

# MT3244S

N-Channel Power MOSFET  
40 V, 90 A, 3.6 mΩ

## Features

- Typ  $R_{DS(on)} = 3.6\text{ m}\Omega$  at  $V_{GS} = 10\text{ V}$
- High performance trench technology for extremely low  $R_{DS(on)}$
- High power and current handling capability

## General Description

This N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low  $R_{DS(ON)}$  and fast switching speed.

## Applications

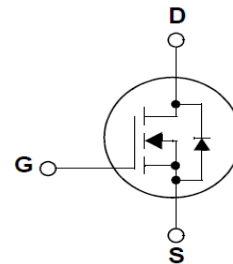
- DC-DC primary bridge
- DC-DC Synchronous rectification
- Power Management for Inverter Systems



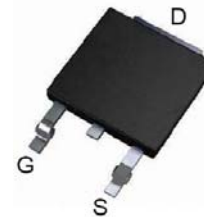
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## Simplified Schematic



## MARKING DIAGRAM & PIN ASSIGNMENT



TO-252-2L

## Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
<b>Common Ratings</b> ( $T_A = 25^\circ\text{C}$ Unless Otherwise Noted)			
$V_{DSS}$	Drain-Source Voltage	40	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	
$T_J$	Maximum Junction Temperature	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$I_S$	Diode Continuous Forward Current	$T_C = 25^\circ\text{C}$ 90	A

### Mounted on Large Heat Sink

$I_{DM}$	Pulsed Drain Current *	360	A	
$I_D$	Continuous Drain Current	$T_C = 25^\circ\text{C}$	90	A
		$T_C = 100^\circ\text{C}$	54	
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	65	W
		$T_C = 100^\circ\text{C}$	35	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1.9	$^\circ\text{C/W}$	

## Electrical Characteristics (T<sub>A</sub> = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions				Unit
			Min.	Typ.	Max.	
<b>Static Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA	40	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V	-	-	1	μA
		T <sub>J</sub> =85°C	-	-	10	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA	1	1.6	3	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
R <sub>DS(ON)*</sub>	Drain-Source On-state Resistance	V <sub>GS</sub> =10V, I <sub>DS</sub> =40A	-	3.6	4.8	mΩ
<b>Diode Characteristics</b>						
V <sub>SD*</sub>	Diode Forward Voltage	I <sub>SD</sub> =30A, V <sub>GS</sub> =0V	-	0.8	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =20A, dI <sub>SD</sub> /dt=100A/μs	-	16	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	10	-	nC

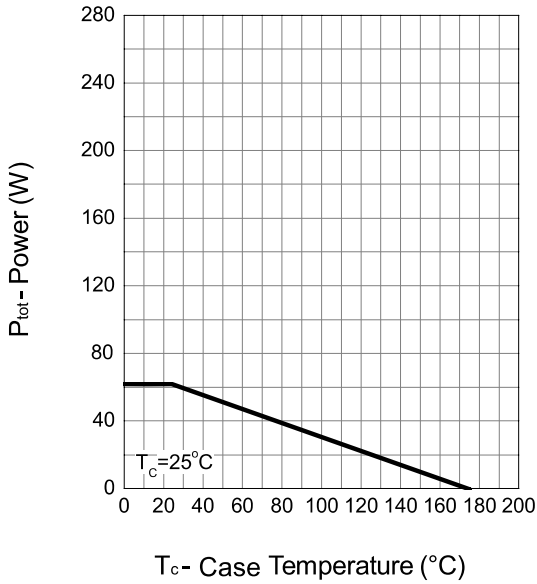
## Electrical Characteristics (Cont.) ( $T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Conditions				Unit
			Min.	Typ.	Max.	
<b>Dynamic Characteristics</b>						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	2.0	-	$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=20V,$ Frequency=1.0MHz	-	3880	-	pF
$C_{oss}$	Output Capacitance		-	274	-	
$C_{rss}$	Reverse Transfer Capacitance		-	215	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=20V, R_G=3\ \Omega,$ $I_{DS}=30A, V_{GS}=10V,$	-	12	-	ns
$T_r$	Turn-on Rise Time		-	29	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	60	-	
$T_f$	Turn-off Fall Time		-	16	-	
<b>Gate Charge Characteristics</b>						
$Q_g$	Total Gate Charge	$V_{DS}=15V, V_{GS}=20V,$ $I_{DS}=30A$	-	73	-	nC
$Q_{gs}$	Gate-Source Charge		-	15	-	
$Q_{gd}$	Gate-Drain Charge		-	16	-	

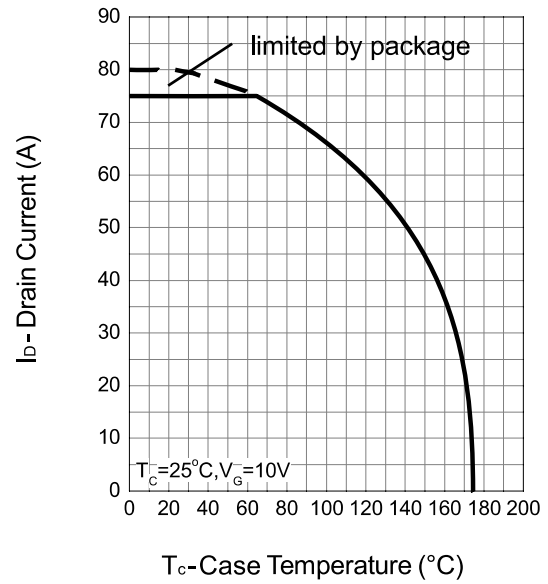
Note \* : Pulse test ; pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .

# Typical Operating Characteristics

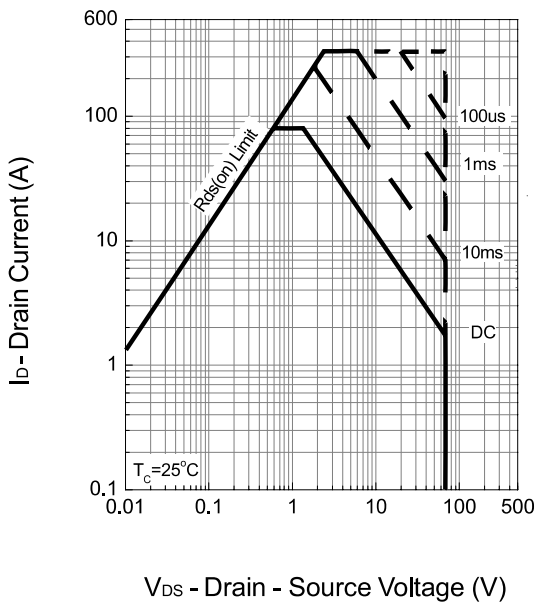
**Power Dissipation**



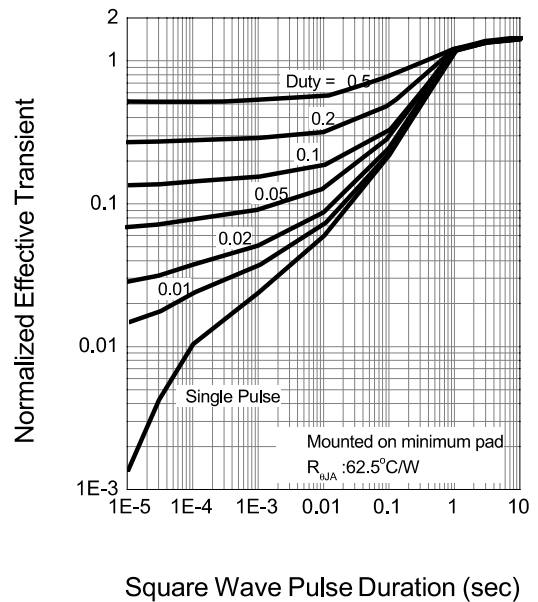
**Drain Current**



**Safe Operation Area**

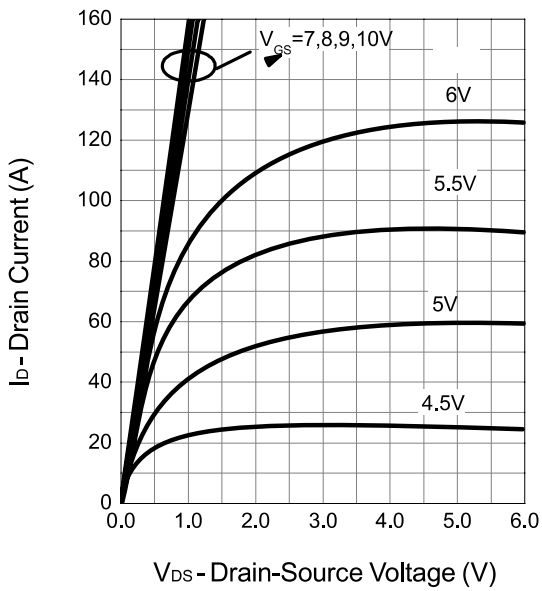


**Thermal Transient Impedance**

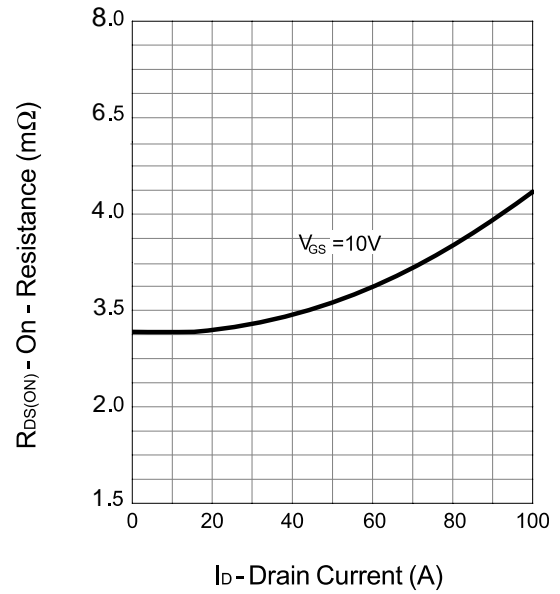


## Typical Operating Characteristics (Cont.)

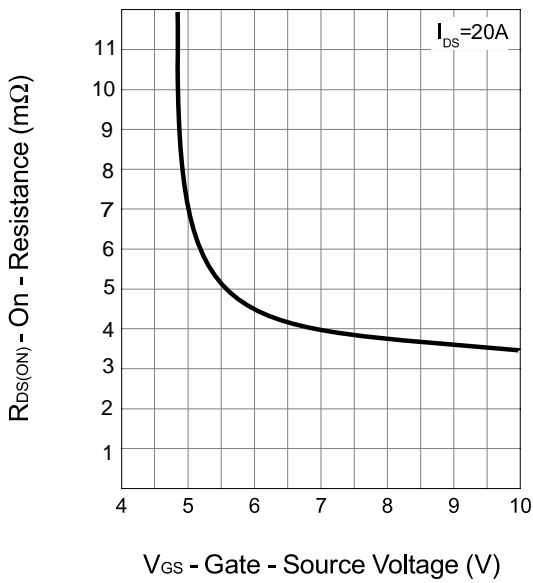
Output Characteristics



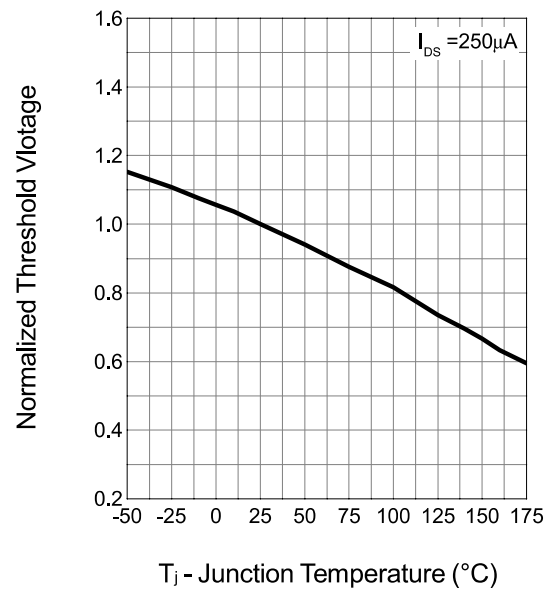
Drain-Source On Resistance



Drain-Source On Resistance

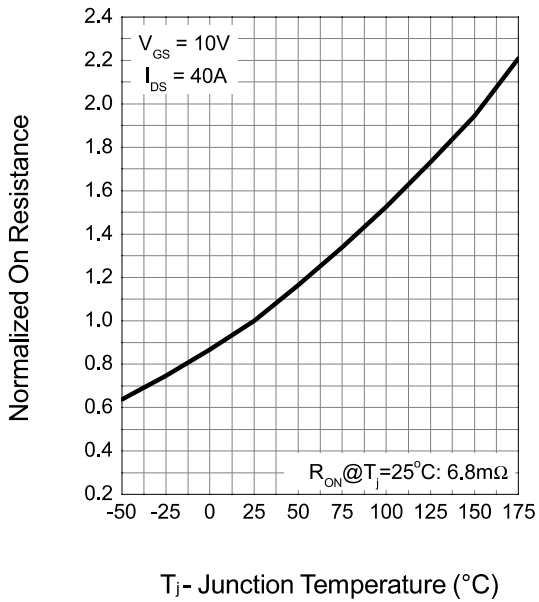


Gate Threshold Voltage

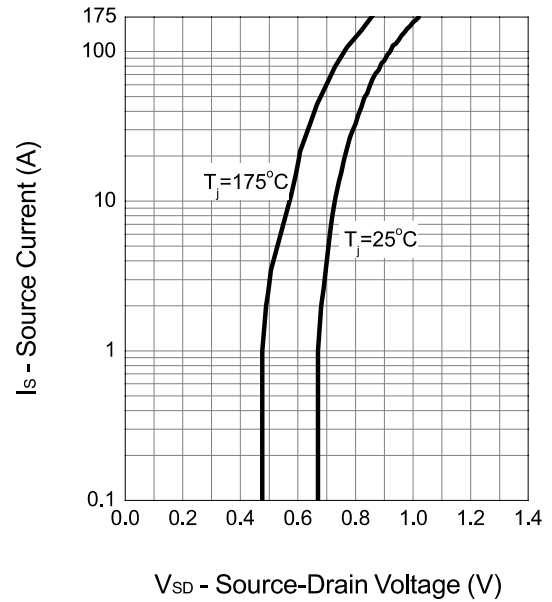


## Typical Operating Characteristics (Cont.)

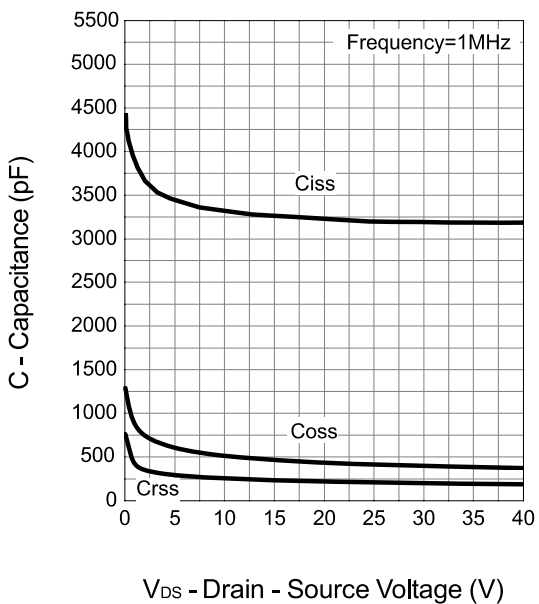
**Drain-Source On Resistance**



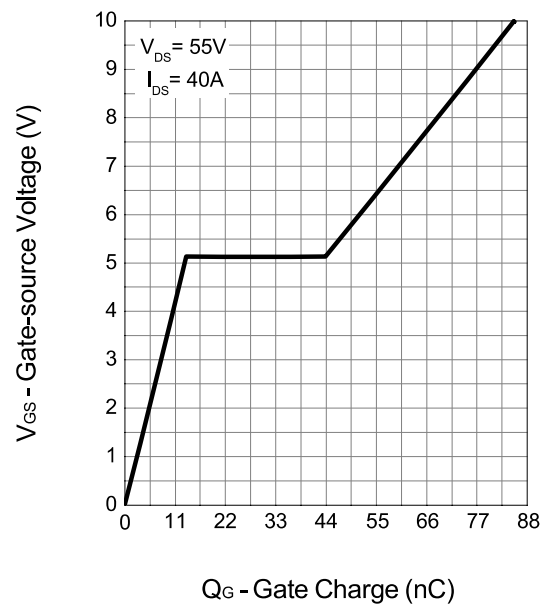
**Source-Drain Diode Forward**



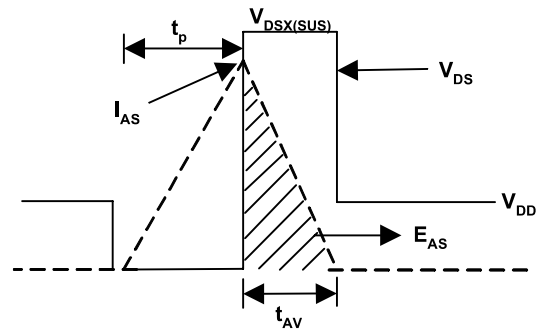
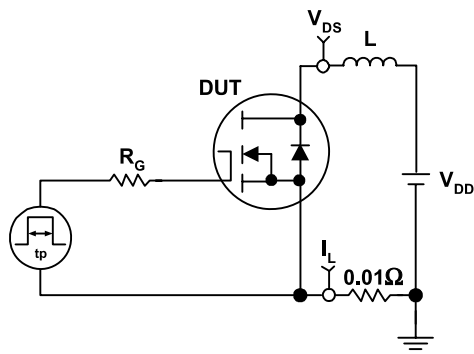
**Capacitance**



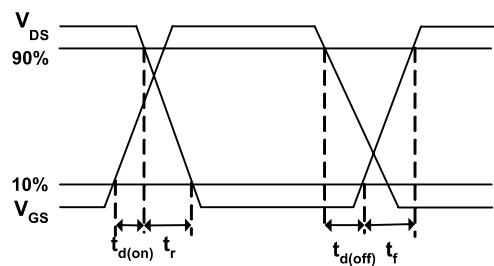
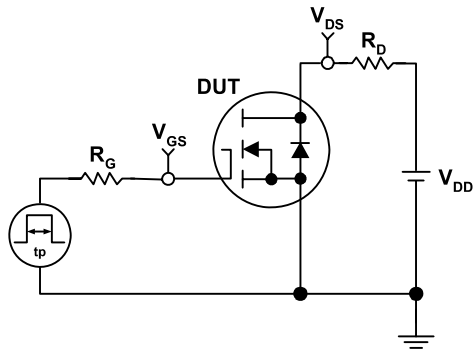
**Gate Charge**



## Avalanche Test Circuit and Waveforms

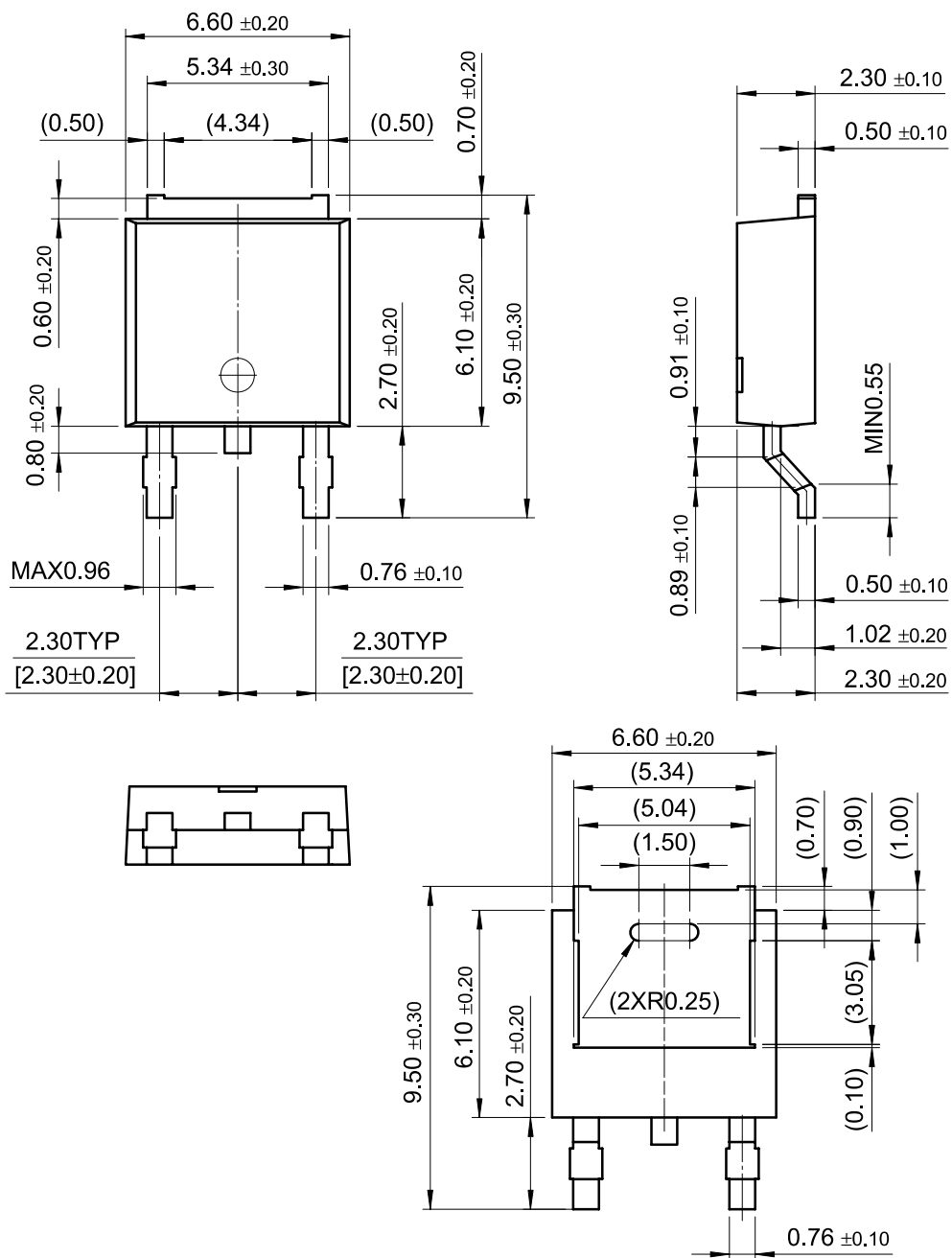


## Avalanche Test Circuit and Waveforms



Package Dimensions

TO-252-2L



Dimensions in Millimeters



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