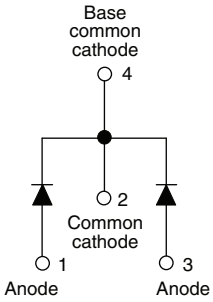
Ultrafast Rectifier, 2 x 3 A FRED Pt®

DPAK (TO-252AA)



FEATURES

- Ultrafast recovery time
- Low forward voltage drop
- Low leakage current
- 175 °C operating junction temperature
- AEC-Q101 qualified
- Meets JESD 201 class 2 whisker test
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 3 A
V_R	200 V
V_F at I_F	0.9 V
t_{rr} typ.	See Recovery table
T_J max.	175 °C
Package	DPAK (TO-252AA)
Circuit configuration	Common cathode

DESCRIPTION / APPLICATIONS

VS-MURD620CTHM3 is the state of the art ultrafast recovery rectifier specifically 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 diode 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.

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Peak repetitive reverse voltage	V_{RRM}		200	V
Average rectified forward current per device	$I_{F(AV)}$	Total device, rated V_R, T_C = 146 °C	6	A
Non-repetitive peak surge current	I_{FSM}		50	
Peak repetitive forward current per diode	I_{FM}	Rated V_R, square wave, 20 kHz, T_C = 146 °C	6	
Operating junction and storage temperatures	T_J, T_{Stg}		-65 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	200	-	-	V
Forward voltage	V_F	I_F = 3 A	-	0.9	1.0	
		I_F = 3 A, T_J = 125 °C	-	0.78	0.96	
		I_F = 6 A	-	1	1.2	
		I_F = 6 A, T_J = 125 °C	-	0.89	1.13	
Reverse leakage current	I_R	V_R = V_R rated	-	-	5	µA
		T_J = 125 °C, V_R = V_R rated	-	-	250	
Junction capacitance	C_T	V_R = 200 V	-	12	-	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	8.0	-	nH

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 = 50 A/μs, V_R = 30 V		-	20	35	ns
		T_J = 25 °C	I_F = 3 A dI_F/dt = 200 A/μs V_R = 160 V	-	19	-	
		T_J = 125 °C		-	26	-	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	3.1	-	A
		T_J = 125 °C		-	4.6	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	30	-	nC
		T_J = 125 °C		-	60	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Maximum junction and storage temperature range	T_J, T_{Stg}		-65	-	175	°C
Thermal resistance, junction to case per leg	R_{thJC}		-	-	9.0	°C/W
Thermal resistance, junction to ambient per leg	R_{thJA}		-	-	80	
Thermal resistance, case to heatsink	R_{thCS}	Mounting surface, flat, smooth, and greased	-	-	-	
Weight			-	0.3	-	g
			-	0.01	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style DPAK (TO-252AA)	MURD620CTH			

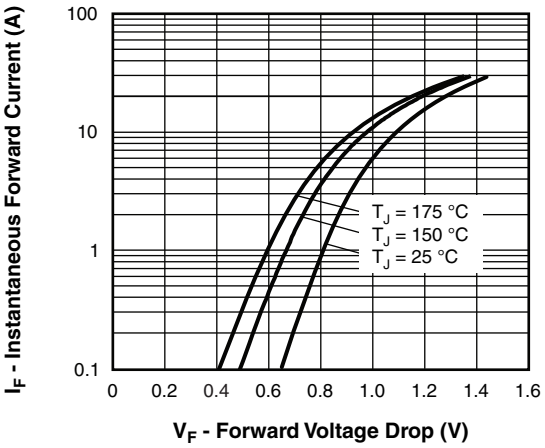


Fig. 1 - Typical Forward Voltage Drop Characteristics

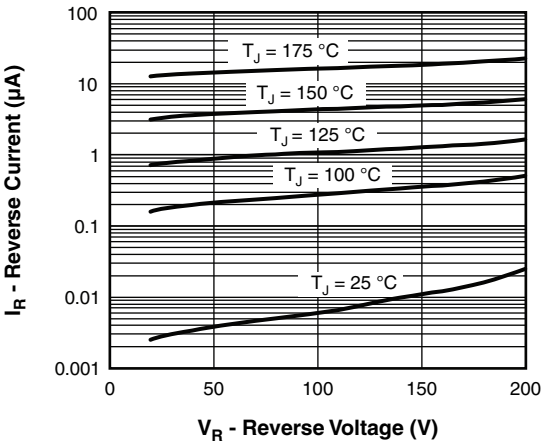


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

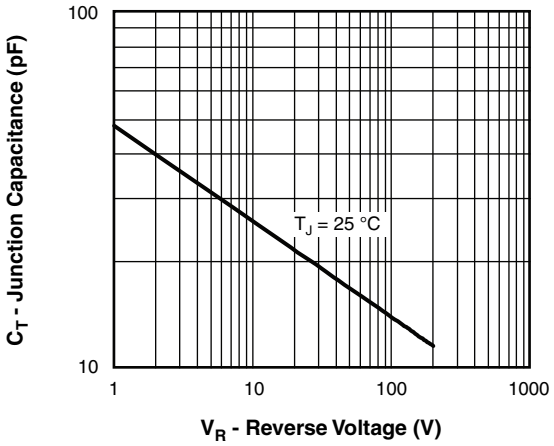


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

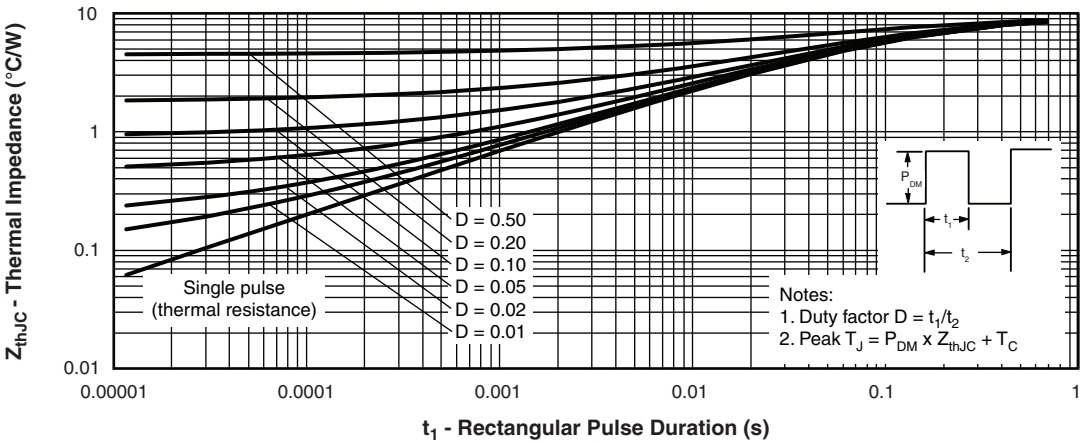


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

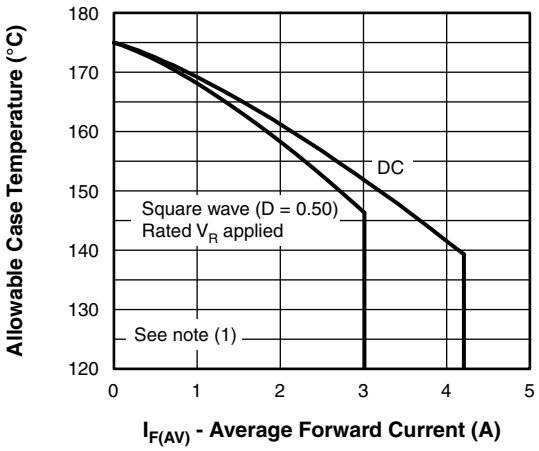


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

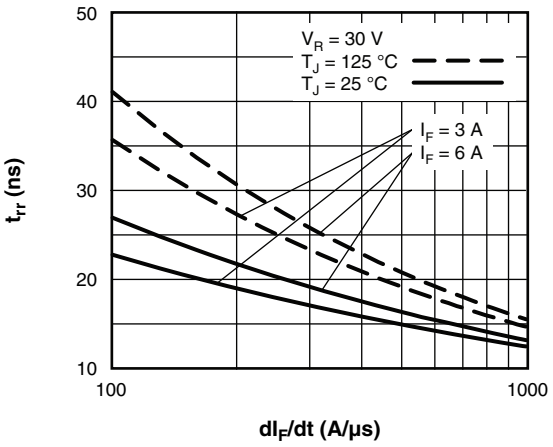


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

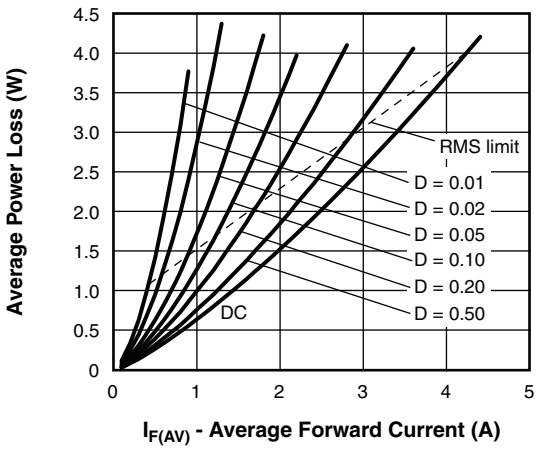


Fig. 6 - Forward Power Loss Characteristics

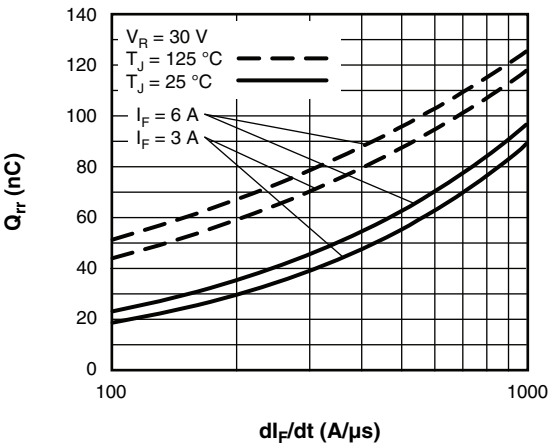


Fig. 8 - Typical Stored Charge vs. dI_F/dt

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

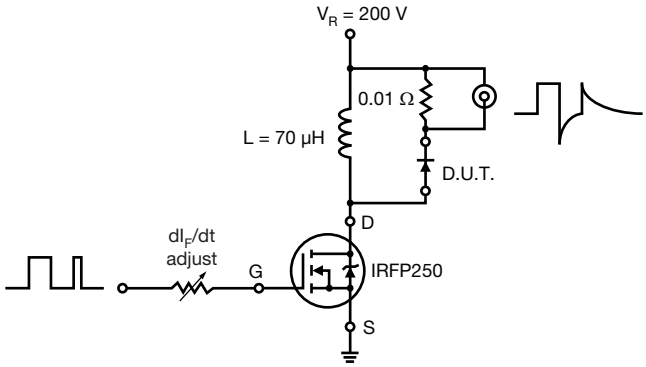
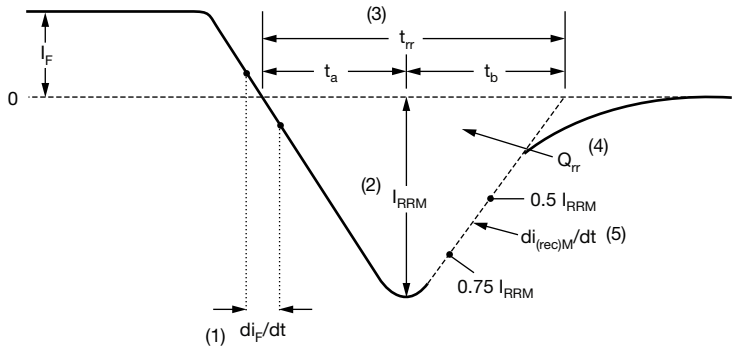


Fig. 9 - Reverse Recovery Parameter Test Circuit



(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. 10 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code

VS-	MUR	D	6	20	CT	TRL	H	M3
1	2	3	4	5	6	7	8	9

1 - Vishay Semiconductors product
2 - Ultrafast MUR series
3 - D = DPAK
4 - Current rating (6 = 6 A)
5 - Voltage rating (20 = 200 V)
6 - CT = center tap (dual)
7 - Tape and reel suffix
8 - H = AEC-Q101 qualified
9 - Environmental digit:
M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

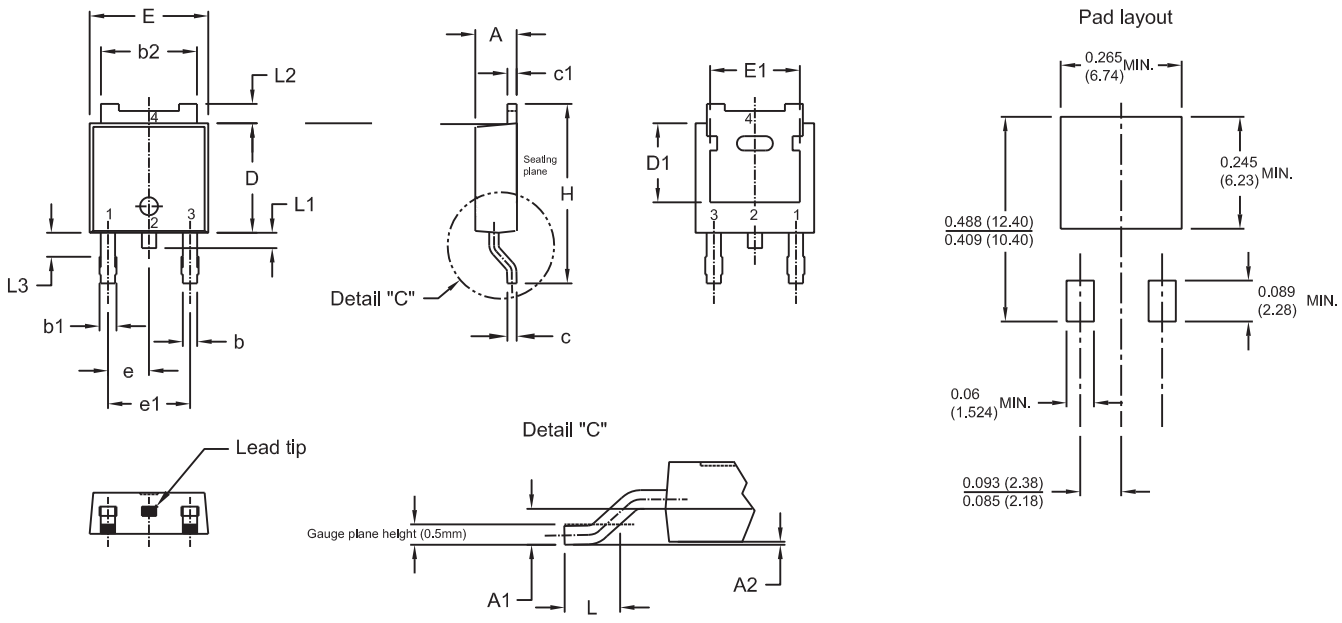
TR = tape and reel
TRL = tape and reel (left oriented)
TRR = tape and reel (right oriented)

ORDERING INFORMATION (Example)			
PREFERRED P/N	**QUANTITY PER T/R**	**MINIMUM ORDER QUANTITY**	**PACKAGING DESCRIPTION**
VS-MURD620CTHM3	75	3000	Antistatic plastic tube
VS-MURD620CTTRHM3	2000	2000	13" diameter reel
VS-MURD620CTTRLHM3	3000	3000	13" diameter reel
VS-MURD620CTTRRHM3	3000	3000	13" diameter reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95519
Part marking information	www.vishay.com/doc?95518
Packaging information	www.vishay.com/doc?95033

D-PAK (TO-252AA)

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES	SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.			MIN.	MAX.	MIN.	MAX.	
A	2.21	2.38	0.087	0.094		A1	0.89	1.14	0.035	0.045	
A2	0.03	0.127	0.001	0.005		H	9.65	10.41	0.380	0.410	
b	0.71	0.88	0.028	0.035		L	1.40	1.78	0.055	0.070	
b1	0.76	1.14	0.030	0.045		e	2.28 BSC		0.09 BSC		
b2	5.23	5.44	0.206	0.214		e1	4.57 BSC		0.18 BSC		
C	0.46	0.58	0.018	0.023		L1	0.64	1.02	0.025	0.040	
C1	0.46	0.58	0.018	0.023		L2	0.89	1.27	0.035	0.050	
D	5.97	6.22	0.235	0.2455		L3	1.15	1.52	0.040	0.060	
D1	4.32	4.45	0.170	0.175							
E	6.48	6.73	0.255	0.2655							
E1	4.49	5.50	0.177	0.217							

Notes

(1) Dimensioning and tolerancing as per ASME Y14.5M-1994
(2) Lead dimension uncontrolled in L3 only for reference
(3) Dimension D1, E1, L2 and b2 establish a minimum mounting surface for thermal pad
(4) Dimensions D and E do not include mold flash.
(5) Outline conforms to JEDEC outline TO-252AA

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