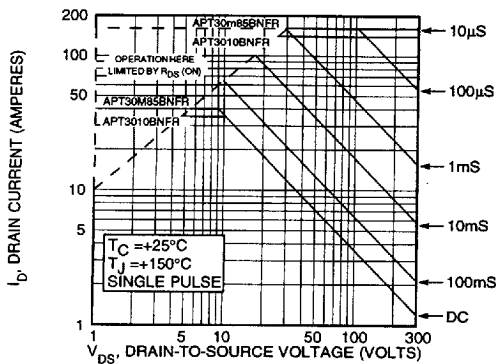


FIGURE 10, MAXIMUM SAFE OPERATING AREA

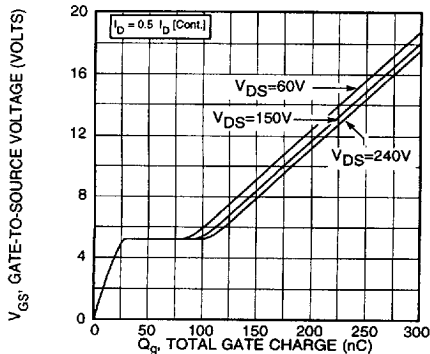


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

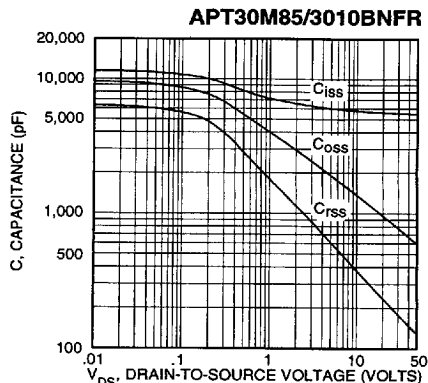


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

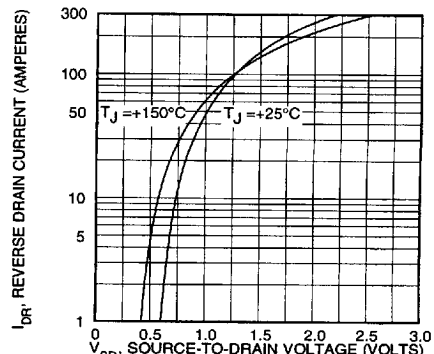
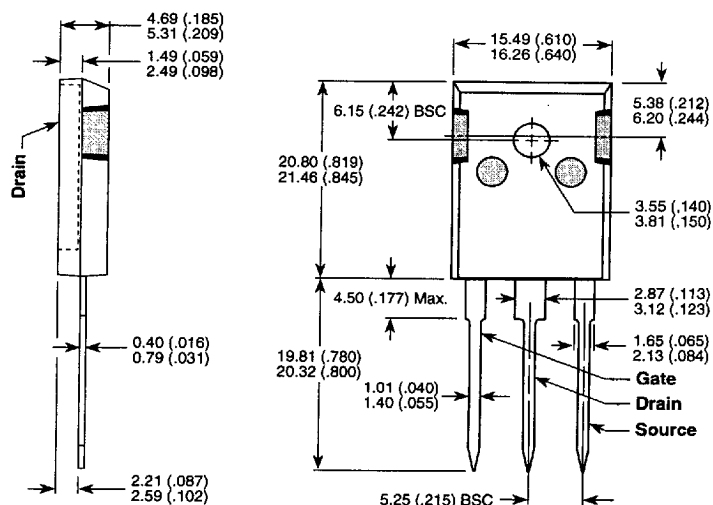


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247AD Package Outline



Dimensions in Millimeters and (Inches)
Page 31

0257909 0001435 T00