SEMTECH

RECTIFIER, up to 600V, 4.5A, 150-400ns

1N5415 thru 1N5420
3SF05 thru 3SF6

January 7, 1998

TEL:805-498-2111 FAX:805-498-3804 WEB:http://www.semtech.com

AXIAL LEADED HERMETICALLY SEALED SUPERFAST RECTIFIER DIODE

- Very low reverse recovery time
- Hermetically sealed in Metoxilite fused metal oxide
- Low switching losses
- Low forward voltage drop
- Soft, non-snap off, recovery characteristics

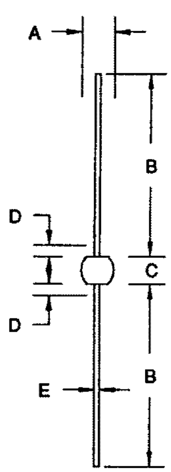
QUICK REFERENCE DATA

- V_R = 50 - 600V
- I_F = 4.5A
- t_{rr} = 150 - 400nS
- I_R = 1.0μA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	1N5415 3SF05	1N5416 3SF1	1N5417 3SF2	1N5418 3SF4	1N5419 3SF5	1N5420 3SF6	Unit
Working reverse voltage	V_{RWM}	50	100	200	400	500	600	V
Repetitive reverse voltage	V_{RRM}	50	100	200	400	500	600	V
Average forward current (@ 55°C in free air, lead length 0.375")	$I_{F(AV)}$	← 4.5 →						A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	← 25 →						A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	← 80 →						A
(t_p = 8.3mS, @ V_R & 25°C)	I_{FSM}	← 150 →						A
Storage temperature range	T_{STG}	← -65 to +175 →						°C
Operating temperature range	T_{OP}	← -65 to +175 →						°C

MECHANICAL



G4

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	3.4	4.6	.135	.180	-
B	22.9	33.0	.90	1.30	-
C	3.5	4.2	.140	.165	-
D	-	.80	-	.030	1
E	.91	1.07	.036	.042	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.04oz

These products are qualified to MIL-S-19500/411 and are preferred parts as listed in MIL-STD-701.
They can be supplied fully released as JAN, JANTX, and JANTXV versions.

These products are qualified in Europe to DEF STAN 59-61 (PART 80)/030 available to F and FX levels.

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ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	1N5415 3SF05	1N5416 3SF1	1N5417 3SF2	1N5418 3SF4	1N5419 3SF5	1N5420 3SF6	Unit
Average forward current max. for sine wave; $T_A = 55^oC$)	$I_{F(AV)}$	←		3.0			→	A
Average forward current max. ($T_L = 55^oC$; L = 3/8") for sine wave	$I_{F(AV)}$	←		4.4			→	A
for square wave	$I_{F(AV)}$	←		4.5			→	A
I^2t for fusing (t = 8.3mS) max.	I^2t	←		90			→	A^2S
Forward voltage drop max. @ I_F = 3.0A, $T_j = 25^oC$	V_F	←		1.1			→	V
Reverse current max. @ V_{RWM}, $T_j = 25^oC$	I_R	←		1.0			→	µA
@ V_{RWM}, $T_j = 100^oC$	I_R	←		20			→	µA
Reverse recovery time max. 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	150	150	150	150	250	400	nS
Junction capacitance typ. @ V_R = 5V , f = 1MHz	C_j	120	120	120	120	170	170	ρF

THERMAL CHARACTERISTICS

	Symbol	1N5415 3SF05	1N5416 3SF1	1N5417 3SF2	1N5418 3SF4	1N5419 3SF5	1N5420 3SF6	Unit
Thermal resistance - junction to lead Lead length = 0.375"	$R_{\theta JL}$	←		20			→	°C/W
Lead length = 0.0"	$R_{\theta JL}$	←		4			→	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	←		75			→	°C/W

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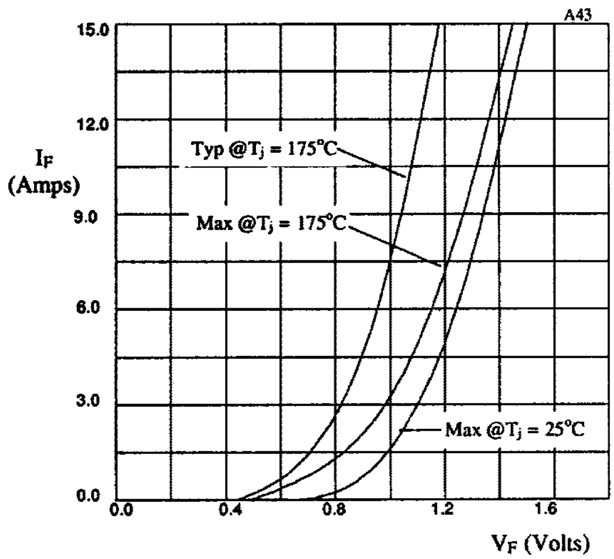

Fig 1. Forward voltage drop as a function of forward current.

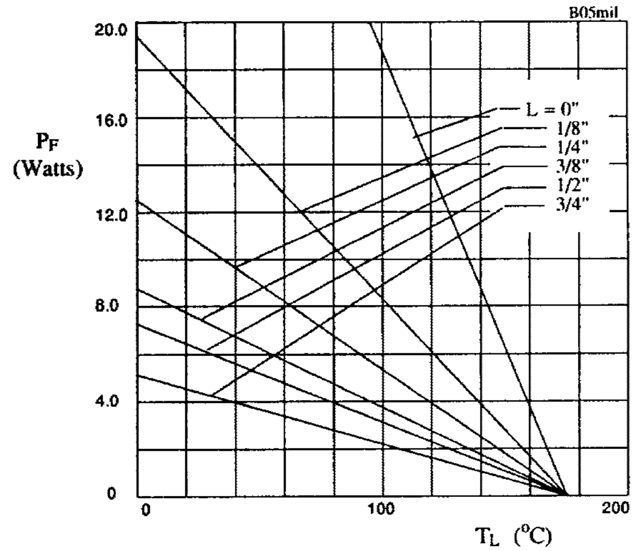

Fig 2. Maximum power versus lead temperature.

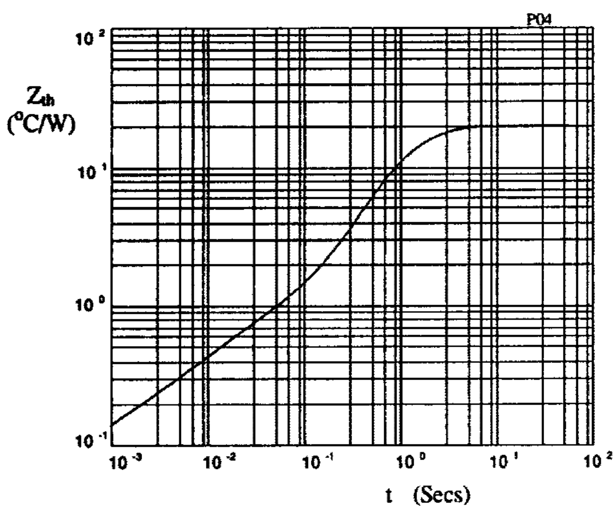

Fig 3. Transient thermal impedance characteristic.

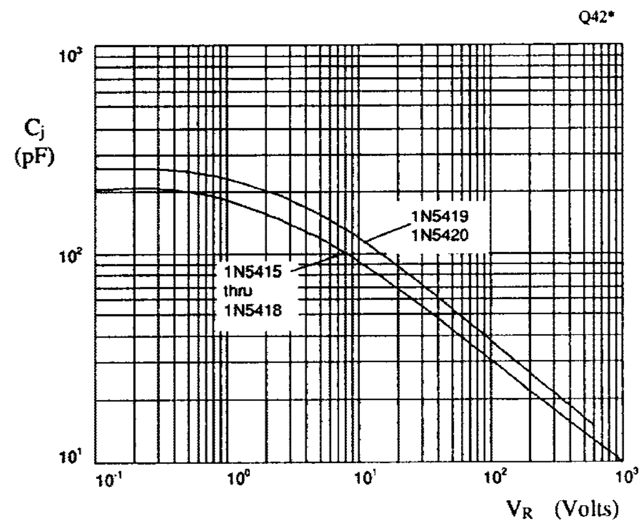

Fig 4. Typical junction capacitance as a function of reverse voltage.

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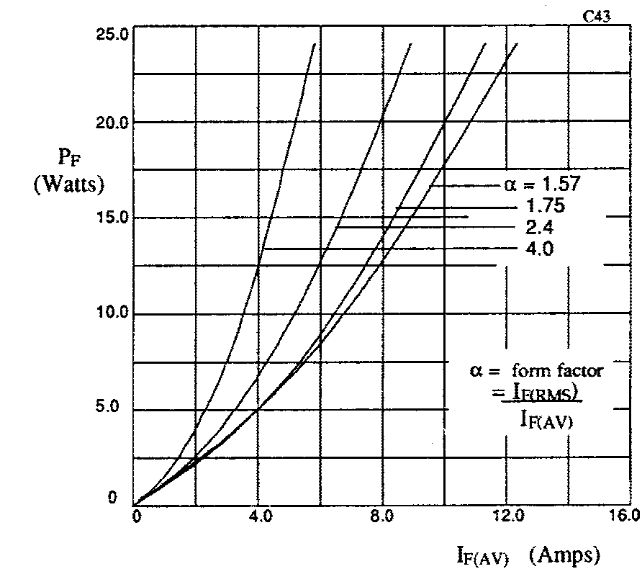

Fig 5. Forward power dissipation as a function of forward current, for sinusoidal operation.

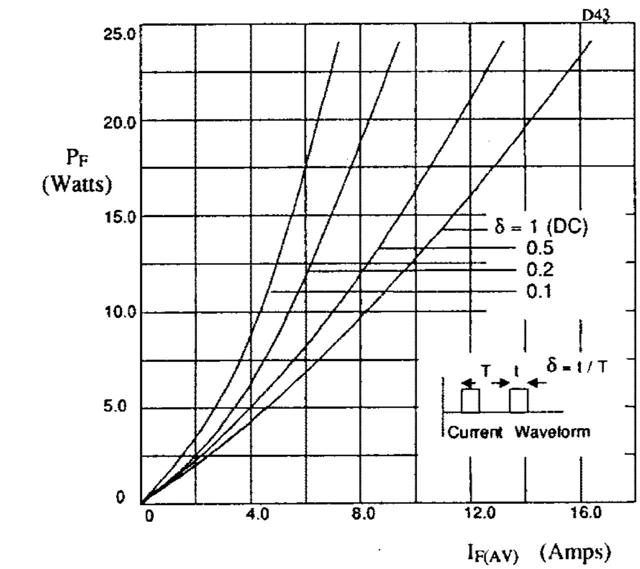

Fig 6. Forward power dissipation as a function of forward current, for square wave operation.

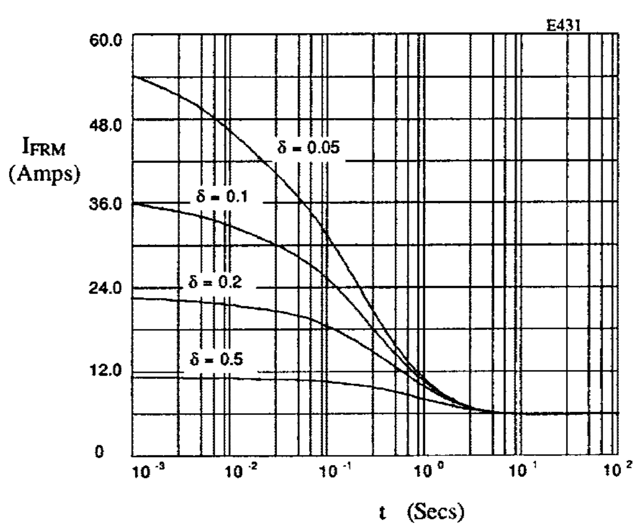

Fig 7. Typical repetitive forward current as a function of pulse width at 55°C; $R_{\theta JL}$ = 20 °C/W; V_{RWM} during 1 - δ.

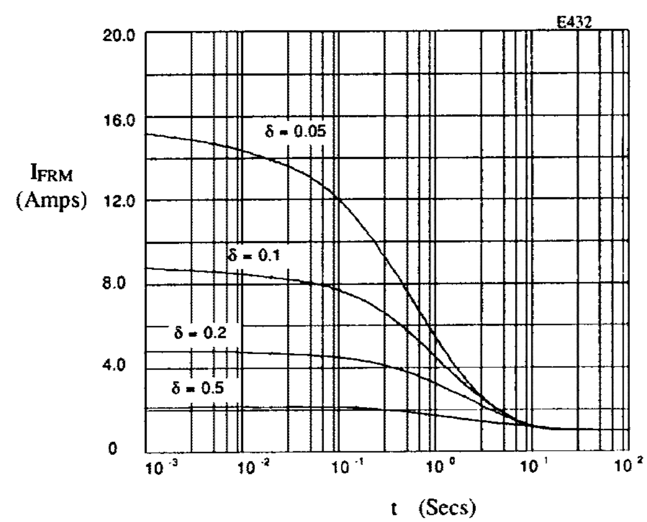

Fig 8. Typical repetitive forward current as a function of pulse width at 100°C; $R_{\theta JL}$ = 80 °C/W; V_{RWM} during 1 - δ.