

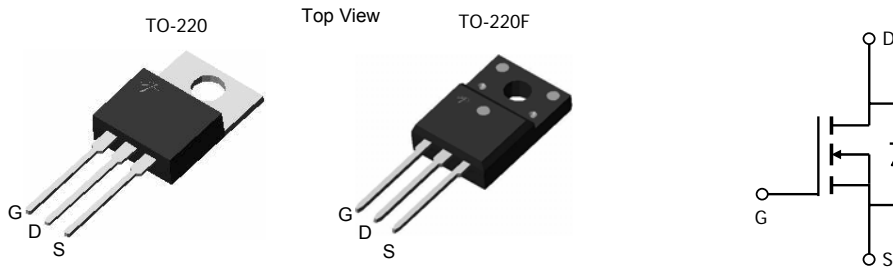
**AOT7N60/AOTF7N60**
**600V, 7A N-Channel MOSFET**
**General Description**

The AOT7N60 & AOTF7N60 have been fabricated using an advanced high voltage MOSFET process that is designed to deliver high levels of performance and robustness in popular AC-DC applications. By providing low  $R_{DS(on)}$ ,  $C_{iss}$  and  $C_{rss}$  along with guaranteed avalanche capability these parts can be adopted quickly into new and existing offline power supply designs.

**Features**

$V_{DS}$  (V) = 700V @ 150°C  
 $I_D$  = 7A  
 $R_{DS(on)} < 1.2\Omega$  ( $V_{GS} = 10V$ )

**100% UIS Tested!**  
**100%  $R_g$  Tested!**  
 **$C_{iss}$ ,  $C_{oss}$ ,  $C_{rss}$  Tested!**


**Absolute Maximum Ratings  $T_A=25^\circ\text{C}$  unless otherwise noted**

Parameter	Symbol	AOT7N60	AOTF7N60	Units
Drain-Source Voltage	$V_{DS}$	600		V
Gate-Source Voltage	$V_{GS}$	$\pm 30$		V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	7	7*
		$T_C=100^\circ\text{C}$	4.4	4.4*
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	28		A
Avalanche Current <sup>C, G</sup>	$I_{AR}$	3		A
Repetitive avalanche energy <sup>C, G</sup>	$E_{AR}$	135		mJ
Single pulsed avalanche energy <sup>G</sup>	$E_{AS}$	270		mJ
Peak diode recovery dv/dt	dv/dt	5		V/ns
Power Dissipation <sup>B</sup>	$P_D$	$T_C=25^\circ\text{C}$	176	38.5
		Derate above 25°C	1.4	0.3
Junction and Storage Temperature Range	$T_J, T_{STG}$	-50 to 150		°C
Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	$T_L$	300		°C

**Thermal Characteristics**

Parameter	Symbol	AOT7N60	AOTF7N60	Units
Maximum Junction-to-Ambient <sup>A, D</sup>	$R_{\theta JA}$	65	65	°C/W
Maximum Case-to-Sink <sup>A</sup>	$R_{\theta CS}$	0.5	--	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	0.71	3.25	°C/W

\* Drain current limited by maximum junction temperature.

Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	600			V
		I <sub>D</sub> =250μA, V <sub>GS</sub> =0V, T <sub>J</sub> =150°C		700		V
BV <sub>DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temperature Coefficient	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V		0.72		V/°C
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V			1	μA
		V <sub>DS</sub> =480V, T <sub>J</sub> =125°C			10	
I <sub>GSS</sub>	Gate-Body leakage current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±30V			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	3	3.9	5	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =3.5A		1	1.2	Ω
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =40V, I <sub>D</sub> =3.5A		12		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1A, V <sub>GS</sub> =0V		0.74	1	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current				7	A
I <sub>SM</sub>	Maximum Body-Diode Pulsed Current				28	A
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1MHz	685	861	1035	pF
C <sub>oss</sub>	Output Capacitance		65	84	100	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		5.2	6.6	7.9	pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	3	4.1	6.2	Ω
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> =10V, V <sub>DS</sub> =480V, I <sub>D</sub> =7A	19.3	23.2	27.8	nC
Q <sub>gs</sub>	Gate Source Charge		3.8	4.6	5.5	nC
Q <sub>gd</sub>	Gate Drain Charge		9.3	11.2	13.5	nC
t <sub>D(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> =10V, V <sub>DS</sub> =300V, I <sub>D</sub> =7A, R <sub>G</sub> =25Ω		25		ns
t <sub>r</sub>	Turn-On Rise Time			49.5		ns
t <sub>D(off)</sub>	Turn-Off DelayTime			51.5		ns
t <sub>f</sub>	Turn-Off Fall Time			43.5		ns
t <sub>rr</sub>	Body Diode Reverse Recovery Time		I <sub>F</sub> =7A, di/dt=100A/μs, V <sub>DS</sub> =100V	212	255	306
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =7A, di/dt=100A/μs, V <sub>DS</sub> =100V	2	2.6	3.1	μC

A. The value of R<sub>θJA</sub> is measured with the device in a still air environment with T<sub>A</sub>=25°C.

B. The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=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. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C, Ratings are based on low frequency and duty cycles to keep initial T<sub>J</sub>=25°C.

D. The R<sub>θJA</sub> is the sum of the thermal impedance from junction to case R<sub>θJC</sub> and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300 μs 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<sub>J(MAX)</sub>=150°C. The SOA curve provides a single pulse rating.

G. L=60mH, I<sub>AS</sub>=3A, V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C

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THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

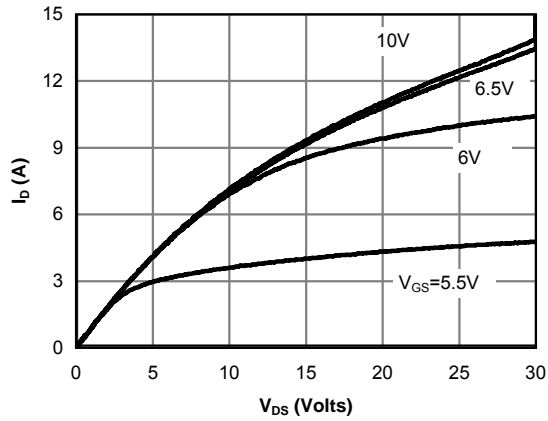


Fig 1: On-Region Characteristics

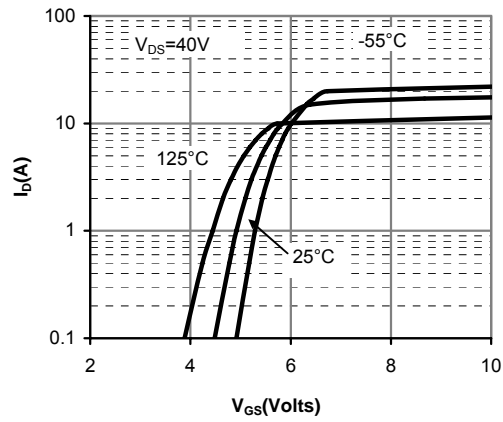


Figure 2: Transfer Characteristics

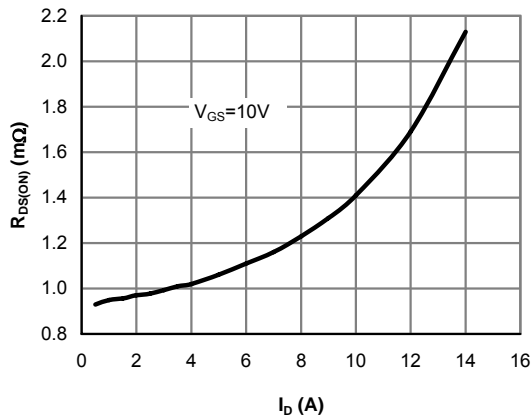


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

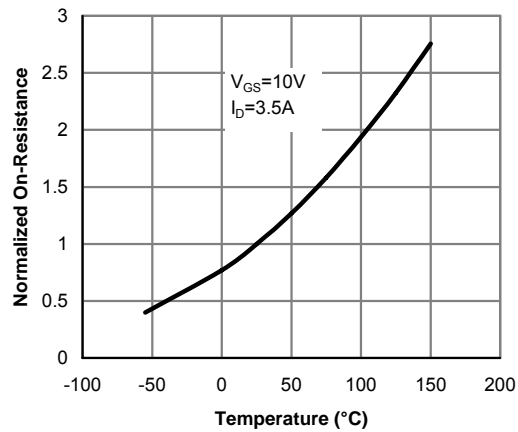


Figure 4: On-Resistance vs. Junction Temperature

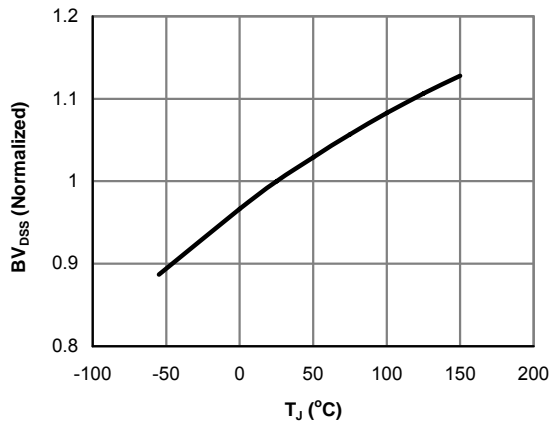


Figure 5: Break Down vs. Junction Temperature

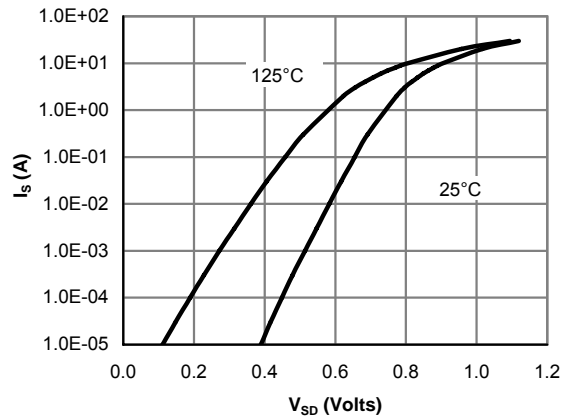


Figure 6: Body-Diode Characteristics

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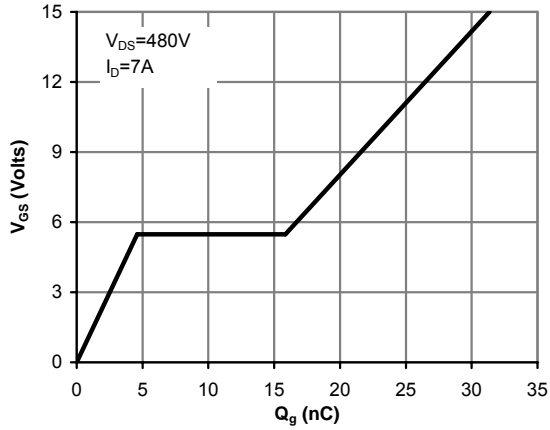


Figure 7: Gate-Charge Characteristics

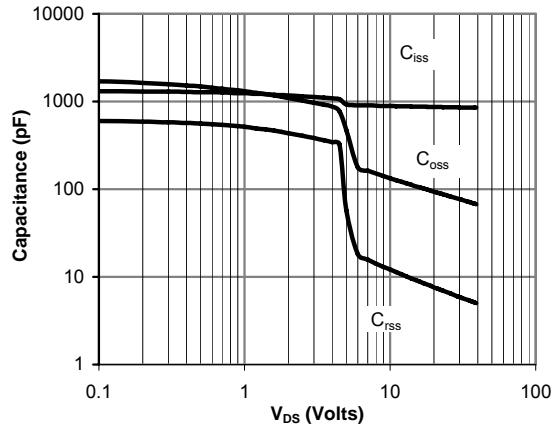


Figure 8: Capacitance Characteristics

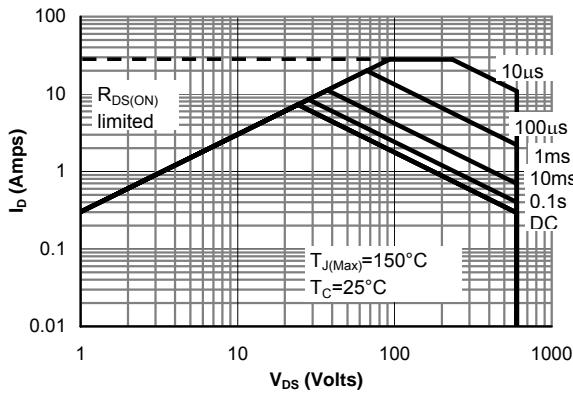


Figure 9: Maximum Forward Biased Safe Operating Area for AOT12N60 (Note F)

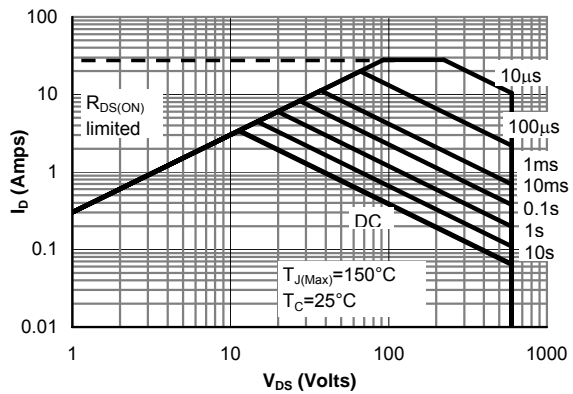


Figure 10: Maximum Forward Biased Safe Operating Area for AOTF12N60 (Note F)

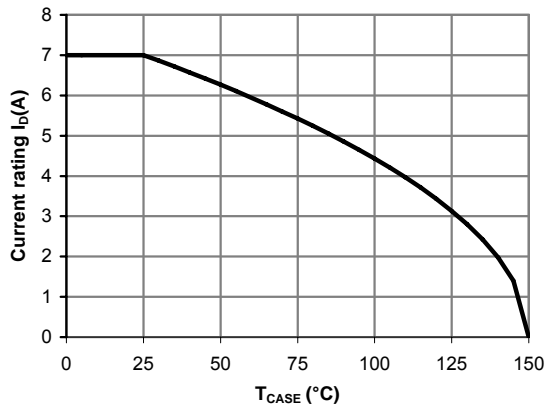


Figure 11: Current De-rating (Note B)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

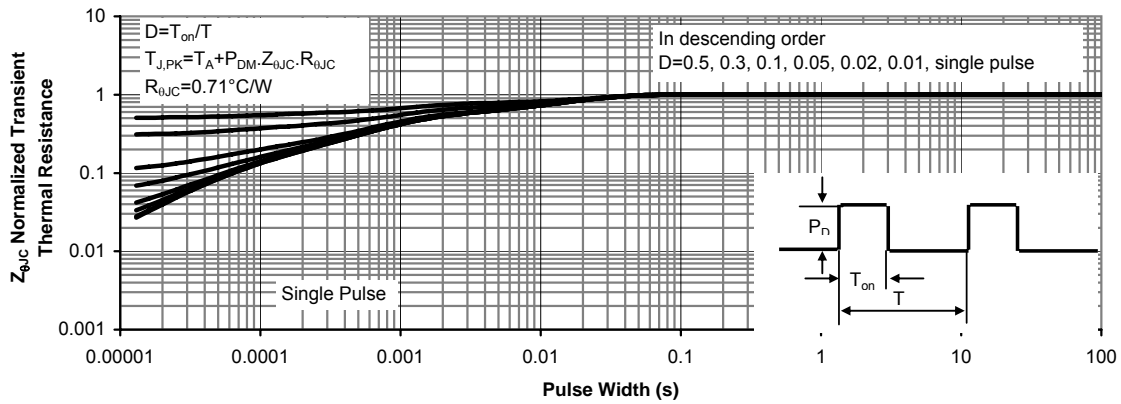


Figure 12: Normalized Maximum Transient Thermal Impedance for AOT7N60 (Note F)

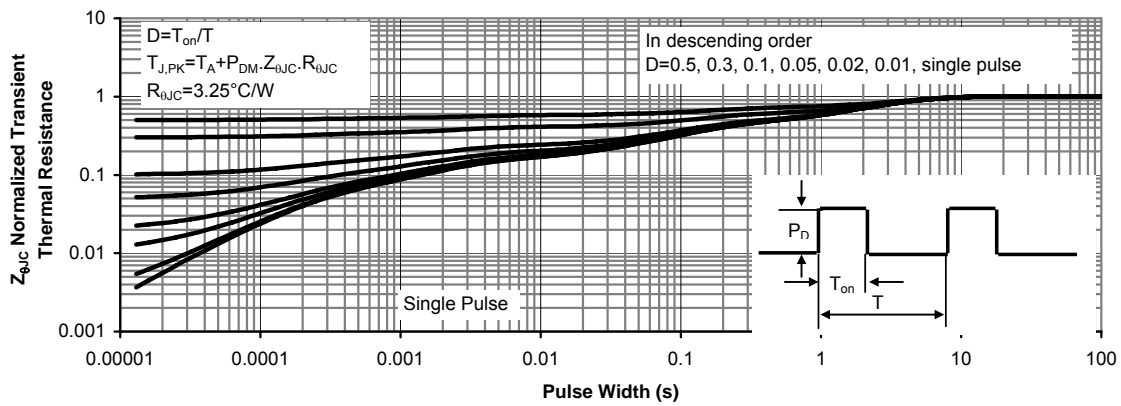
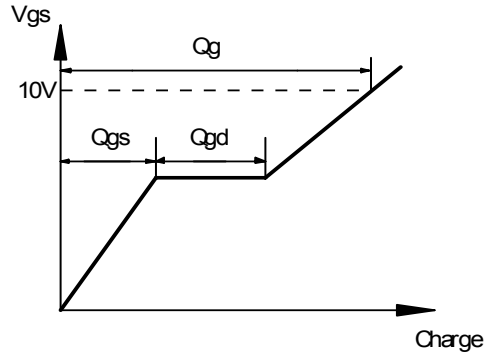
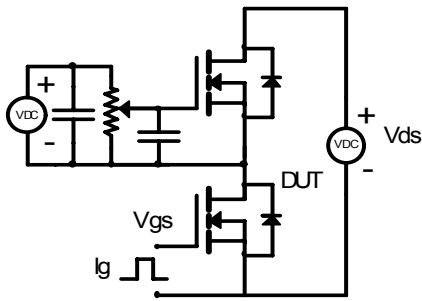
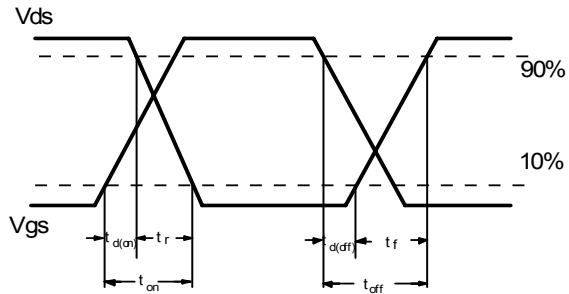
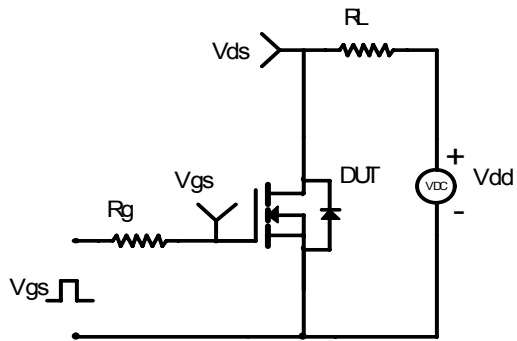


Figure 13: Normalized Maximum Transient Thermal Impedance for AOTF7N60 (Note F)

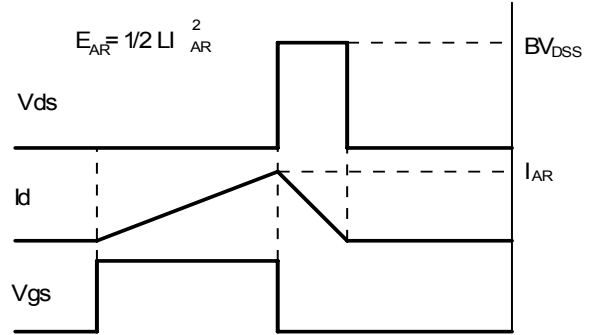
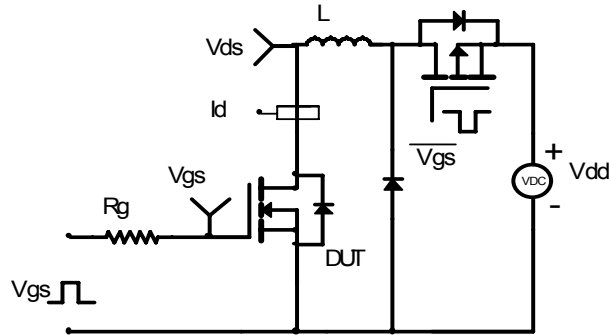
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

