

**POWER DISCRETES**
**Description**

Quick reference data

$$V_R = 50 - 600V$$

$$I_F = 4.5A$$

$$t_{rr} = 150 - 400nS$$

$$I_R = 1.0\mu A$$

**Features**

- ◆ Very low reverse recovery time
- ◆ Hermetically sealed non-cavity construction.
- ◆ Low switching losses
- ◆ Low forward voltage drop
- ◆ Soft, non-snap off, recovery characteristics
- ◆ Capable of withstanding temperature cycle conditions from -180°C to +130°C for space critical programs.

These products are qualified to MIL-PRF-19500/411. They can be supplied fully released as JAN, JANTX, JANTXV and JANS versions.

**Absolute Maximum Ratings**

Electrical specifications @  $T_A = 25^\circ C$  unless otherwise specified.

	Symbol	1N5415 3SF05	1N5416 3SF1	1N5417 3SF2	1N5418 3SF4	1N5419 3SF5	1N5420 3SF6	Units
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 ( $t_p = 8.3mS$ @ $V_R$ & $T_{JMAX}$ ) ( $t_p = 8.3mS$ , @ $V_R$ & $25^\circ C$ )	$I_{FSM}$	80 150						A
Storage Temperature Range	$T_{STG}$	-65 to +175						°C

**POWER DISCRETES**
**Electrical Specifications**

	Symbol	1N5415 3SF05	1N5416 3SF1	1N5417 3SF2	1N5418 3SF4	1N5419 3SF5	1N5420 3SF6	Units
Average Forward Current max. for sine wave, $T_A = 55^\circ\text{C}$	$I_{F(AV)}$	3.0						A
Average Forward Current max. ( $T_L = 55^\circ\text{C}$ ; $L = 3/8"$ ) for sine wave	$I_{F(AV)}$	4.4						A
for square wave	$I_{F(AV)}$	4.5						A
Pt for fusing ( $t = 8.3\text{mS}$ ) max	Pt	90						A <sup>2</sup> S
Forward Voltage Drop max. @ $I_F = 3.0\text{A}$ , $T_j = 25^\circ\text{C}$	$V_F$	1.1						V
Reverse Current max. @ $V_{RWM}$ , $T_j = 25^\circ\text{C}$ @ $V_{RWM}$ , $T_j = 100^\circ\text{C}$	$I_R$ $I_R$	1.0 20						$\mu\text{A}$
Reverse Recovery Time max. 0.5A $I_F$ to 1.0A $I_{RM}$ recovers to 0.25A $I_{RM(REC)}$	trr	150	150	150	150	250	400	nS
Junction Capacitance typ. @ $V_R = 4\text{V}$ , $f = 1\text{MHz}$	Cj	550	430	250	165	140	120	pF

**Thermal Characteristics**

	Symbol	1N5415 3SF05	1N5416 3SF1	1N5417 3SF2	1N5418 3SF4	1N5419 3SF5	1N5420 3SF6	Units
Thermal Resistance-Junction to Lead Lead length = 0.375"	$R_{\theta JL}$	20						$^\circ\text{C/W}$
Lead length = 0.0"	$R_{\theta JL}$	4						$^\circ\text{C/W}$
Thermal Resistance-Junction to Ambient on 0.06" thick pcb. 1 oz. copper	$R_{\theta JA}$	75						$^\circ\text{C/W}$

**Application Note**

These diodes are capable of withstanding 20 cycles of Temperature Cycling from  $-180^\circ\text{C}$  to  $+130^\circ\text{C}$  for for Space Critical Programs. Semtech is also able to offer this test condition as a 100% Screening Option. A full Summary Data Report is available on request. Please consult the factory for details.

POWER DISCRETES

Typical Characteristics

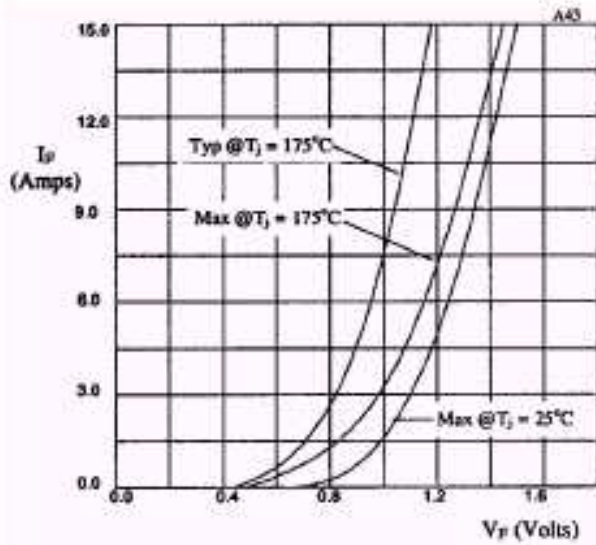


Fig 1. Forward voltage drop as a function of forward current.

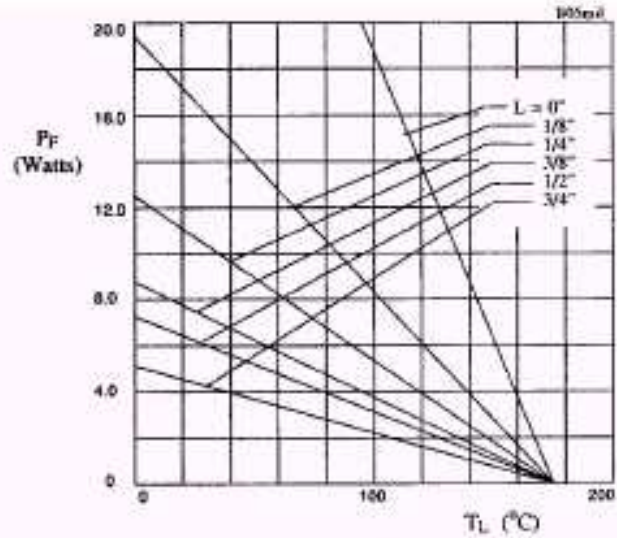


Fig 2. Maximum power versus lead temperature.

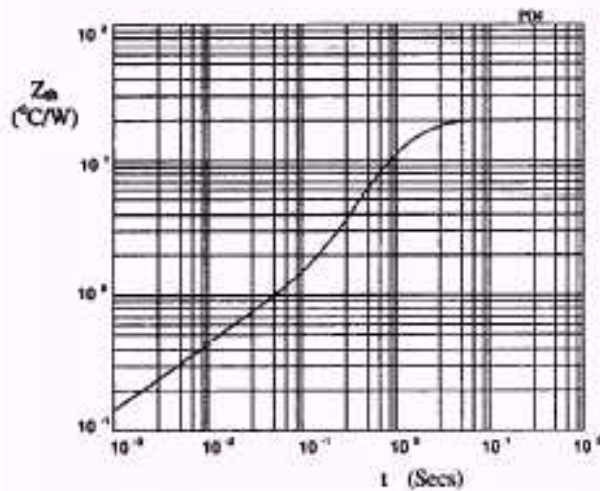


Fig 3. Transient thermal impedance characteristic.

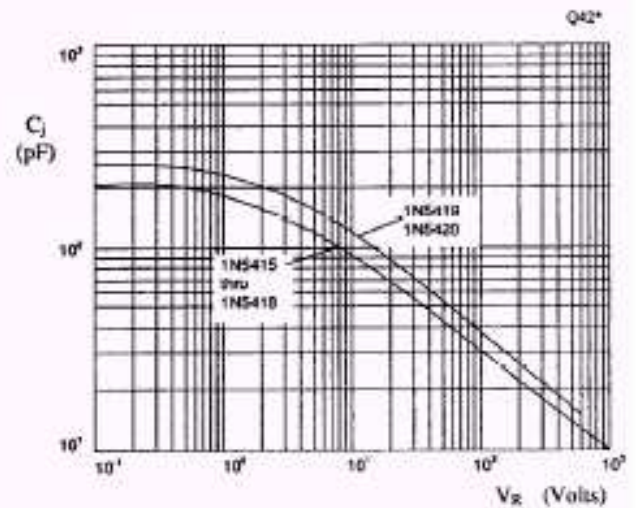


Fig 4. Typical junction capacitance as a function of reverse voltage.

**POWER DISCRETES**  
Typical Characteristics

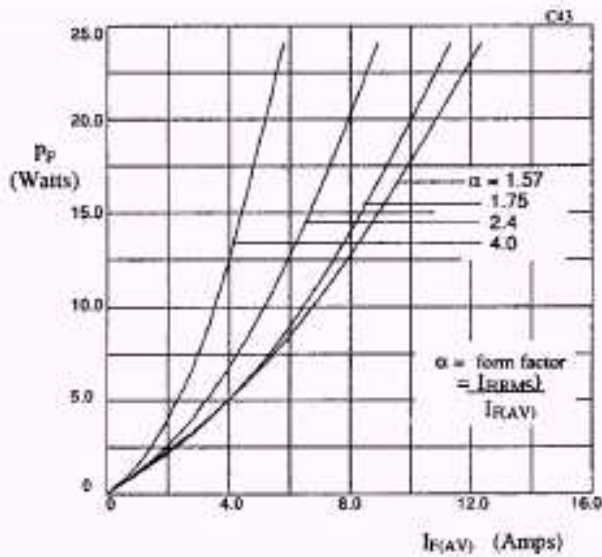


Fig 5. Forward power dissipation as a function of forward current, for sinusoidal operation.

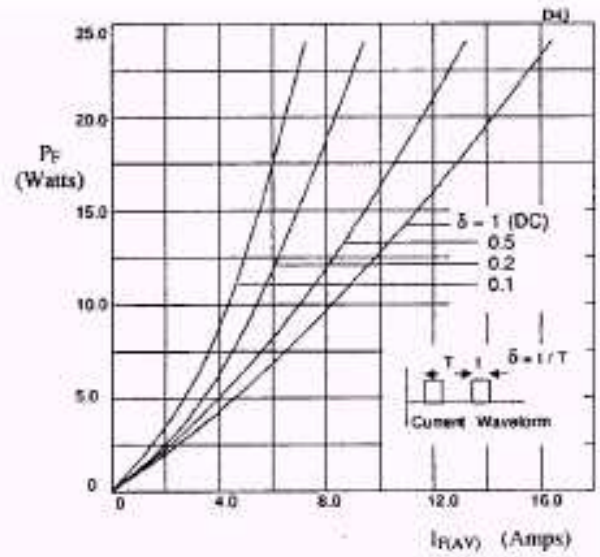


Fig 6. Forward power dissipation as a function of forward current, for square wave operation.

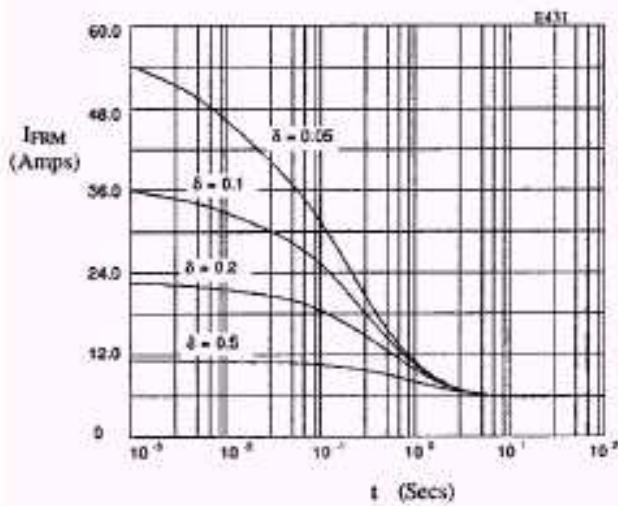


Fig 7. Typical repetitive forward current as a function of pulse width at 55°C;  $R_{\theta JL} = 20^\circ\text{C/W}$ ;  $V_{RWM}$  during  $1 - \delta$ .

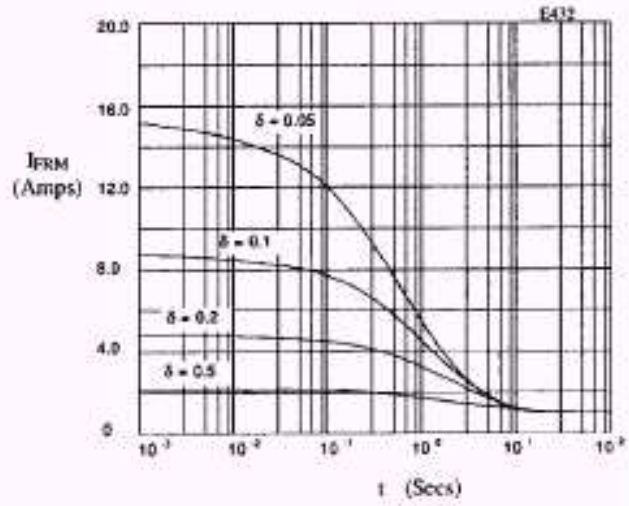


Fig 8. Typical repetitive forward current as a function of pulse width at 100°C;  $R_{\theta JL} = 80^\circ\text{C/W}$ ;  $V_{RWM}$  during  $1 - \delta$ .

**POWER DISCRETES**

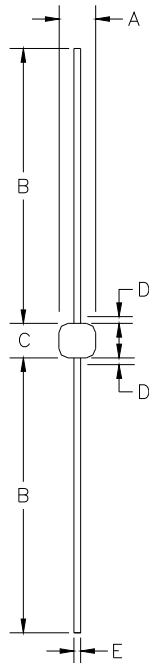
**Ordering Information**

Part Number	Description
1N5415	Axial leaded hermetically sealed <sup>(1)</sup>
1N5416	
1N5417	
1N5418	
1N5419	
1N5420	
3SF05	
3SF1	
3SF2	
3SF4	
3SF5	
3SF6	

Note:

(1) Available in bulk and tape and reel packaging. Please consult factory for quantities.

**Outline Drawing**



G4

DIM <sup>N</sup>	Dimensions				Note
	Inches		Millimeters		
	MIN	MAX	MIN	MAX	
A	0.135	0.18	3.43	4.57	-
B	0.9	1.3	22.9	33.0	-
C	0.13	0.17	3.3	4.32	-
D	-	0.05	-	1.27	1
E	0.036	0.042	0.91	1.07	-

Note:

(1) Lead diameter uncontrolled over this region.

Weight = 0.04oz

**Contact Information**

Semtech Corporation  
Power Discretes Products Division  
200 Flynn Road, Camarillo, CA 93012  
Phone: (805)498-2111 FAX (805)498-3804