Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

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ALPHA & OMEGA SEMICONDUCTOR

AON6542

30V N-Channel AlphaMOS

General Description

- Latest Trench Power AlphaMOS (αMOS LV) technology
- Very Low RDS(on) at 4.5V_{GS}
- Low Gate Charge
- High Current Capability
- RoHS and Halogen-Free Compliant

Application

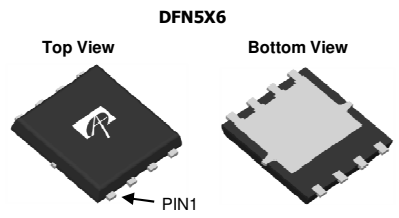
- DC/DC Converters in Computing, Servers, and POL
- Isolated DC/DC Converters in Telecom and Industrial

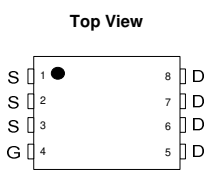
Product Summary

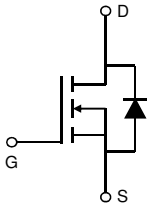
V_{DS}	30V
I_D (at V_{GS}=10V)	30A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 5mΩ
$R_{DS(ON)}$ (at V_{GS} = 4.5V)	< 8.5mΩ

100% UIS Tested
100% R_g Tested

Green Product







Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current[G]	T_C=25°C	I_D	30	A
	T_C=100°C		23	
Pulsed Drain Current [C]		I_{DM}	120	
Continuous Drain Current	T_A=25°C	I_{DSM}	23	A
	T_A=70°C		18	
Avalanche Current [C]		I_{AS}	32	A
Avalanche energy L=0.05mH [C]		E_{AS}	26	mJ
V_{DS} Spike	100ns	V_{SPIKE}	36	V
Power Dissipation [B]	T_C=25°C	P_D	25	W
	T_C=100°C		10	
Power Dissipation [A]	T_A=25°C	P_{DSM}	4.1	W
	T_A=70°C		2.6	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	24	30	°C/W
Maximum Junction-to-Ambient [A D]	Steady-State		53	64	°C/W
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	3.5	5	°C/W

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250µA, V_{GS}=0V	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V			1	µA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±20V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250µA	1.2	1.8	2.2	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=20A		4.1	5	mΩ
		T_J=125°C		5.6	6.8	
		V_{GS}=4.5V, I_D=20A		6.7	8.5	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A		91		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.7	1	V
I_S	Maximum Body-Diode Continuous Current				30	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz		951		pF
C_{oss}	Output Capacitance			373		pF
C_{rss}	Reverse Transfer Capacitance			62		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	0.7	1.5	2.3	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=20A		15.7	22.5	nC
Q_g(4.5V)	Total Gate Charge			7.5	10.5	nC
Q_{gs}	Gate Source Charge			2.8		nC
Q_{gd}	Gate Drain Charge			3.2		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=0.75Ω, R_{GEN}=3Ω		6.25		ns
t_r	Turn-On Rise Time			2.5		ns
$t_{D(off)}$	Turn-Off DelayTime			18.5		ns
t_f	Turn-Off Fall Time			4		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A, dI/dt=500A/µs		10.2		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=20A, dI/dt=500A/µs		13.6		nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A =25° C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(MAX)}$=150° C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Single pulse width limited by junction temperature $T_{J(MAX)}$=150° C.

D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300µs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150° C. The SOA curve provides a single pulse rating.

G. The maximum current rating is package limited.

H. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

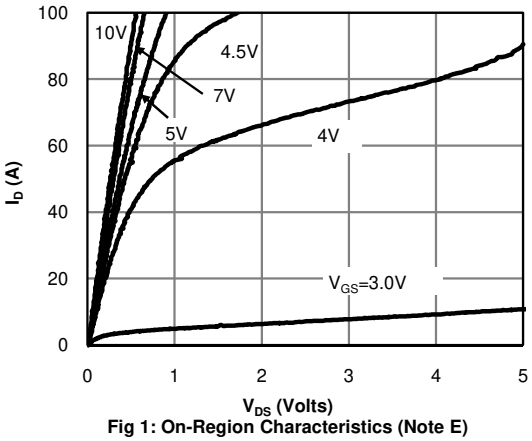


Fig 1: On-Region Characteristics (Note E)

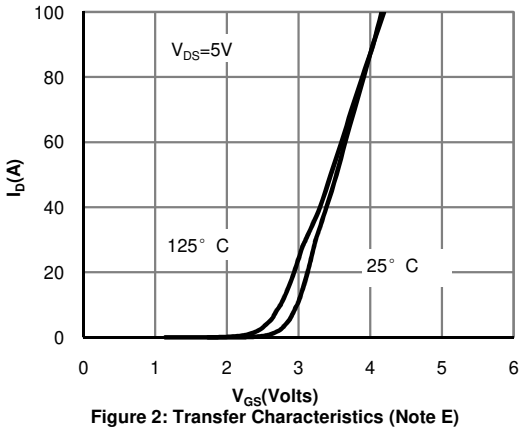


Figure 2: Transfer Characteristics (Note E)

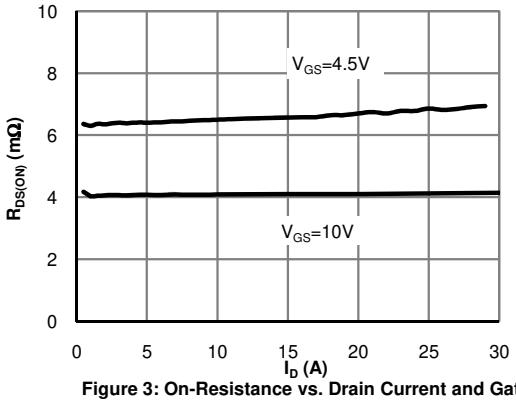


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

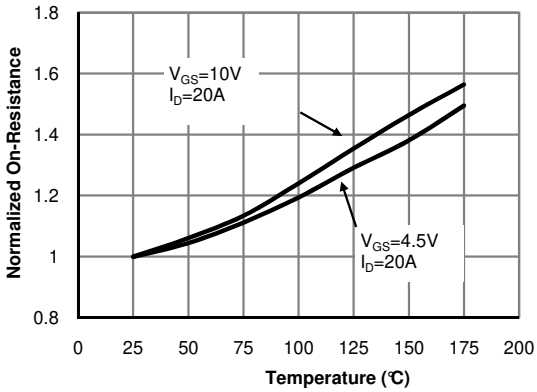


Figure 4: On-Resistance vs. Junction Temperature (Note E)

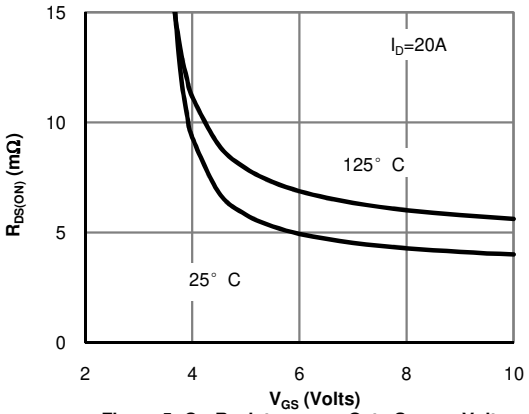


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

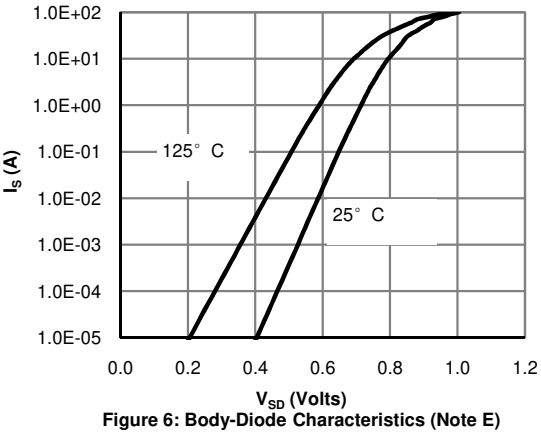


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

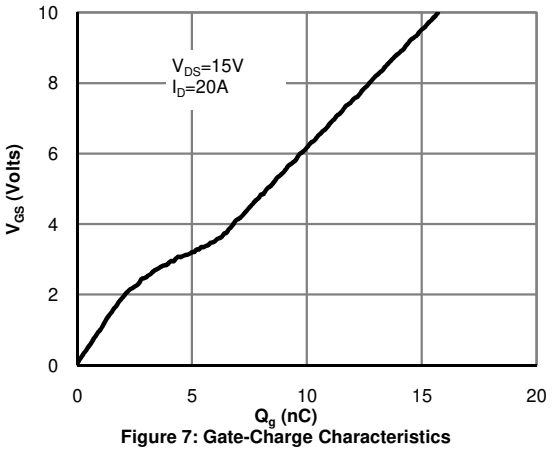


Figure 7: Gate-Charge Characteristics

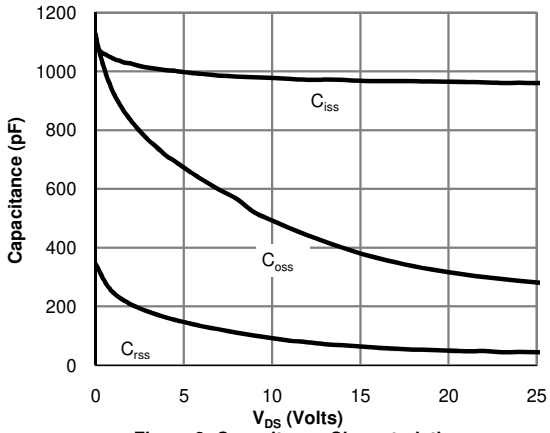


Figure 8: Capacitance Characteristics

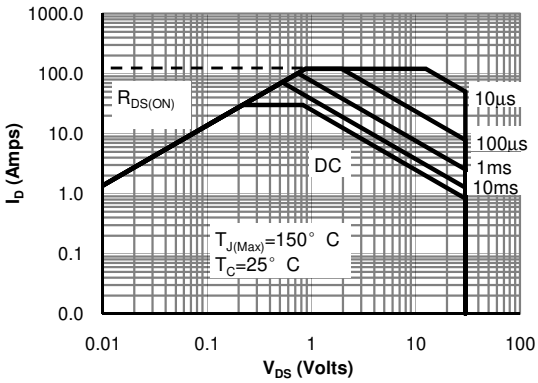


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

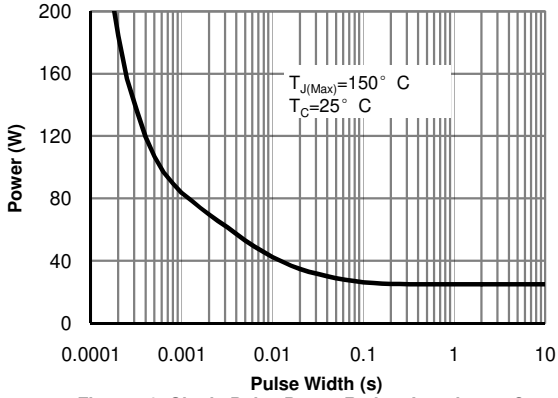


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

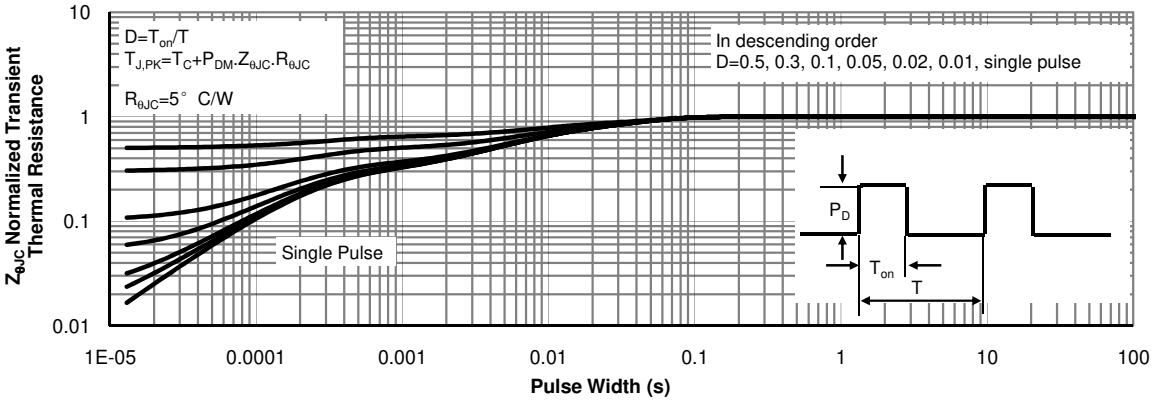


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

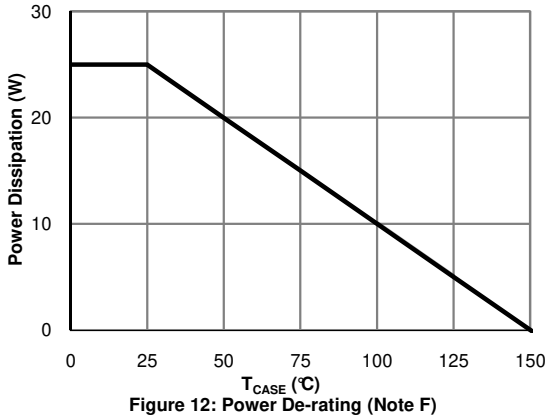


Figure 12: Power De-rating (Note F)

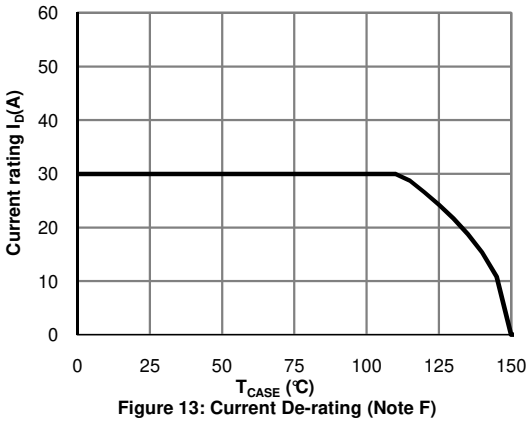


Figure 13: Current De-rating (Note F)

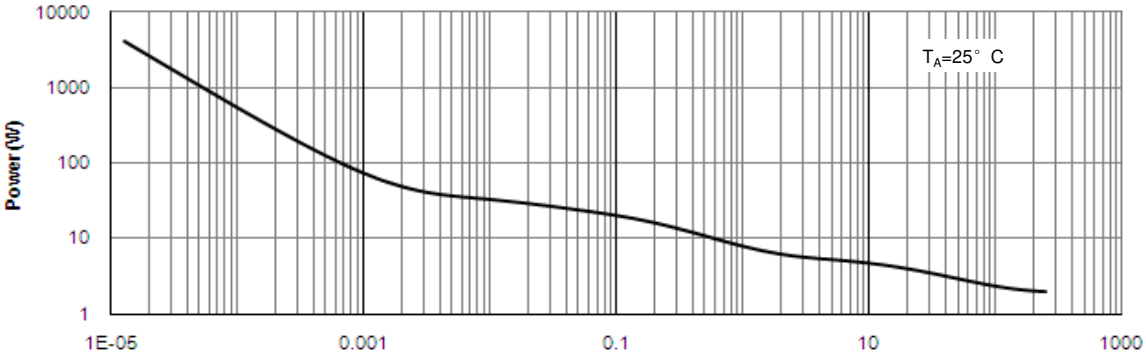


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

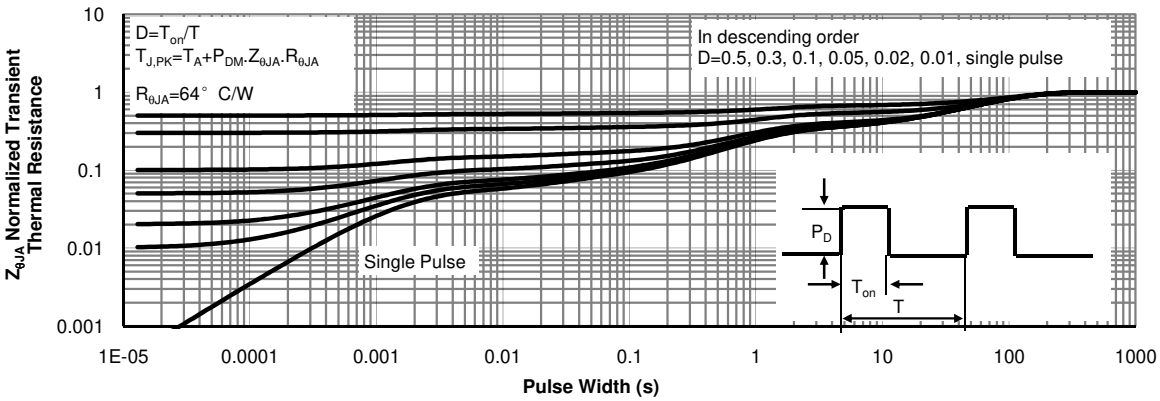
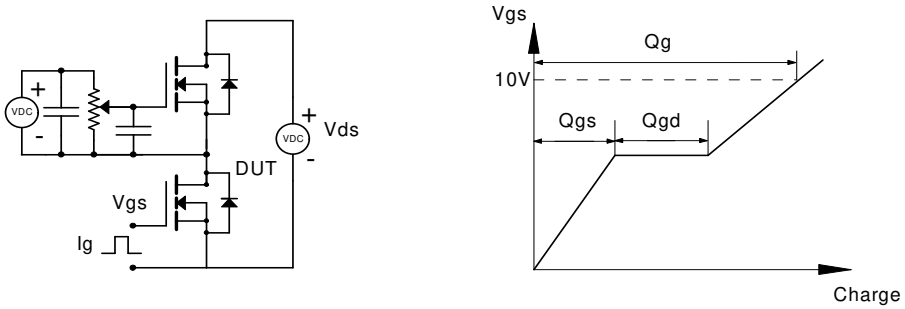
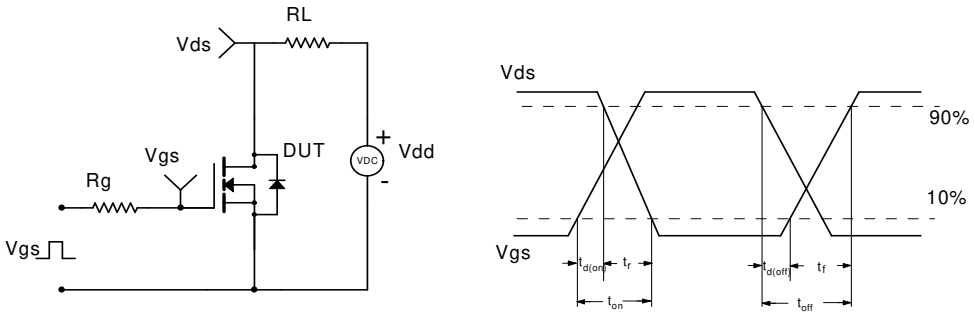


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

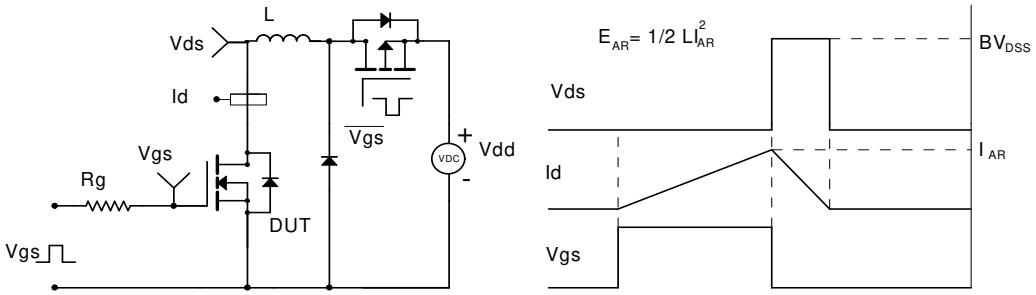
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms