

# Ultra-Fast Soft Recovery Diode Module

## Description

Ultra-FRD module devices are optimized to reduce losses and EMI/RFI in high frequency power conditioning electrical systems. These diode modules are ideally suited for power converters, motors drives and other applications where switching losses are significant portion of the total losses.

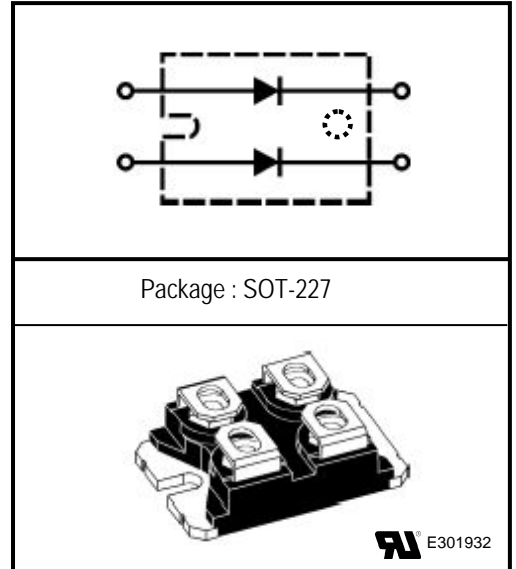
## Features

- ☞ Repetitive Reverse Voltage :  $V_{RRM} = 400V$
- ☞ Low Forward Voltage Drop :  $V_F(\text{typ.}) = 1.35V$
- ☞ Average Forward Current :  $I_F(\text{AV.}) = 90A @ T_c = 100^\circ C$
- ☞ Ultra-Fast Reverse Recovery Time :  $t_{rr}(\text{typ.}) = 100 \text{ ns}$
- ☞ Extensive Characterization of Recovery Parameters
- ☞ Reduced EMI and RFI
- ☞ Isolation Type Package

## Applications

Motor Drives, Free wheel use, High Power Converters, Welders, Various Switching and Telecommunication Power Supply.

## Equivalent Circuit and Package



Package : SOT-227

E301932

Please see the package Out line information

## Absolute Maximum Ratings @ $T_j=25^\circ C$ (Per Leg)

Symbol	Parameter	Conditions	Ratings	Unit
$V_{RRM}$	Repetitive Peak Reverse Voltage		400	V
$V_{R(DC)}$	Reverse DC Voltage		320	V
$I_{F(AV)}$	Average Forward Current	Resistive Load	180 90	A A
$I_{FSM}$	Surge(non-repetitive) Forward Current	One Half Cycle at 60Hz, Peak Value	2000	A
$I^2t$	$I^2t$ for Fusing	Value for One Cycle Current, $t_w = 8.3ms, T_j = 25^\circ C$ Start	$7.1 \times 10^2$	$A^2s$
$T_j$	Junction Temperature		-40 ~ 150	$^\circ C$
$T_{stg}$	Storage Temperature		-40 ~ 125	$^\circ C$
$V_{isol}$	Isolation Voltage	@ AC 1 minutes	2500	V
$P_d$	Maximum Power Dissipation		250	W
-	Mounting Torque		1.45	N.m
-	Terminal Torque		1.45	N.m
-	Weight	Typical Including Screws	30	g

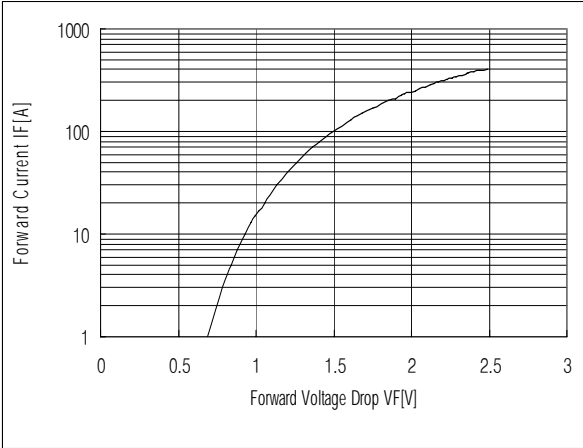
## Thermal Characteristics

Symbol	Parameter	Conditions	Values			Unit
			Min.	Typ.	Max.	
$R_{th(j-c)}$	Thermal Resistance	Junction to Case	-	-	0.5	$^{\circ}\text{C}/\text{W}$

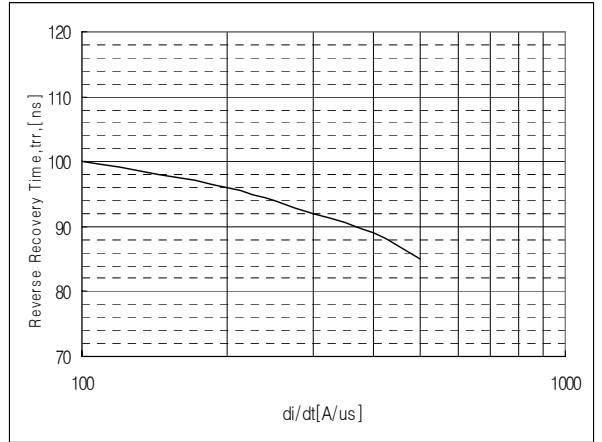
## Electrical Characteristics @ $T_j=25^{\circ}\text{C}$ (unless otherwise specified)

Symbol	Parameter	Conditions	Values			Unit	
			Min.	Typ.	Max.		
$V_R$	Cathode Anode Breakdown Voltage	$I_R = 100\mu\text{A}$	400	-	-	V	
$V_{FM}$	Maximum Forward Voltage	$I_{FM} = 90\text{A}, T_c = 25^{\circ}\text{C}$	-	1.35	1.6	V	
		$I_{FM} = 90\text{A}, T_c = 100^{\circ}\text{C}$	-	1.1	1.4	V	
$I_{RRM}$	Repetitive Peak Reverse Current	$T_c = 100^{\circ}\text{C}, V_{RRM}$ applied	-	-	1.0	mA	
$T_{rr}$	Reverse Recovery Time	$I_{FM} = 90\text{A}, V_R = 200\text{V}, di/dt = -100\text{A}/\mu\text{s}$	$T_c = 25^{\circ}\text{C}$	-	100	130	ns
			$T_c = 100^{\circ}\text{C}$	-	140	-	ns

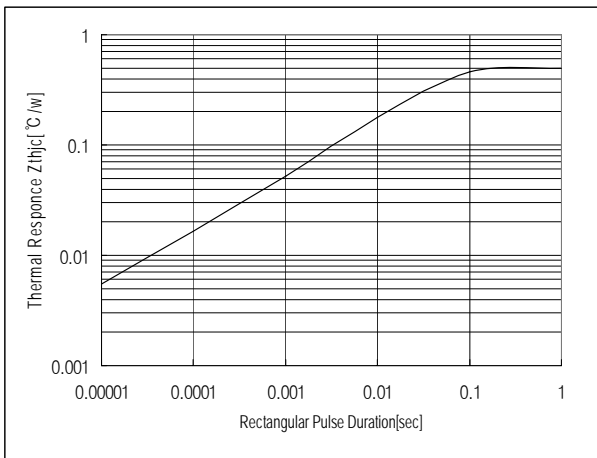
## Performance Curves



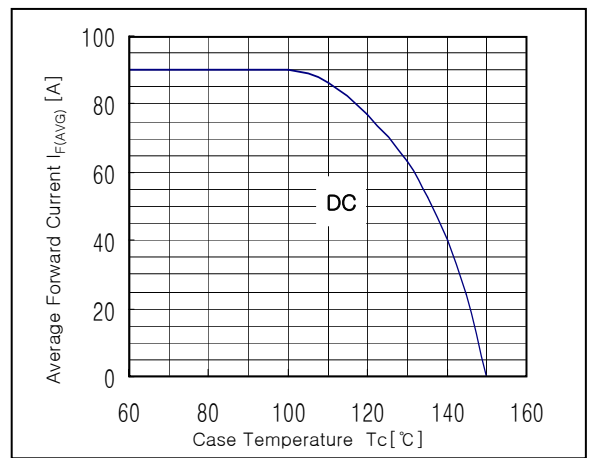
**Fig. 1 : Typical Forward Voltage Drop vs. Instantaneous Forward Current**



**Fig. 2 : Typical Reverse Recovery Time vs. -di/dt**



**Fig. 3 : Transient Thermal Impedance( $Z_{thjc}$ ) Characteristics**

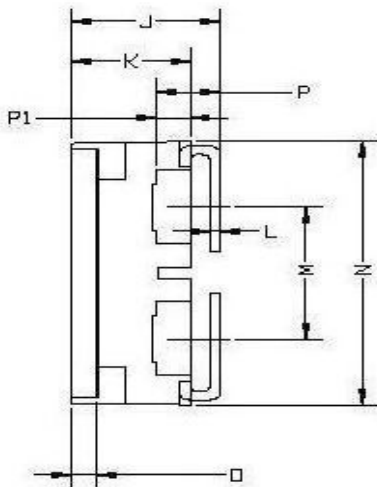
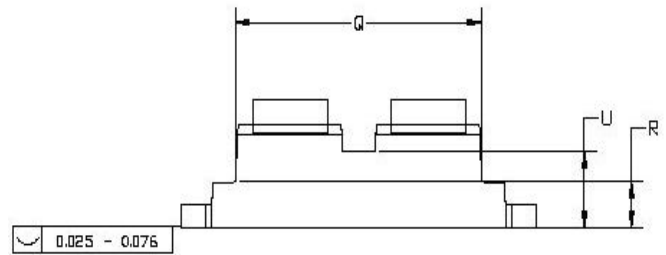
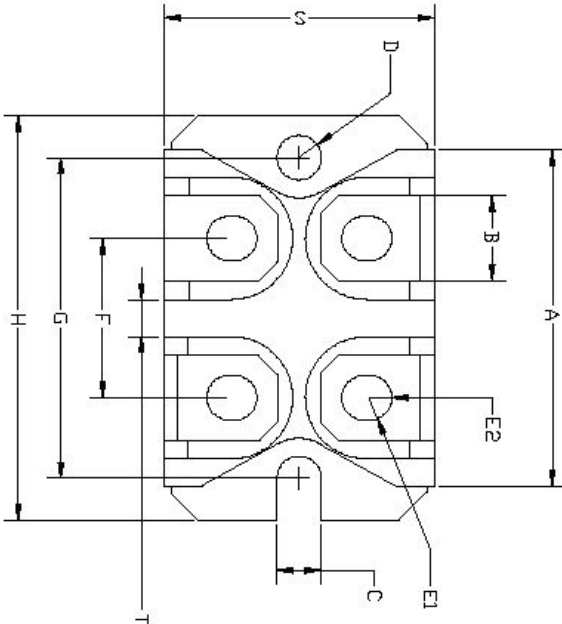


**Fig. 4 : Forward Current Derating Curve**

Package Out Line Information

SOT-227

Dimensions in mm



ITEM	mm		Inch	
	MIN	MAX	MIN	MAX
A	31.50	31.70	1.240	1.248
B	7.80	8.18	0.307	0.322
C	4.09	4.19	0.161	0.165
D	4.09	4.27	0.161	0.168
E1	4.09	4.29	0.161	0.169
E2	4.72	4.85	0.186	0.191
F	14.91	15.09	0.587	0.594
G	30.12	30.30	1.186	1.193
H	38.00	38.20	1.496	1.504
J	11.81	12.12	0.465	0.480
K	8.92	9.59	0.351	0.377
L	0.76	0.84	0.030	0.033
M	12.60	12.80	0.496	0.504
N	25.20	25.45	0.992	1.002
O	1.98	2.13	0.078	0.084
P	5.11	5.89	0.201	0.232
P1	2.67	2.87	0.105	0.113
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	24.59	25.07	0.968	0.987
T	3.30	3.61	0.130	0.142
U	6.88	7.09	0.271	0.279
V				