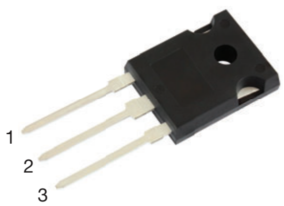
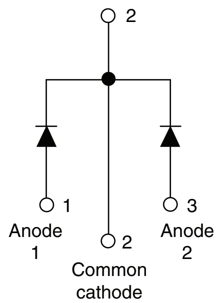
Ultrafast Rectifier, 2 x 30 A FRED Pt®



TO-247AD 3L



FEATURES

- Ultrafast recovery time
- Low forward voltage drop
- 175 °C operating junction temperature
- Designed and qualified according to commercial qualification
- AEC-Q101 qualified, meets JESD 201 class 2 whisker test
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
e3
RoHS
COMPLIANT
HALOGEN
FREE

DESCRIPTIONS / APPLICATIONS

VS-CPU60... series are the state of the art ultrafast recovery rectifiers designed with optimized performance of forward voltage drop and ultrafast recovery time.

The planar structure and the platinum doped life time control guarantee the best overall performance, ruggedness and reliability characteristics.

These devices are intended for use in the output rectification stage of SMPS, UPS, DC/DC converters as well as freewheeling diodes in low voltage inverters and chopper motor drives.

Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

PRODUCT SUMMARY	
Package	TO-247AD 3L
$I_{F(AV)}$	2 x 30 A
V_R	600 V
V_F at I_F	1.75 V
t_{rr} typ.	26 ns
T_J max.	175 °C
Diode variation	Common cathode

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Repetitive peak reverse voltage	V_{RRM}		600	V
Average rectified forward current per leg	$I_{F(AV)}$	T_C = 131 °C	30	A
Non-repetitive peak surge current per leg	I_{FSM}	T_C = 25 °C, t_p = 8.3 ms half sine wave; connecting two anode pins	250	
Operating junction and storage temperatures	T_J, T_{Stg}		-55 to +175	°C

ELECTRICAL SPECIFICATIONS (T_J = 25 °C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	V_{BR}, V_R	I_R = 100 μA	600	-	-	V
Forward voltage	V_F	I_F = 30 A	-	1.4	1.75	
		I_F = 30 A, T_J = 150 °C	-	1.1	1.4	
Reverse leakage current	I_R	V_R = V_R rated	-	0.02	30	μA
		T_J = 150 °C, V_R = V_R rated	-	30	200	
Junction capacitance	C_T	V_R = 600 V	-	20	-	pF

DYNAMIC RECOVERY CHARACTERISTICS (T_J = 25 °C unless otherwise specified)							
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**MIN.**	**TYP.**	**MAX.**	**UNITS**
Reverse recovery time	t_{rr}	I_F = 1.0 A, dI_F/dt = 100 A/μs, V_R = 30 V		-	26	-	ns
		T_J = 25 °C	I_F = 30 A dI_F/dt = -200 A/μs V_R = 200 V	-	42	-	
		T_J = 125 °C		-	100	-	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	5	-	A
		T_J = 125 °C		-	10	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	125	-	nC
		T_J = 125 °C		-	580	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Maximum junction and storage temperature range	T_J, T_{Stg}		-55	-	175	°C
Thermal resistance, junction to case per leg	R_{thJC}		-	0.7	1	°C/W
Thermal resistance, junction to ambient per leg	R_{thJA}	Typical socket mount	-	-	70	
Thermal resistance, case to heat sink	R_{thCS}	Mounting surface, flat, smooth and greased	-	0.5	-	
Weight			-	6.0	-	g
			-	0.21	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style TO-247AD 3L	CPU6006LH			

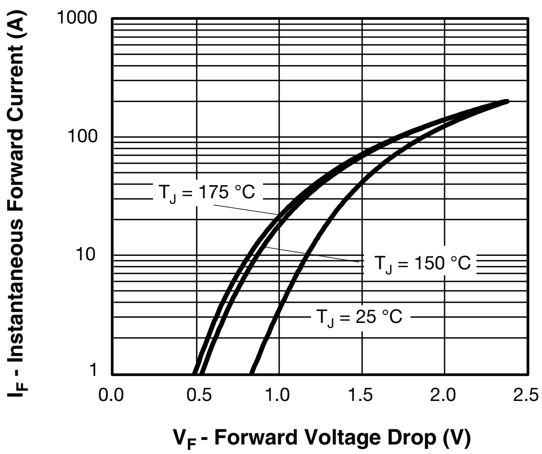


Fig. 1 - Typical Forward Voltage Drop Characteristics

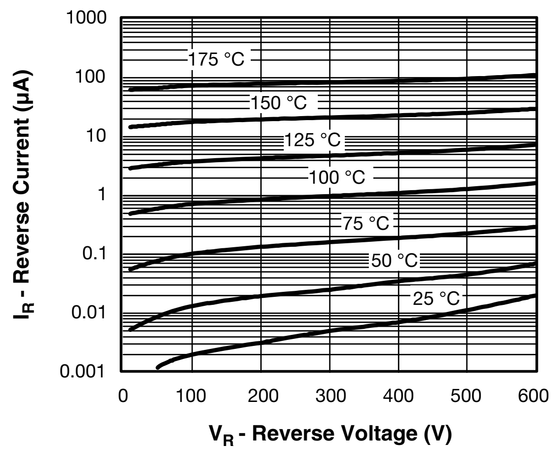


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

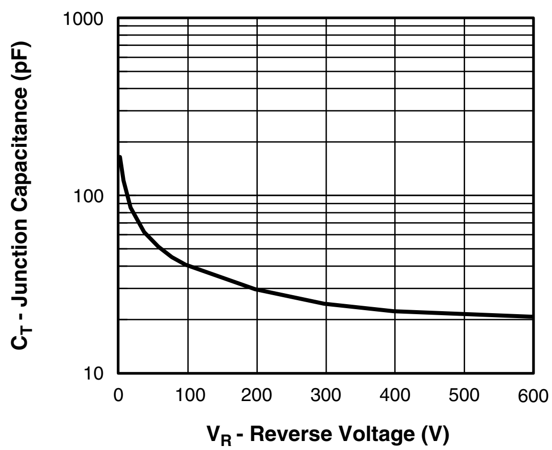


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

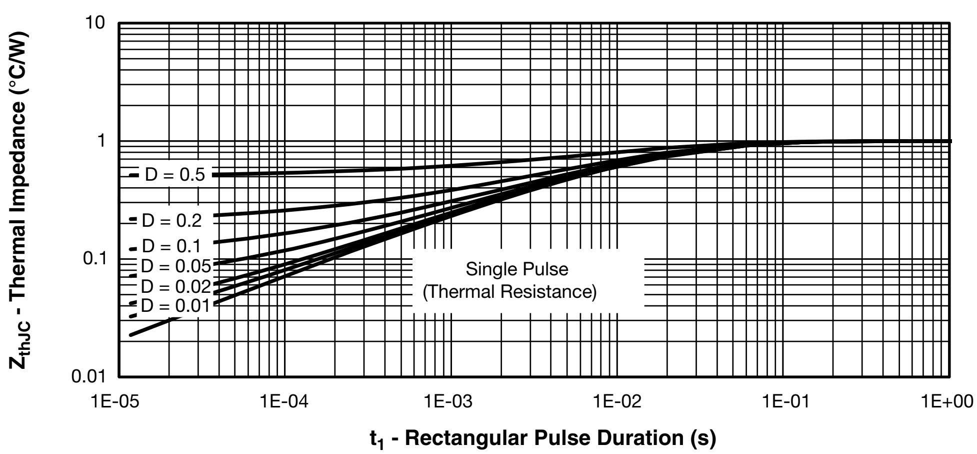


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

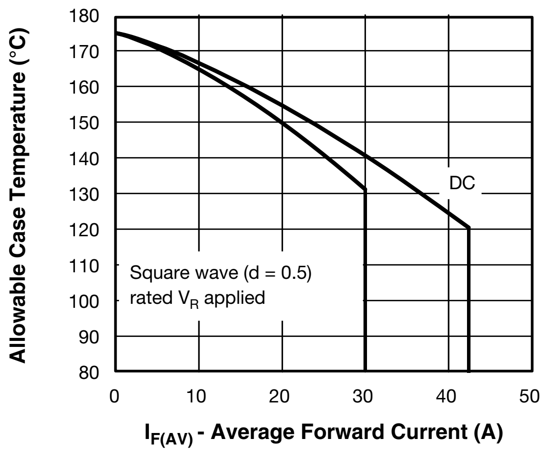


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

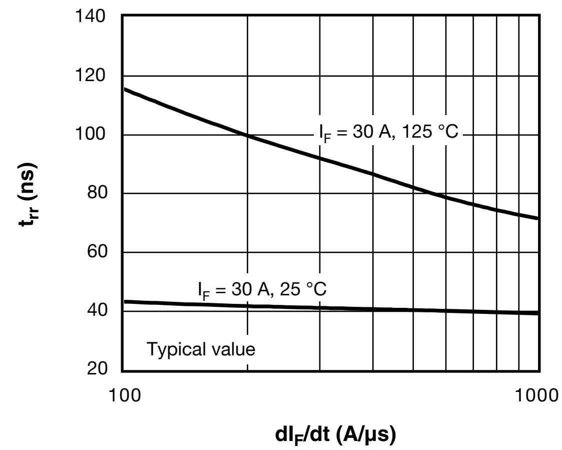


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

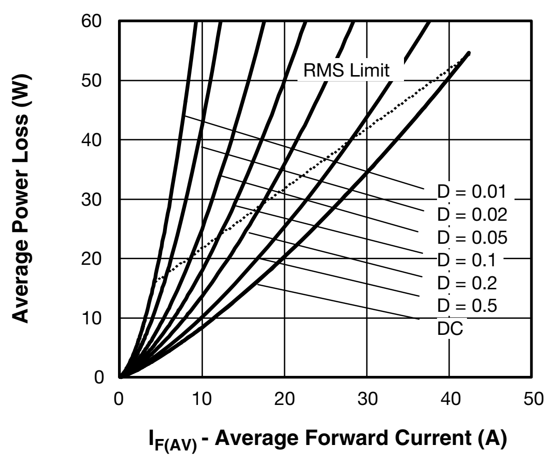


Fig. 6 - Forward Power Loss Characteristics

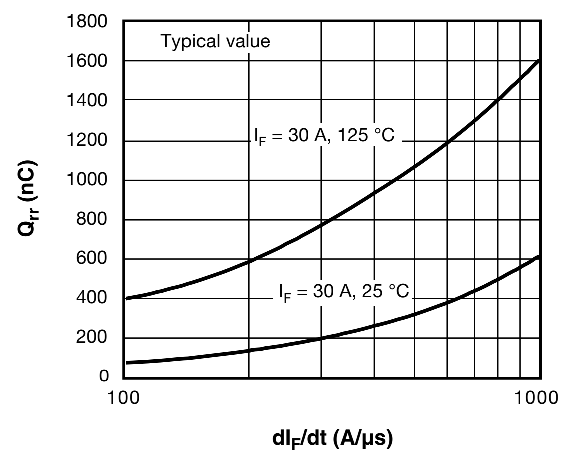
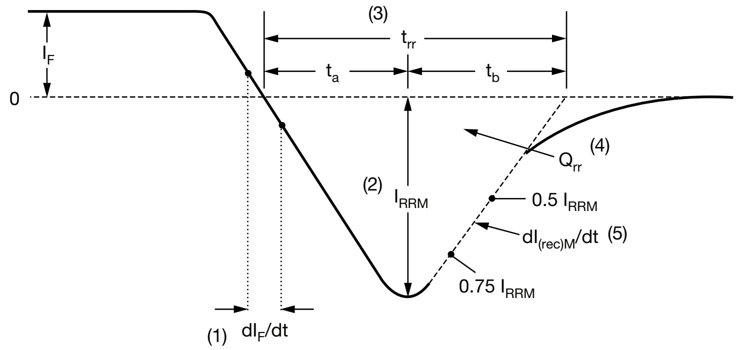


Fig. 8 - Typical Stored Charge vs. dI_F/dt

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
Pd_{REV} = inverse power loss = $V_{R1} \times I_R$ (1 - D); I_R at V_{R1} = rated V_R



(1) dI_F/dt - rate of change of current through zero crossing

(2) I_{RRM} - peak reverse recovery current

(3) t_{rr} - reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through 0.75 I_{RRM} and 0.50 I_{RRM} extrapolated to zero current.

(4) Q_{rr} - area under curve defined by t_{rr} and I_{RRM}

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

(5) $dI_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

Fig. 9 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code	VS-	C	P	U	60	06	L	H	N3
	1	2	3	4	5	6	7	8	9

- **1** - Vishay Semiconductors product
- **2** - Circuit configuration:
  C = common cathode
- **3** - P = TO-247
- **4** - U = ultrafast recovery time
- **5** - Current code (60 = 2 x 30 A)
- **6** - Voltage code (06 = 600 V)
- **7** - L = long lead
- **8** - H = AEC-Q101 qualified
- **9** - Environmental digit:
  N3 = halogen-free, RoHS-compliant, and totally lead (Pb)-free

ORDERING INFORMATION (Example)

PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-CPU6006LHN3	25	500	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS		
Dimensions	TO-247AD 3L	www.vishay.com/doc?95626
Part marking information	TO-247AD 3L	www.vishay.com/doc?95007

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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

Как с нами связаться

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