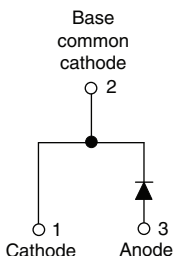
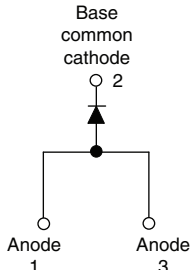


Ultrafast Soft Recovery Diode, 60 A FRED Pt®


TO-247AC 2L

VS-60EPU06-N3

TO-247AC 3L

VS-60APU06-N3

FEATURES

- Ultrafast recovery time
- Low forward voltage drop
- 175 °C operating junction temperature
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

BENEFITS

- Reduced RFI and EMI
- Higher frequency operation
- Reduced snubbing
- Reduced parts count

DESCRIPTION / APPLICATIONS

These diodes are optimized to reduce losses and EMI/RFI in high frequency power conditioning systems.

The softness of the recovery eliminates the need for a snubber in most applications. These devices are ideally suited for HF welding, power converters and other applications where switching losses are not significant portion of the total losses.

PRIMARY CHARACTERISTICS

$I_{F(AV)}$	60 A
V_R	600 V
V_F at I_F	1.11 V
t_{rr} typ.	See Recovery table
T_J max.	175 °C
Package	TO-247AC 2L, TO-247AC 3L
Circuit configuration	Single

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode voltage	V_R		600	V
Continuous forward current	$I_{F(AV)}$	$T_C = 116\text{ °C}$	60	A
Single pulse forward current	I_{FSM}	$T_C = 25\text{ °C}$, $t_p = 10\text{ ms}$	600	
Maximum repetitive forward current	I_{FRM}	Square wave, 20 kHz	120	
Operating junction and storage temperatures	T_J , T_{Stg}		-55 to +175	°C

ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ °C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	V_{BR} , V_R	$I_R = 100\text{ }\mu\text{A}$	600	-	-	V
Forward voltage	V_F	$I_F = 60\text{ A}$	-	1.35	1.68	
		$I_F = 60\text{ A}$, $T_J = 125\text{ °C}$	-	1.20	1.42	
		$I_F = 60\text{ A}$, $T_J = 175\text{ °C}$	-	1.11	1.30	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	-	50	μA
		$T_J = 150\text{ °C}$, $V_R = V_R$ rated	-	-	500	
Junction capacitance	C_T	$V_R = 600\text{ V}$	-	39	-	pF

DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t_{rr}	$I_F = 1\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	34	45	ns
		$T_J = 25^\circ\text{C}$	-	81	-	
		$T_J = 125^\circ\text{C}$	-	164	-	
Peak recovery current	I_{RRM}	$T_J = 25^\circ\text{C}$	-	7.4	-	A
		$T_J = 125^\circ\text{C}$	-	17.0	-	
Reverse recovery charge	Q_{rr}	$T_J = 25^\circ\text{C}$	-	300	-	nC
		$T_J = 125^\circ\text{C}$	-	1394	-	

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	R_{thJC}		-	-	0.63	K/W
Thermal resistance, junction to ambient per leg	R_{thJA}	Typical socket mount	-	-	40	$^\circ\text{C}/\text{W}$
Thermal resistance, case to heatsink	R_{thCS}	Mounting surface, flat, smooth, and greased	-	0.2	-	K/W
Weight			-	5.5	-	g
			-	0.2	-	oz.
Mounting torque			1.2	-	2.4	N · m
			10	-	20	lbf · in
Marking device		Case style TO-247AC 2L	60EPU06			
		Case style TO-247AC 3L	60APU06			

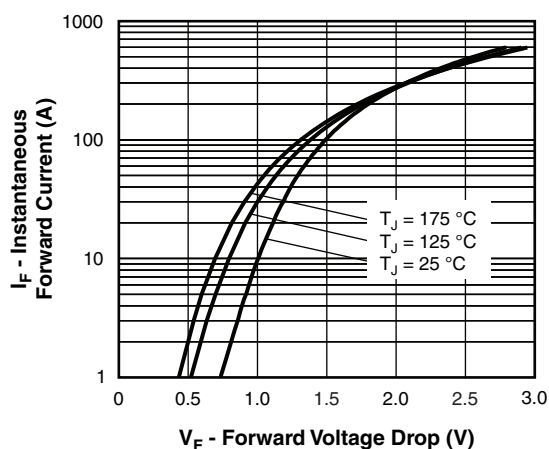


Fig. 1 - Typical Forward Voltage Drop Characteristics

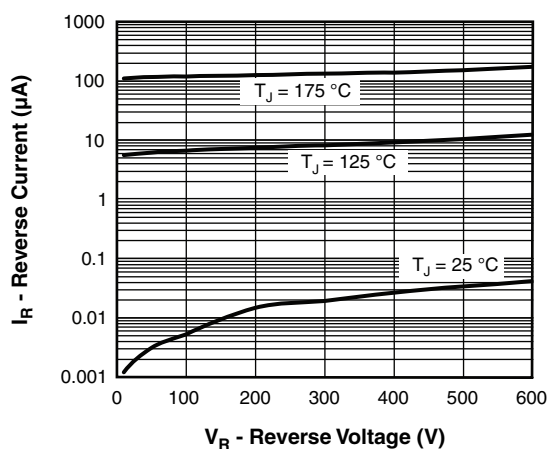


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

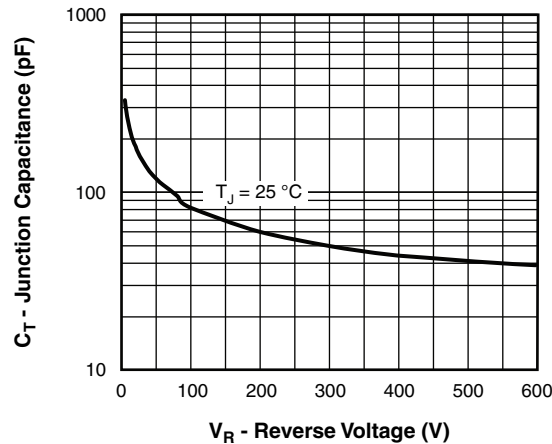


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

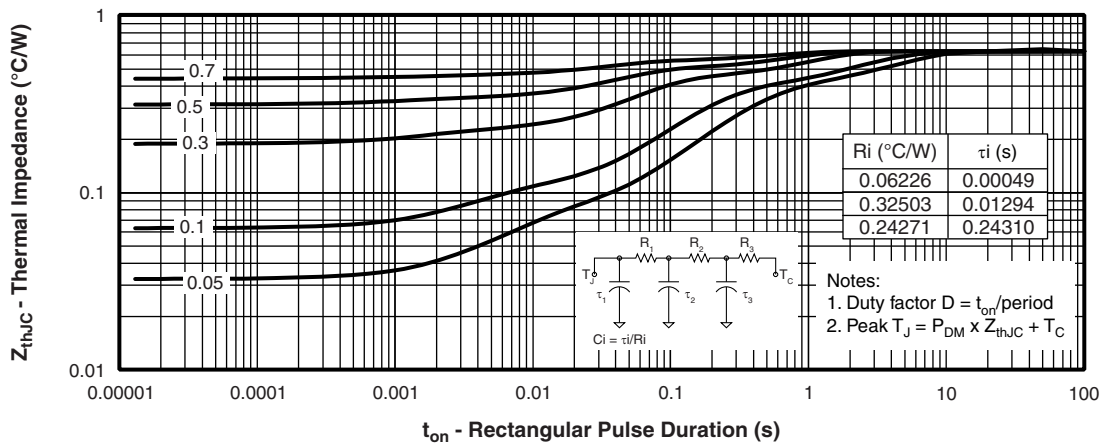
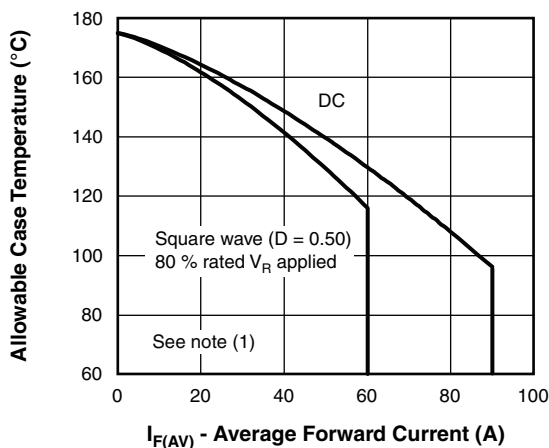

Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics


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

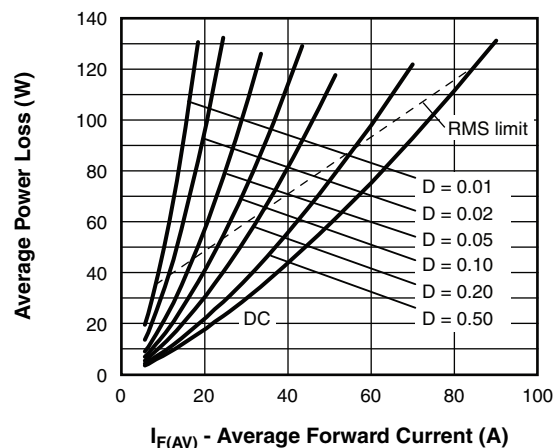


Fig. 6 - Forward Power Loss Characteristics

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 P_d = forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 P_{dREV} = inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at $V_{R1} = 80\%$ rated V_R

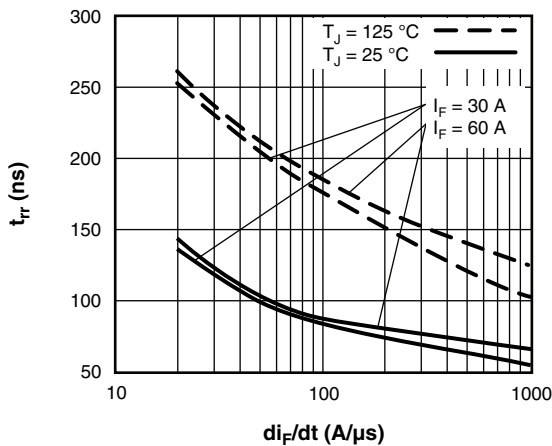
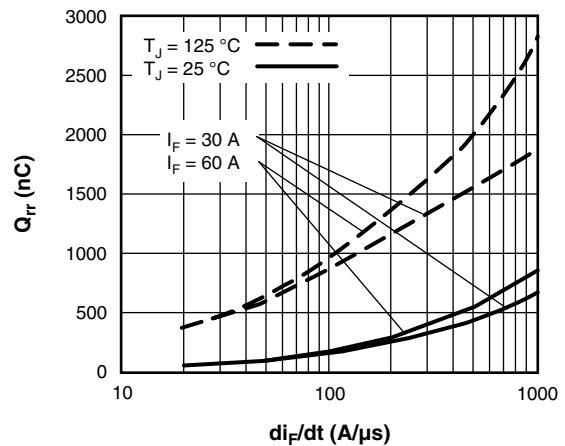
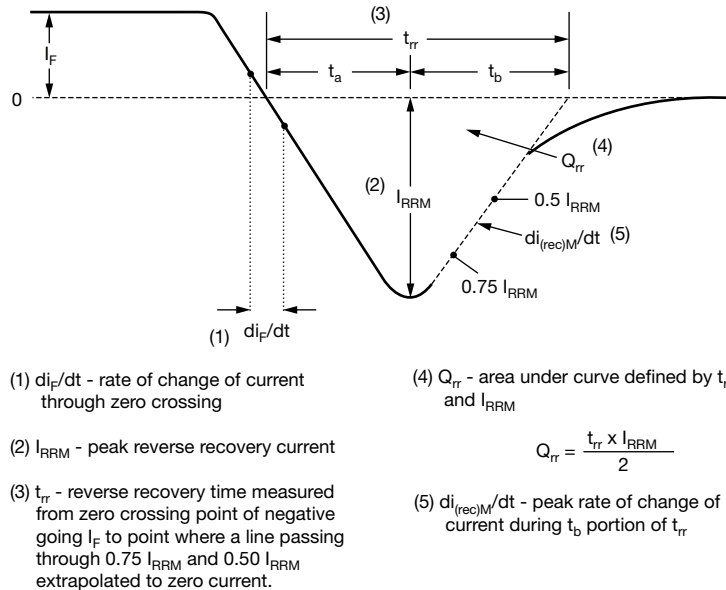

Fig. 7 - Typical Reverse Recovery Time vs. di_F/dt

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


Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code	VS-	60	E	P	U	06	-N3
	1	2	3	4	5	6	7
1	-	Vishay Semiconductors product					
2	-	Current rating (60 = 60 A)					
3	-	Circuit configuration:					
		• E = single diode, 2 pins					
		• A = single diode, 3 pins					
4	-	Package:					
		P = TO-247AC					
5	-	Type of silicon:					
		U = ultrafast recovery					
6	-	Voltage rating (06 = 600 V)					
7	-	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-60EPU06-N3	25	500	Antistatic plastic tube
VS-60APU06-N3	25	500	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS

Dimensions	TO-247AC 2L	www.vishay.com/doc?96144
	TO-247AC 3L	www.vishay.com/doc?96138
Part marking information	TO-247AC 2L	www.vishay.com/doc?95648
	TO-247AC 3L	www.vishay.com/doc?95007



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