

Pb Free Plating Product

APT40DQ100BCT/APT40DQ100BCTG



2*40A/1000V Heatsink Dual Cathode Common Ultra Fast Recovery Rectifiers

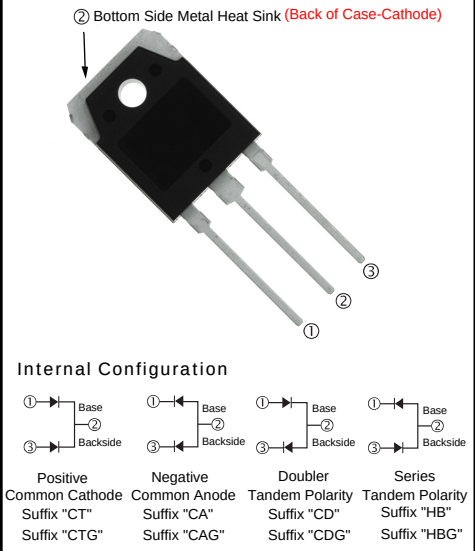
APPLICATION

- Freewheeling, Snubber, Clamp
- Inversion Welder
- PFC
- Plating Power Supply
- Ultrasonic Cleaner and Welder
- Converter & Chopper
- UPS

PRODUCT FEATURE

- Ultrafast Recovery Time
- Soft Recovery Characteristics
- Low Recovery Loss
- Low Forward Voltage
- High Surge Current Capability
- Low Leakage Current

TO-3PN/TO-3PB-SQ



GENERAL DESCRIPTION

APT40DQ100BCT/APT40DQ100BCTG using the latest FRED FAB process(planar passivation pellet) with ultrafast and soft recovery characteristics.

MAXIMUM RATINGS

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

Symbol	Characteristic / Test Conditions	APT40DQ100BCT/APT40DQ100BCTG	UNIT
V_R	Maximum D.C. Reverse Voltage	1000	Volts
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		
V_{RWM}	Maximum Working Peak Reverse Voltage		
$I_{F(AV)}$	Maximum Average Forward Current ($T_C = 106^{\circ}\text{C}$, Duty Cycle = 0.5)	40	Amps
$I_{F(RMS)}$	RMS Forward Current (Square wave, 50% duty)	60	
I_{FSM}	Non-Repetitive Forward Surge Current ($T_J = 45^{\circ}\text{C}$, 8.3ms)	210	
E_{AVL}	Avalanche Energy (1A, 40mH)	20	mJ
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to 175	$^{\circ}\text{C}$
T_L	Lead Temperature for 10 Sec.	300	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
V_F	Forward Voltage	$I_F = 40\text{A}$		2.5	Volts
		$I_F = 80\text{A}$		3.08	
		$I_F = 40\text{A}, T_J = 125^{\circ}\text{C}$		1.97	
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1000\text{V}$		100	μA
		$V_R = 1000\text{V}, T_J = 125^{\circ}\text{C}$		500	
C_T	Junction Capacitance, $V_R = 200\text{V}$		28		pF

DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
t_{rr}	Reverse Recovery Time	$I_F = 1A$, $di_F/dt = -100A/\mu s$, $V_R = 30V$, $T_J = 25^\circ C$	-	25		ns
t_{rr}	Reverse Recovery Time	$I_F = 40A$, $di_F/dt = -200A/\mu s$ $V_R = 667V$, $T_C = 25^\circ C$	-	250		
Q_{rr}	Reverse Recovery Charge		-	415		nC
I_{RRM}	Maximum Reverse Recovery Current		-	4	-	Amps
t_{rr}	Reverse Recovery Time	$I_F = 40A$, $di_F/dt = -200A/\mu s$ $V_R = 667V$, $T_C = 125^\circ C$	-	315		ns
Q_{rr}	Reverse Recovery Charge		-	1650		nC
I_{RRM}	Maximum Reverse Recovery Current		-	9	-	Amps
t_{rr}	Reverse Recovery Time	$I_F = 40A$, $di_F/dt = -1000A/\mu s$ $V_R = 667V$, $T_C = 125^\circ C$	-	145		ns
Q_{rr}	Reverse Recovery Charge		-	2660		nC
I_{RRM}	Maximum Reverse Recovery Current		-	29		Amps

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction-to-Case Thermal Resistance			.61	$^\circ C/W$
W_T	Package Weight		0.22		oz
			5.9		g
Torque	Maximum Mounting Torque			10	lb•in
				1.1	N•m

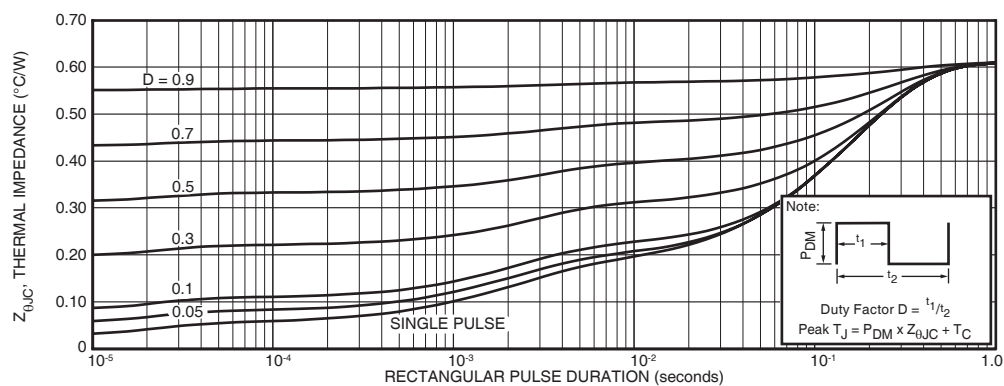


FIGURE 1a. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

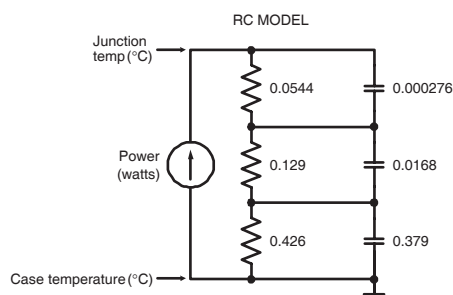


FIGURE 1b. TRANSIENT THERMAL IMPEDANCE MODEL

TYPICAL PERFORMANCE CURVES

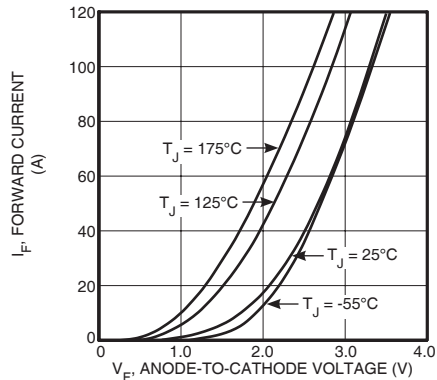


Figure 2. Forward Current vs. Forward Voltage

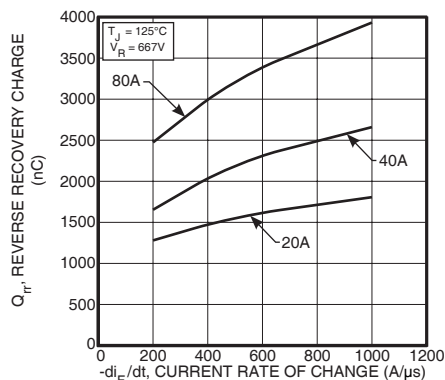


Figure 4. Reverse Recovery Charge vs. Current Rate of Change

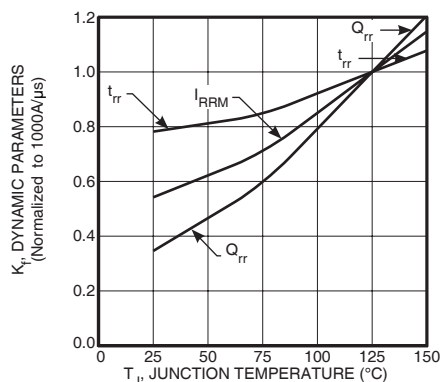


Figure 6. Dynamic Parameters vs. Junction Temperature

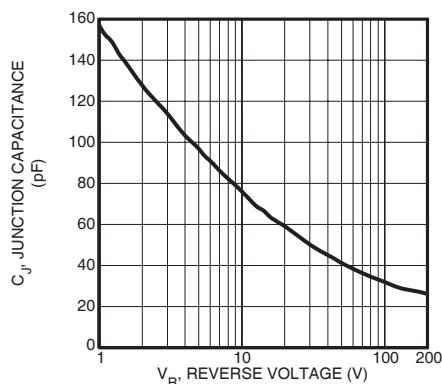


Figure 8. Junction Capacitance vs. Reverse Voltage

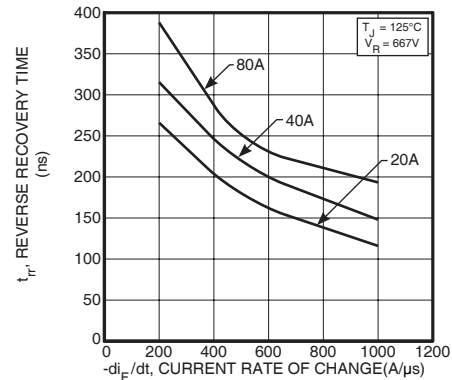


Figure 3. Reverse Recovery Time vs. Current Rate of Change

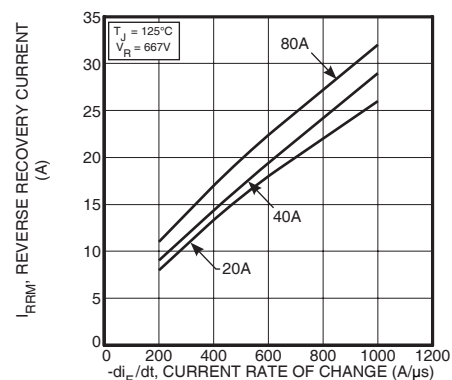


Figure 5. Reverse Recovery Current vs. Current Rate of Change

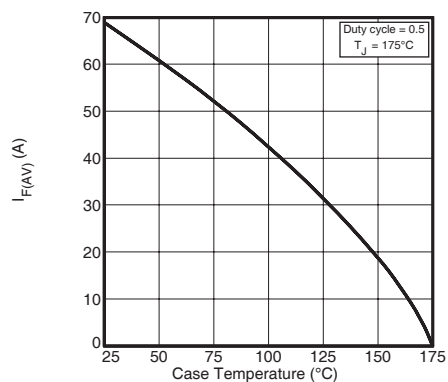


Figure 7. Maximum Average Forward Current vs. Case Temperature

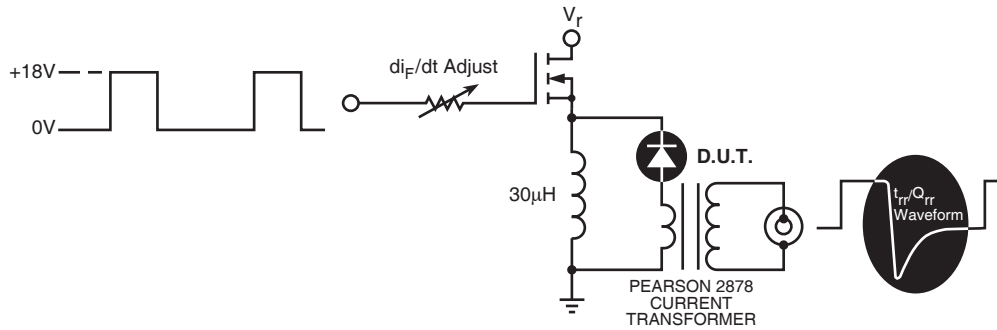


Figure 9. Diode Test Circuit

- ① I_F - Forward Conduction Current
- ② di_F/dt - Rate of Diode Current Change Through Zero Crossing.
- ③ I_{RRM} - Maximum Reverse Recovery Current.
- ④ t_{rr} - Reverse Recovery Time, measured from zero crossing where diode current goes from positive to negative, to the point at which the straight line through I_{RRM} and $0.25 \cdot I_{RRM}$ passes through zero.
- ⑤ Q_{rr} - Area Under the Curve Defined by I_{RRM} and t_{rr} .

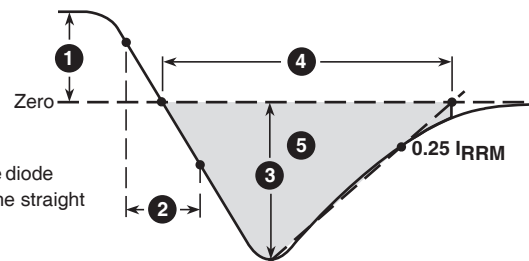
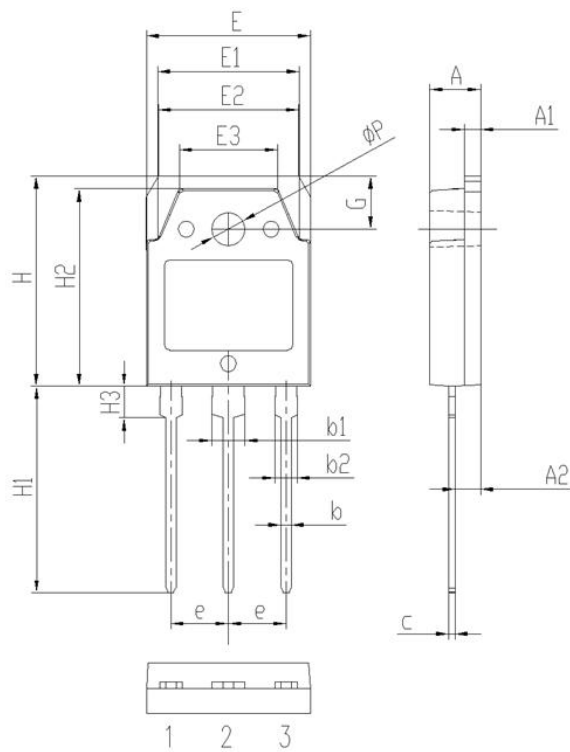


Figure 10. Diode Reverse Recovery Waveform and Definitions

Package Outline

THINKI TO-3PN/TO-3PB-SQ



Symbol	Dimensions(millimeters)	
	Min.	Max.
A	4.60	5.00
A1	1.50	2.00
A2	2.20	2.60
b	0.80	1.20
b1	2.90	3.30
b2	1.90	2.30
c	0.40	0.80
e	5.25	5.65
E	15.3	15.7
E1	13.2	13.6
E2	13.1	13.5
E3	9.10	9.50
H	19.7	20.1
H1	19.1	20.1
H2	18.3	18.7
H3	2.80	3.20
G	4.80	5.20
ΦP	3.00	3.40