

APT6060CN	600V	10.5A	0.60Ω
APT5560CN	550V	10.5A	0.60Ω
APT6070CN	600V	9.5A	0.70Ω
APT5570CN	550V	9.5A	0.70Ω

POWER MOS IV™

N - CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

MAXIMUM RATINGS

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

Symbol	Parameter	APT 5560CN	APT 6060CN	APT 5570CN	APT 6070CN	UNIT
V_{DSS}	Drain-Source Voltage	550	600	550	600	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	10.5		9.5		Amps
I_{DM}	Pulsed Drain Current ①	42		38		
V_{GS}	Gate-Source Voltage	±30				Volts
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	150				Watts
	Linear Derating Factor	1.2				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				

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250 \mu\text{A}$)	APT6060CN / APT6070CN		600	Volts
		APT5560CN / APT5570CN		550	
$I_{D(ON)}$	On State Drain Current ② ($V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max, $V_{GS} = 10V$)	APT6060CN / APT5560CN		10.5	Amps
		APT6070CN / APT5570CN		9.5	
$R_{DS(ON)}$	Drain-Source On-State Resistance ② ($V_{GS} = 10V, 0.5 I_D$ [Cont.])	APT6060CN / APT5560CN		0.60	Ohms
		APT6070CN / APT5570CN		0.70	
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}, V_{GS} = 0V$)			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 ($V_{GS} = \pm 30V, V_{DS} = 0V$)			±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1.0\text{mA}$)	2		4	Volts

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.80	°C/W
$R_{\theta JA}$	Junction to Ambient			50	

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DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{DC}	Drain-to-Case Capacitance	$f = 1 \text{ MHz}$		15	22	pF
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 \text{ MHz}$		1510	1800	
C_{oss}	Output Capacitance			280	390	
C_{rss}	Reverse Transfer Capacitance			105	157	
Q_g	Total Gate Charge ③	$V_{GS} = 10V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}] @ 25^\circ C$		66	105	nC
Q_{gs}	Gate-Source Charge			8	12	
Q_{gd}	Gate-Drain ("Miller") Charge			35	53	
$t_d(\text{on})$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}] @ 25^\circ C$ $R_G = 1.8\Omega$		13	26	ns
t_r	Rise Time			18	36	
$t_d(\text{off})$	Turn-off Delay Time			46	70	
t_f	Fall Time			17	34	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	APT6060CN / APT5560CN		10.5	Amps
		APT6070CN / APT5570CN		9.5	
I_{SM}	Pulsed Source Current ① (Body Diode)	APT6060CN / APT5560CN		42	
		APT6070CN / APT5570CN		38	
V_{SD}	Diode Forward Voltage ② ($V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$)			1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_D [\text{Cont.}], di_S/dt = 100A/\mu s$)	148	297	594	ns
Q_{rr}	Reverse Recovery Charge ($I_S = -I_D [\text{Cont.}], di_S/dt = 100A/\mu s$)	2	4	8	μC

SAFE OPERATING AREA CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
SOA1	Safe Operating Area	$V_{DS} = 0.4 V_{DSS}, I_{DS} = P_D / 0.4 V_{DSS}, t = 1 \text{ Sec.}$	150			Watts
SOA2	Safe Operating Area	$I_{DS} = I_D [\text{Cont.}], V_{DS} = P_D / I_D [\text{Cont.}], t = 1 \text{ Sec.}$	150			
I_{LM}	Inductive Current Clamped	APT6060CN / APT5560CN		42		Amps
		APT6070CN / APT5570CN		38		

① Repetitive Rating: Pulse width limited by maximum junction temperature. See Transient Thermal Impedance Curve. (Fig.1)

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

③ See MIL-STD-750 Method 3471

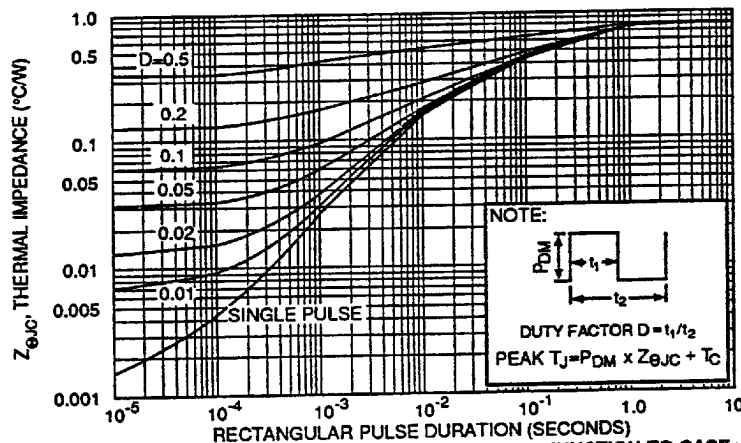


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

APT6060/5560/6070/5570CN

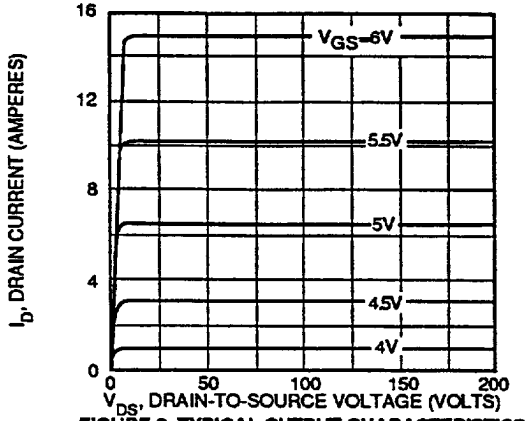


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

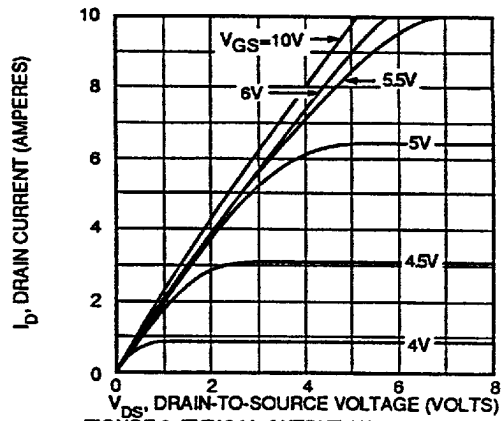


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

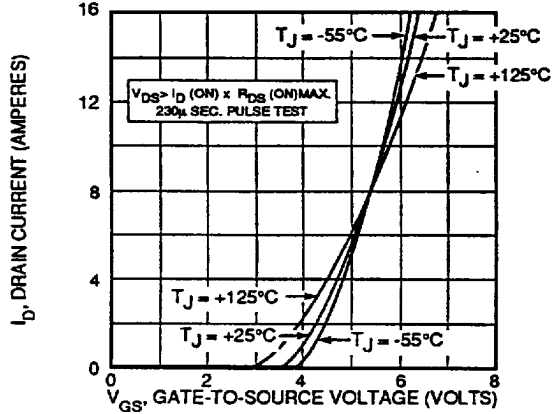


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

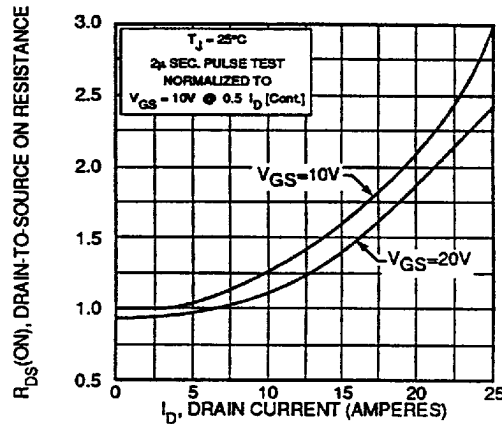


FIGURE 5, $R_{DS}(ON)$ vs DRAIN CURRENT

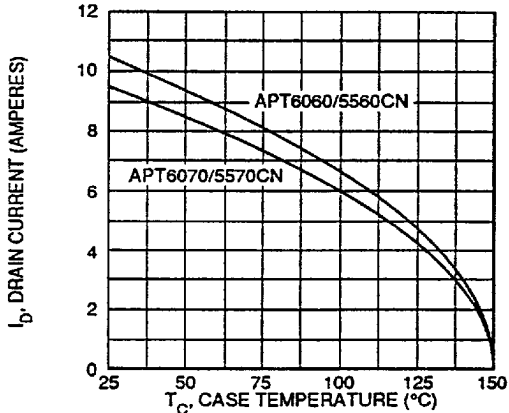


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

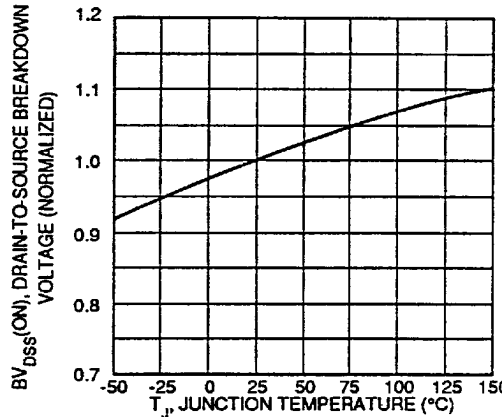


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

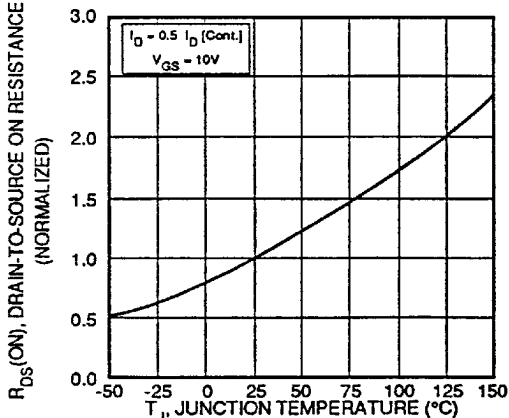


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

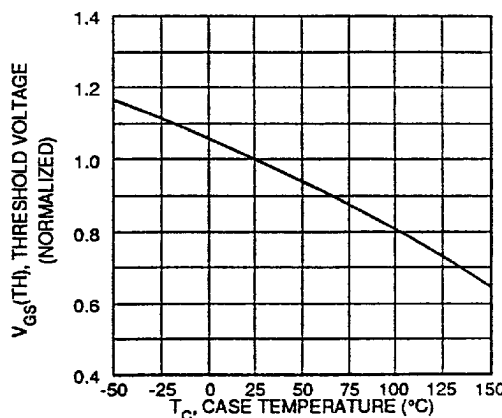


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

APT6060/5560/6070/5570CN

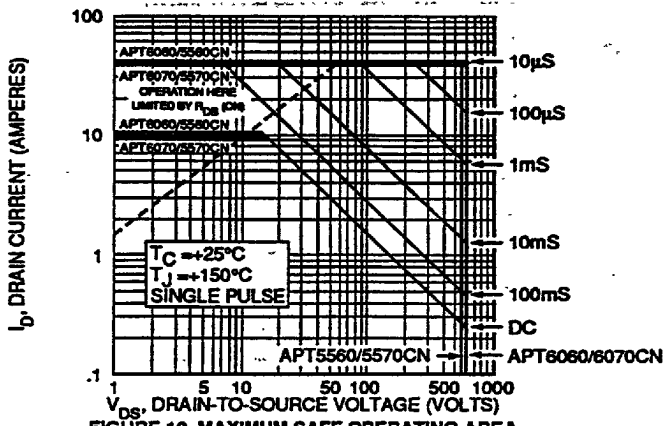


FIGURE 10, MAXIMUM SAFE OPERATING AREA

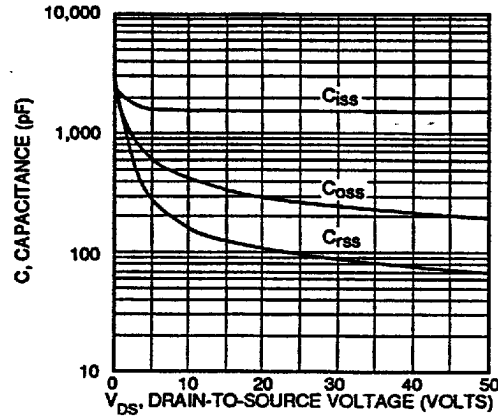


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

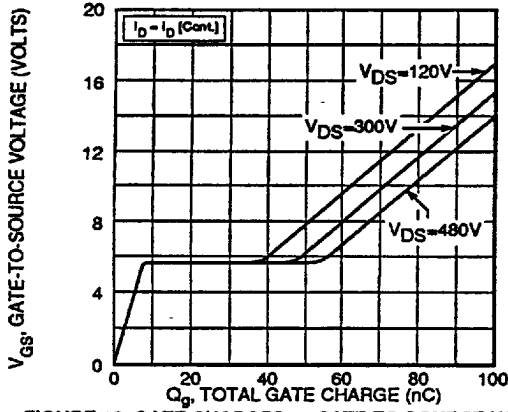


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

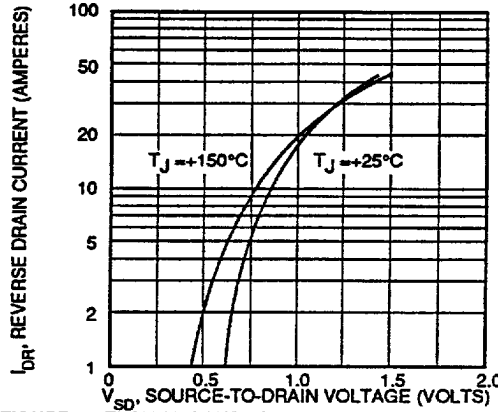
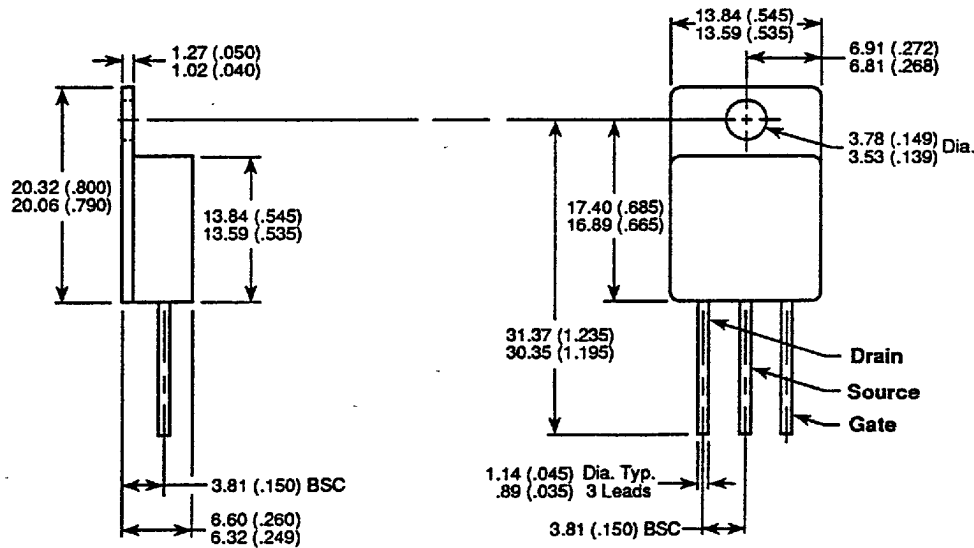


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-254AA Package Outline



Dimensions in Millimeters and (Inches)

050-6015
Rev A

4