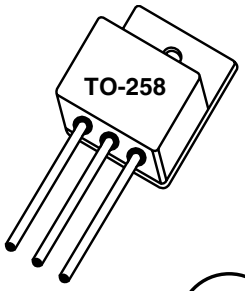
APT47N60HC3

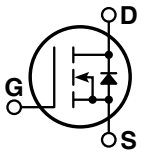
600V 33.5A 0.080Ω

Super Junction MOSFET



COOLMOS™ Power Semiconductors

- **Ultra low $R_{DS(ON)}$**
- **Low Miller Capacitance**
- **Ultra Low Gate Charge, Q_g**
- **Avalanche Energy Rated**
- **Hermetic TO-258 Package**



MAXIMUM RATINGS

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

Symbol	Parameter	APT47N60HC3	UNIT
V_{DSS}	Drain-Source Voltage	600	Volts
I_D	Continuous Drain Current @ T_C = 25°C	33.5	Amps
I_{DM}	Pulsed Drain Current ①	100.5	
V_{GS}	Gate-Source Voltage Continuous	±20	Volts
V_{GSM}	Gate-Source Voltage Transient	±30	
P_D	Total Power Dissipation @ T_C = 25°C	240	Watts
	Linear Derating Factor	1.92	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.	260	
dv/dt	Drain-Source Voltage slope (V_{DS} = 480V, I_D = 33.5A, T_J = 125°C)	50	V/ns
I_{AR}	Repetitive Avalanche Current ⑥	20	Amps
E_{AR}	Repetitive Avalanche Energy ⑥	1	mJ
E_{AS}	Single Pulse Avalanche Energy ④	1800	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage (V_{GS} = 0V, I_D = 250μA)	600			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ② (V_{GS} = 10V, I_D = 30A)		0.07	0.08	Ohms
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = 600V, V_{GS} = 0V)		0.5	25	μA
	Zero Gate Voltage Drain Current (V_{DS} = 600V, V_{GS} = 0V, T_J = 150°C)			250	
I_{GSS}	Gate-Source Leakage Current (V_{GS} = ±20V, V_{DS} = 0V)			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 2.7mA)	2.1	3	3.9	Volts

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

APT Website - http://www.advancedpower.com

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DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1 MHz		7015		pF
C_{oss}	Output Capacitance			2565		
C_{rss}	Reverse Transfer Capacitance			210		
Q_g	Total Gate Charge ③	V_{GS} = 0 TO10V V_{DD} = 350V I_D = 47A @ 25°C		260	330	nC
Q_{gs}	Gate-Source Charge			29		
Q_{gd}	Gate-Drain ("Miller") Charge			110		
$t_{d(on)}$	Turn-on Delay Time	V_{GS} = 13V V_{DD} = 380 V I_D = 47A R_G = 1.8Ω, T_J = 125°C		18		ns
t_r	Current Rise Time			27		
$t_{d(off)}$	Turn-off Delay Time			110	165	
t_f	Current Fall Time			8	12	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)			33.5	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)			100.5	
V_{SD}	Diode Forward Voltage ② (V_{GS} = 0V, I_S = -33.5A)		1	1.2	Volts
t_{rr}	Reverse Recovery Time (I_S = -33.5A, dI_S/dt = 100A/µs) V_R = 350V		366		ns
Q_{rr}	Reverse Recovery Charge (I_S = -33.5A, dI_S/dt = 100A/µs) V_R = 350V		36		µC
dv/dt	Peak Diode Recovery dv/dt ⑤			6	V/ns

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.52	°C/W
$R_{\theta JA}$	Junction to Ambient			62	

① Repetitive Rating: Pulse width limited by maximum junction temperature

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

③ See MIL-STD-750 Method 3471

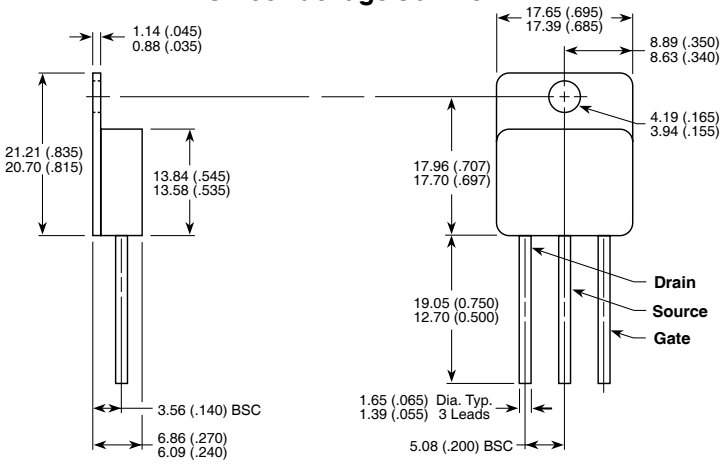
④ Starting T_j = +25°C, L = 36.0mH, R_G = 25Ω, Peak I_L = 10A

⑤ $I_S \le -I_D$ 47A $di/dt \le 700A/\mu s$ $V_R \le V_{DSS}$ $T_J \le 150°C$

⑥ Repetitve avalanche causes additional power losses that can be calculated as $P_{AV}=E_{AR}*f$

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

TO-258 Package Outline



Dimensions in Millimeters and (Inches)