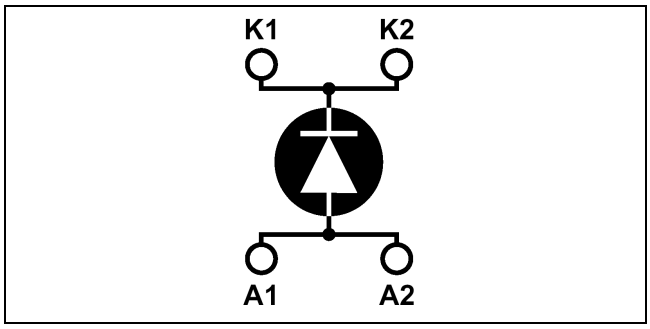
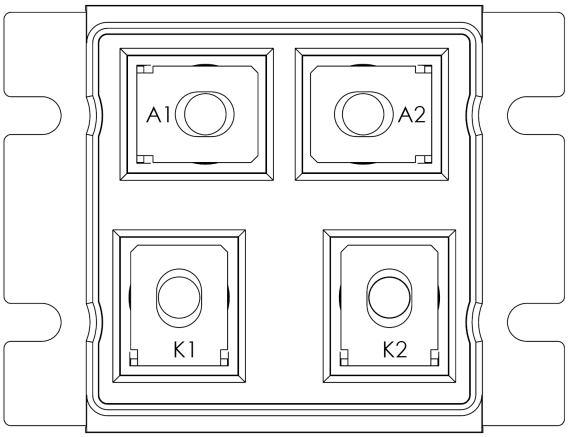
APTDF500U40G

Single diode Power Module

V_{CES} = 400V
I_C = 500A @ Tc = 80°C





Application

- Anti-Parallel diode
  - Switchmode Power Supply
  - Inverters
- Snubber diode
- Uninterruptible Power Supply (UPS)
- Induction heating
- Welding equipment
- High speed rectifiers
- Electric vehicles

Features

- Ultra fast recovery times
- Soft recovery characteristics
- Very low stray inductance
- High blocking voltage
- High current
- Low leakage current

Benefits

- Low losses
- Low noise switching
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- RoHS Compliant

All ratings @ T_j = 25°C unless otherwise specified

Absolute maximum ratings

Symbol	*Parameter*			*Max ratings*	*Unit*
V_R	DC reverse Voltage			400	V
V_{RRM}	Peak Repetitive Reverse Voltage				
$I_{F(AV)}$	Average Forward Current	Duty cycle = 50%	T_c = 25°C	500	A
			T_c = 80°C	500	
$I_{F(RMS)}$	RMS Forward Current			850	
I_{FSM}	Non-Repetitive Forward Surge Current		T_j = 25°C	5000	

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

Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_F	Diode Forward Voltage	I_F = 500A			1.3	1.5	V
		I_F = 1000A			1.6		
		I_F = 500A	T_j = 125°C		1.2		
I_{RM}	Maximum Reverse Leakage Current	V_R = 400V	T_j = 25°C			2000	µA
			T_j = 125°C			5000	
C_T	Junction Capacitance	V_R = 200V			1300		pF

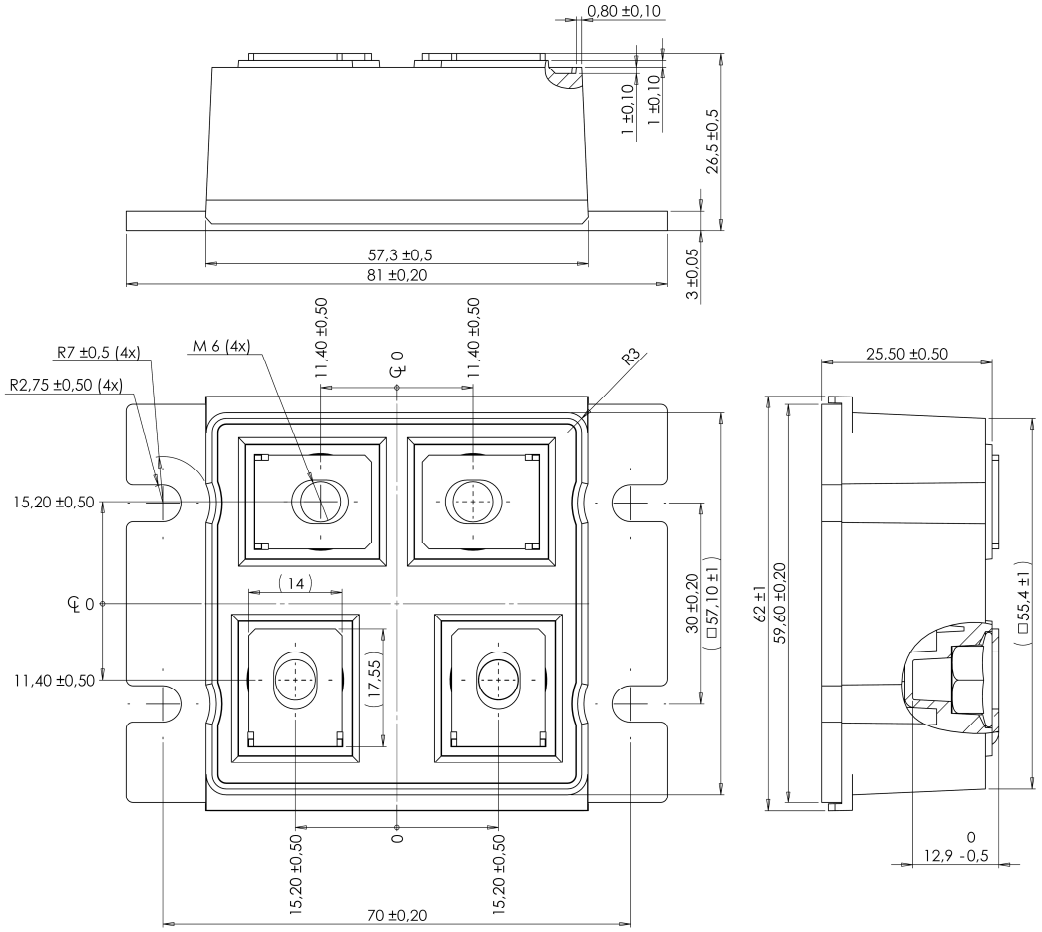
Dynamic Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
t_{rr}	Reverse Recovery Time	I_F = 500A V_R = 268V di/dt=1000A/µs	T_j = 25°C		50		ns
			T_j = 125°C		150		
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		750		nC
			T_j = 125°C		5250		
I_{rr}	Reverse Recovery Current		T_j = 25°C		30		A
			T_j = 125°C		65		
t_{rr}	Reverse Recovery Time	I_F = 500A V_R = 268V di/dt=4000A/µs	T_j = 125°C		90		ns
Q_{rr}	Reverse Recovery Charge				10.5		µC
I_{rr}	Reverse Recovery Current				195		A

Thermal and package characteristics

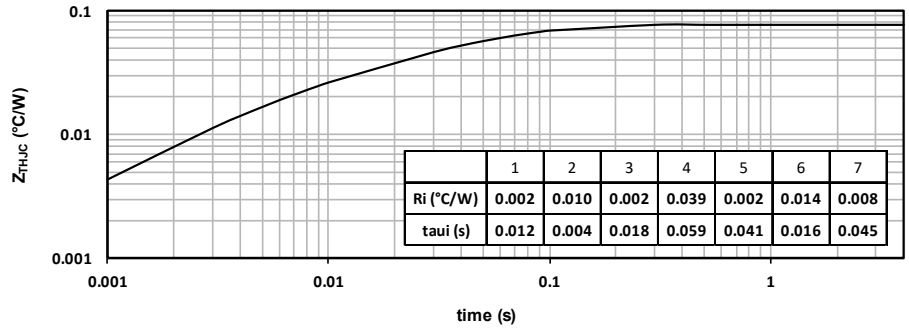
Symbol	Characteristic			Min	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance				0.08	°C/W
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000		V
T_J	Operating junction temperature range			-40	150	°C
T_{JOP}	Recommended junction temperature under switching conditions			-40	$T_J$max -25	
T_{STG}	Storage Temperature Range			-40	125	
T_C	Operating Case Temperature			-40	125	
Torque	Mounting torque	To heatsink	M5	2.5	3.5	N.m
		For terminals	M6	3	4	
Wt	Package Weight				250	g

LP4 Package outline (dimensions in mm)



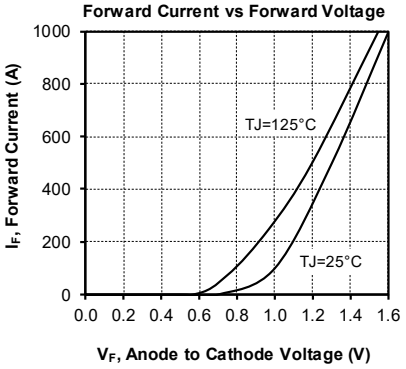
Typical Performance Curve

Maximum thermal impedance

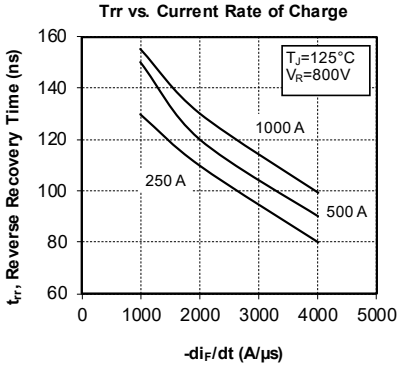


	1	2	3	4	5	6	7
Ri (°C/W)	0.002	0.010	0.002	0.039	0.002	0.014	0.008
taui (s)	0.012	0.004	0.018	0.059	0.041	0.016	0.045

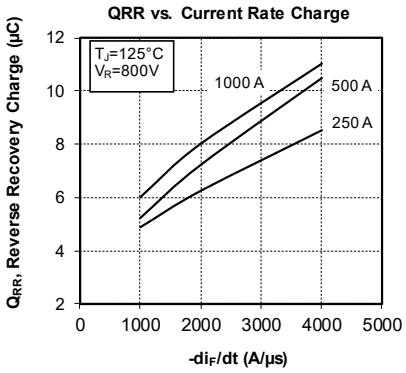
Forward Current vs Forward Voltage



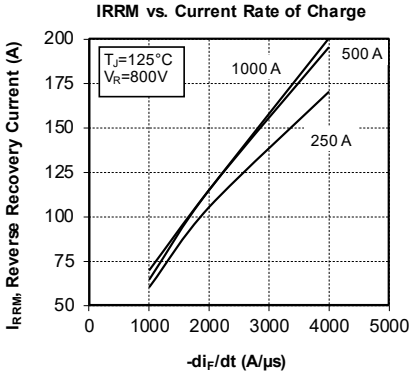
Trr vs. Current Rate of Charge



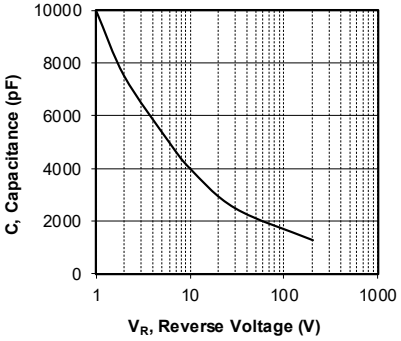
QRR vs. Current Rate Charge



IRRM vs. Current Rate of Charge



Capacitance vs. Reverse Voltage



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