Ultra Fast Recovery Diodes

Microsemi offers a family of discrete silicon diode products: a new DQ series Fast Recovery Epitaxial Diode (FRED), the original D series FRED, the DS series FRED, and a silicon Schottky. These series of diodes are designed to provide high quality solutions to a wide range of high voltage, high power application requirements, ranging from fast recovery for continuous conduction mode power factor correction to low conduction loss for output rectification. Distinguishing features, technology used, and applications for each product family are listed below.

1) **DQ Series FRED** – designated by DQ in the part number. These devices are available in 600V, 1000V, and 1200V ratings. These products are targeted for very low Q_{RR} - ultrafast recovery for low switching losses in PFC and high switching frequency applications.

General features for all DQ series diodes include:

- **Ultra fast recovery** – completely new design utilizing the latest technology to reduce peak di/dt during recovery
- **Low leakage current** – Microsemi's proprietary platinum process results in excellent high temperature performance and reliability
- **Rated to 175°C**
- **Avalanche energy rated**

2) **D Series FRED** – designated by D in the part number. These devices are available in 200V, 300V, 400V, 600V, 1000V, and 1200V ratings. Features of the D series include:

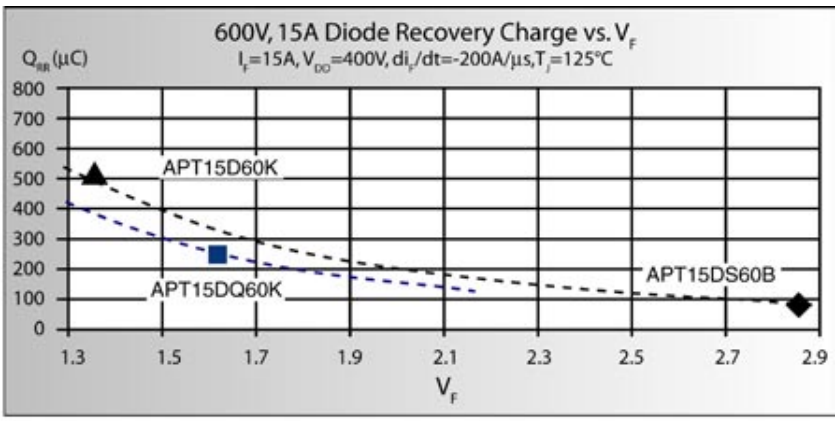
- **Low V_F** - Medium speed for output rectification, industrial, and SMPS applications
- **Low leakage current** – Microsemi's proprietary platinum process results in excellent high temperature performance and reliability
- **Rated to 175°C**

3) **DS Series FRED** – designated by DS in the part number. These devices are available in 600V rating. The DS series is intended for very high performance PFC Boost applications where reverse recovery must be minimized.

4) **S Series Schottky** – designated by S in the part number. These devices are available in 200V rating. Features of Schottky series include:

- **Low V_F** - less than 1V for low conduction loss in output rectification in telecom and other SMPS
- **Low Q_{RR}** - low recovery losses due to Schottky construction
- **Easy to parallel** - very narrow V_F distribution
- **Avalanche energy rated**

Diode Technology Performance Comparison



The graph shows the reverse recovery charge Q_{RR} versus forward voltage or 600V DQ, D, and DS. Q_{RR} is a good indicator of recovery speed because it relates directly to switching losses in the circuit and is less impacted by factors external to the diode. The dashed lines indicate a technology curves. The D and DS series are on the same technology curve and have different recovery charge and forward voltages by design. Being based on an all new design with improved technology, the DQ technology curve is slightly better than the D and DS series technology curve, resulting in better overall cost / performance. Silicon carbide technology has very high performance and a correspondingly higher cost.

Ultra Fast Recovery Diodes

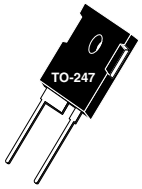
NEW - "DQ" DIODES

Volts	$I_{F(avg)}$ Amps	V_F (volts) Typ 25°C	t_{RR} (ns) Typ 25°C	Q_{RR} (nC) Typ 125°C at $I_F = I_{F(avg)}$	Diode Series	Part Number	Package Style
SINGLE	15	2.8	21	960	DQ	APT15DQ120B	TO-247
	15	2.8	21	960	DQ	APT15DQ120K	TO-220
	15	2.0	32	1300	D	APT15D120B	TO-247
1200	15	2.0	32	1300	D	APT15D120K	TO-220
	30	2.0	31	3450	D	APT30D120B	TO-247
	30	2.8	24	1800	DQ	APT30DQ120B	TO-247
	30	2.8	24	1800	DQ	APT30DQ120K	TO-220
	40	2.8	26	2200	DQ	APT40DQ120B	TO-247
	60	2.0	38	4000	D	APT60D120B	TO-247
	60	2.8	30	2800	DQ	APT60DQ120B	TO-247
	75	2.8	32	3340	DQ	APT75DQ120B	TO-247
	15	2.5	20	810	DQ	APT15DQ100B	TO-247
	15	2.5	20	810	DQ	APT15DQ100K	TO-220
	15	1.9	28	1550	D	APT15D100K	TO-220
1000	30	1.9	29	2350	D	APT30D100B	TO-247
	30	2.5	22	1250	DQ	APT30DQ100B	TO-247
	30	2.5	22	1250	DQ	APT30DQ100K	TO-247
	40	2.5	24	1430	DQ	APT40DQ100B	TO-247
	60	1.9	34	3600	D	APT60D100B	TO-247
	60	2.5	29	2325	DQ	APT60DQ100B	TO-247
	75	2.5	33	2660	DQ	APT75DQ100B	TO-247
	8	2.0	14	160	DQ	APT8DQ60K	TO-220
	8	2.0	14	160	DQ	APT8DQ60SA	TO-263
	8	2.0	14	160	DQ	APT8DQ60K3	TO-220(FP)
	15	2.0	16	250	DQ	APT15DQ60B	TO-247
	15	2.0	16	250	DQ	APT15DQ60K	TO-220
	15	1.6	21	520	D	APT15D60B	TO-247
600	15	1.6	21	520	D	APT15D60K	TO-220
	30	1.6	23	700	D	APT30D60B	TO-247
	30	2.0	19	400	DQ	APT30DQ60B	TO-247
	30	2.0	19	400	DQ	APT30DQ60K	TO-220
	40	2.0	22	480	DQ	APT40DQ60B	TO-247
	60	1.6	40	920	D	APT60D60B	TO-247
	60	2.0	26	640	DQ	APT60DQ60B	TO-247
	75	2.0	29	650	DQ	APT75DQ60B	TO-247
	15	1.3	19	300	D	APT15D40K	TO-220
400	30	1.3	22	360	D	APT30D40B	TO-247
	60	1.3	30	540	D	APT60D40B	TO-247
300	15	1.2	16	230	D	APT15D30K	TO-220
	60	1.2	29	370	D	APT60D30B	TO-247
	15	0.80	20	440	Schottky	APT15S20K	TO-220
	30	1.1	21	150	D	APT30D20B	TO-247
200	30	0.83	25	448	Schottky	APT30S20B	TO-247
	60	1.1	30	250	D	APT60D20B	TO-247
	60	0.83	35	490	Schottky	APT60S20B	TO-247
	100	0.89	40	690	Schottky	APT100S20B	TO-247
TANDEM, DS DIODES FOR PFC BOOST APPLICATIONS							
600	15	3.2	13	85	DS	APT15DS60B	TO-247
	30	3.2	17	180	DS	APT30DS60B	TO-247

(2-300V Dice Connected In Series)

TO-220[K]

TO-220(FP)
Full Pak[K3]

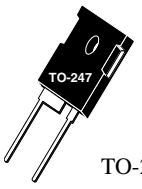


TO-247[B]

D³ PAK[S]
TO-268

TO-263 [SA]

Part Numbers for D³ packages - replace "B" with "S" in part number



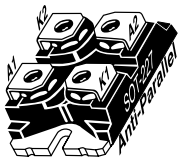
TO-247[B]

For RoHS compliant products add "G" to the end of part number except ISOTOP® package

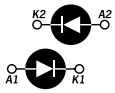
NEW - "DQ" DIODES

Ultra Fast Recovery Diodes

Volts	$I_{F(avg)}$ Amps	V_F (volts) Typ 25°C	t_{RR} (ns) Typ 25°C	Q_{RR} (nC) Typ 125°C at $I_F = I_{F(avg)}$	Diode Series	Part Number	Package Style
DUAL	2x27	2.0	31	3450	D	APT2X30D120J	SOT-227
	2x30	2.6	25	1800	DQ	APT2X30DQ120J	
1200	2x53	2.0	38	4000	D	APT2X60D120J	
	2x60	2.5	30	2890	DQ	APT2X60DQ120J	
	2x93	2.0	47	5350	D	APT2X100D120J	
	2x100	2.4	45	5240	DQ	APT2X100DQ120J	
	2x28	1.9	29	2350	D	APT2X30D100J	
	2x55	1.9	34	3600	D	APT2X60D100J	
1000	2x60	2.2	30	2350	DQ	APT2X60DQ100J	
	2x95	1.9	43	4050	D	APT2X100D100J	
	2x100	2.1	45	3645	DQ	APT2X100DQ100J	
	2x30	1.8	20	400	DQ	APT2X30DQ60J	
	2x30	1.6	23	700	D	APT2X30D60J	
600	2x60	1.7	27	650	DQ	APT2X60DQ60J	
	2x60	1.6	40	920	D	APT2X60D60J	
	2x100	1.6	30	980	DQ	APT2X100DQ60J	
	2x100	1.6	34	1450	D	APT2X100D60J	
	2x30	1.3	22	360	D	APT2X30D40J	
400	2x60	1.3	30	540	D	APT2X60D40J	
	2x100	1.3	37	1050	D	APT2X100D40J	
300	2x60	1.2	29	370	D	APT2X60D30J	
	2x100	1.2	36	650	D	APT2X100D30J	
	2x30	0.80	25	448	Schottky	APT2X31S20J	
	2x60	1.1	30	250	D	APT2X60D20J	
200	2x60	0.83	35	490	Schottky	APT2X61S20J	
	2x100	1.1	39	840	D	APT2X100D20J	
	2x100	0.89	40	690	Schottky	APT2X101S20J	
	2x15	2.8	21	960	DQ	APT15DQ120BCT	TO-247 [BCT]
1200	2x30	2.8	24	1800	DQ	APT30DQ120BCT	TO-247 [BCT]
	2x40	2.8	26	2200	DQ	APT40DQ120BCT	TO-247 [BCT]
	2x60	2.8	30	2800	DQ	APT60DQ120LCT	TO-264 [LCT]
	2x15	2.5	20	810	DQ	APT15DQ100BCT	TO-247 [BCT]
	2x15	1.9	28	1550	D	APT15D100BHB	TO-247 [BHB]
	2x30	2.5	22	1250	DQ	APT30DQ100BCT	TO-247 [BCT]
1000	2x30	1.9	30	2350	D	APT30D100BHB	TO-247 [BHB]
	2x30	1.9	30	2350	D	APT30D100BCA	TO-247 [BCA]
	2x40	2.5	24	1430	DQ	APT40DQ100BCT	TO-247 [BCT]
	2x60	2.5	29	2325	DQ	APT60DQ100LCT	TO-264 [LCT]
	2x60	1.9	35	3600	D	APT60D100LCT	TO-264 [LCT]
	2x8	2.0	15	160	DQ	APT8DQ60KCT	TO-220 [KCT]
	2x8	2.0	15	160	DQ	APT8DQ60K3CT	TO-220 [K3CT]
	2x15	2.0	15	250	DQ	APT15DQ60BCT	TO-247 [BCT]
	2x15	1.6	20	520	D	APT15D60BCA	TO-247 [BCA]
600	2x30	2.0	19	400	DQ	APT30DQ60BCT	TO-247 [BCT]
	2x30	1.6	23	700	D	APT30D60BCT	TO-247 [BCT]
	2x30	1.6	25	700	D	APT30D60BHB	TO-247 [BHB]
	2x30	1.6	25	700	D	APT30D60BCA	TO-247 [BCA]
	2x40	2.0	22	480	DQ	APT40DQ60BCT	TO-247 [BCT]
	2x60	2.0	26	640	DQ	APT60DQ60BCT	TO-247 [BCT]
	2x60	1.6	30	920	D	APT60D60LCT	TO-264 [LCT]
400	2x60	1.3	30	540	D	APT60D40LCT	TO-264 [LCT]
300	2X60	1.2	29	370	D	APT60D30LCT	TO-264 [LCT]
	2x15	0.80	20	440	Schottky	APT15S20KCT	TO-220 [KCT]
	2x15	0.80	20	440	Schottky	APT15S20BCT	TO-247 [BCT]
	2x30	1.1	21	150	D	APT30D20BCA	TO-247 [BCA]
200	2x30	0.80	25	448	Schottky	APT30S20BCT	TO-247 [BCT]
	2x60	1.1	30	250	D	APT60D20LCT	TO-264[LCT]
	2x60	0.83	35	490	Schottky	APT60S20B2CT	T-MAX® [B2CT]
	2x100	0.89	40	690	Schottky	APT100S20LCT	TO-264[LCT]

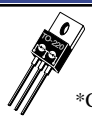


ISOTOP®[J] SOT-227
Antiparallel
Configuration
(ISOLATED BASE)



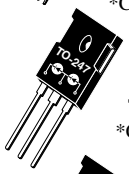
Part Numbers for Parallel Configuration replace 30, 60, or 100 with 31, 61, or 101. Except Schottky

Example: 2X30D120J becomes 2X31D120J

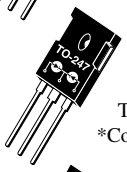


TO-220[KCT]
*Common Cathode

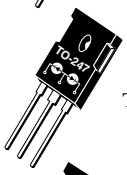
TO-220 [K3CT]
Full Pak
*Common Cathode



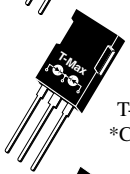
TO-247[BCA]
*Common Anode



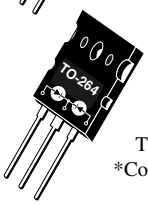
TO-247[BCT]
*Common Cathode



TO-247[BHB]
*Half Bridge



T-MAX® [B2CT]
*Common Cathode



TO-264[LCT]
*Common Cathode

*Current ratings per leg

For RoHS compliant products add "G" to the end of part number except ISOTOP® package

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www.advancedpower.com

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