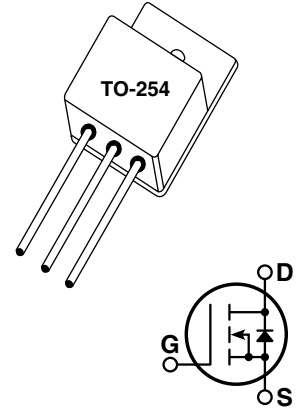


Super Junction MOSFET



- Ultra low $R_{DS(ON)}$
- Low Miller Capacitance
- Ultra Low Gate Charge, Q_g
- Avalanche Energy Rated
- Hermetic TO-254 Package




MAXIMUM RATINGS

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

Symbol	Parameter	APT20N60CC3	UNIT
V_{DSS}	Drain-Source Voltage	600	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	14	Amps
I_{DM}	Pulsed Drain Current ^①	42	
V_{GS}	Gate-Source Voltage Continuous	± 20	Volts
V_{GSM}	Gate-Source Voltage Transient	± 30	
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	104	Watts
	Linear Derating Factor	0.83	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	
dv/dt	Drain-Source Voltage slope ($V_{DS} = 480\text{V}$, $I_D = 14\text{A}$, $T_J = 125^\circ\text{C}$)	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	690	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0\text{V}$, $I_D = 250\mu\text{A}$)	600			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ^② ($V_{GS} = 10\text{V}$, $I_D = 13.1\text{A}$)		0.18	0.21	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}$, $V_{GS} = 0\text{V}$)		0.05	25	μA
	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}$, $V_{GS} = 0\text{V}$, $T_J = 150^\circ\text{C}$)			250	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$)			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 1\text{mA}$)	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>

"COOLMOS™" comprise a new family of transistors developed by Infineon Technologies AG. "COOLMOS" is a trademark of Infineon Technologies AG"

DYNAMIC CHARACTERISTICS

APT20N60CC3

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 \text{ MHz}$		2440		pF
C_{oss}	Output Capacitance			860		
C_{rss}	Reverse Transfer Capacitance			50		
Q_g	Total Gate Charge ③	$V_{GS} = 0 \text{ to } 10V$ $V_{DD} = 480V$ $I_D = 20A @ 25^\circ C$		90	114	nC
Q_{gs}	Gate-Source Charge			13		
Q_{gd}	Gate-Drain ("Miller") Charge			45		
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 13V$ $V_{DD} = 380V$ $I_D = 20A$ $R_G = 3.6\Omega, T_J = 125^\circ C$		10		ns
t_r	Current Rise Time			5		
$t_{d(off)}$	Turn-off Delay Time			65	100	
t_f	Current Fall Time			5	12	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)			14	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)			42	
V_{SD}	Diode Forward Voltage ② ($V_{GS} = 0V, I_S = -14A$)		1	1.2	Volts
t_{rr}	Reverse Recovery Time ($I_S = -14A, di_S/dt = 100A/\mu s, V_R = 480V$)		500	800	ns
Q_{rr}	Reverse Recovery Charge ($I_S = -14A, di_S/dt = 100A/\mu s, V_R = 480V$)		11		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			1.20	$^\circ C/W$
$R_{\theta JA}$	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

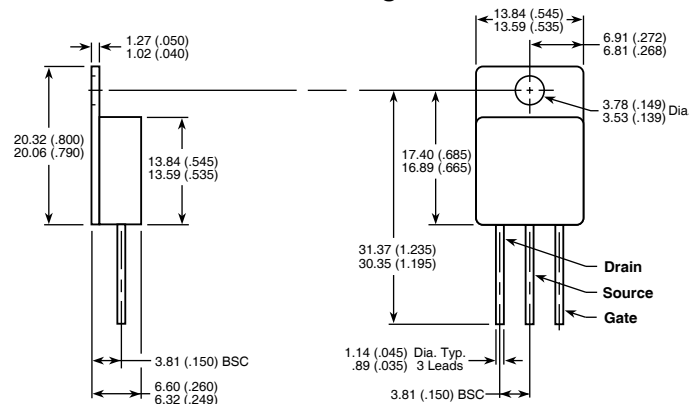
④ Starting $T_J = +25^\circ C, L = 13.80mH, R_G = 25\Omega, \text{Peak } I_L = 10A$

⑤ $I_S \leq -I_D 20A, di/dt \leq 700A/\mu s, V_R \leq V_{DSS}, T_J \leq 150^\circ C$

⑥ Repetitive 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-254 Package Outline



Dimensions in Millimeters and (Inches)

APT's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522

5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 and foreign patents. US and Foreign patents pending. All Rights Reserved.