MT1003

N-Channel Power MOSFET
25V,60A,7.5mΩ

MT Semiconductor®

http://www.mtsemi.com

Features

- Max $R_{DS(on)}$ = 7.5mΩ at V_{GS} = 10V, I_D =22A
- Fast Switching Speed
- Low Gate Charge
- High Performance Trench Technology for Extr emely Low $R_{DS(on)}$
- High Power and Current Handling Capability
- RoHS Compliant

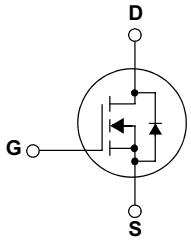
General Description

This N-Channel MOSFET is produced using MOS-TECH Semiconductor's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Applications

- DC-DC primary bridge
- DC-DC Synchronous rectification
- Hot swap

Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT

TO-252-2L

MOSFET Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		25	V
V_{GSS}	Gate-Source Voltage		±12	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_S	Diode Continuous Forward Current	T_C=25°C	60	A
Mounted on Large Heat Sink				
I_{DM}		T_C=25°C	180	A
I_D	Continuous Drain Current	T_C=25°C	60	A
		T_C=100°C	31	
P_D	Maximum Power Dissipation	T_C=25°C	36	W
		T_C=100°C	14.7	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		3.4	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62.5	°C/W
E_{AS}	Drain-Source Avalanche Energy	L=0.5mH	70***	mJ

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
MT1003	MT1003	TO-252-2L	-	-	2500

Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	25	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1.0	1.6	2.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=22A	-	7.5	8	mΩ
Diode Characteristics						
V_{SD}	Diode Forward Voltage	I_{SD}=22A, V_{GS}=0V	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I_{DS}=22A, dI_{SD}/dt=100A/μs	-	21	-	ns
Q_{rr}	Reverse Recovery Charge		-	13	-	nC

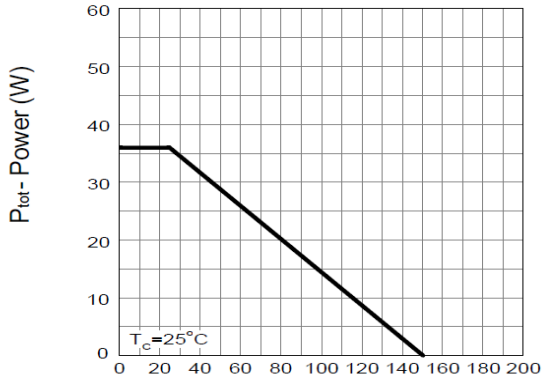
Electrical Characteristics (Cont.) (T_C = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	2.9	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz	-	1062	-	pF
C_{oss}	Output Capacitance		-	250	-	
C_{rss}	Reverse Transfer Capacitance		-	122	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15 V, R_G= 3 Ω, I_{DS}=22A, V_{GS}=10 V,	-	15	28	ns
T_r	Turn-on Rise Time		-	13	24	
$t_{d(OFF)}$	Turn-off Delay Time		-	20	35	
T_f	Turn-off Fall Time		-	10	19	
Gate Charge Characteristics						
Q_g	Total Gate Charge	V_{DS}=24V, V_{GS}=10 V, I_{DS}=22A	-	29	-	nC
Q_{gs}	Gate-Source Charge		-	4.7	-	
Q_{gd}	Gate-Drain Charge		-	4.3	-	

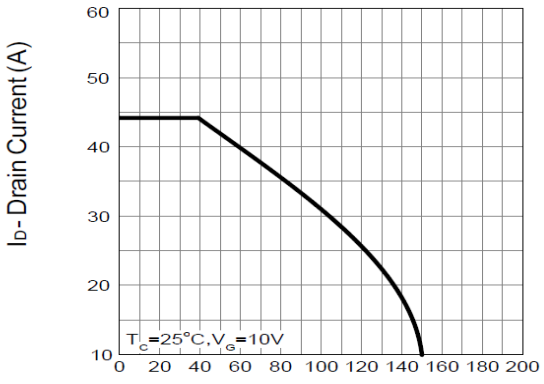
Note * : Pulse test ; pulse width ≤300μs, duty cycle≤2%.

Typical Operating Characteristics

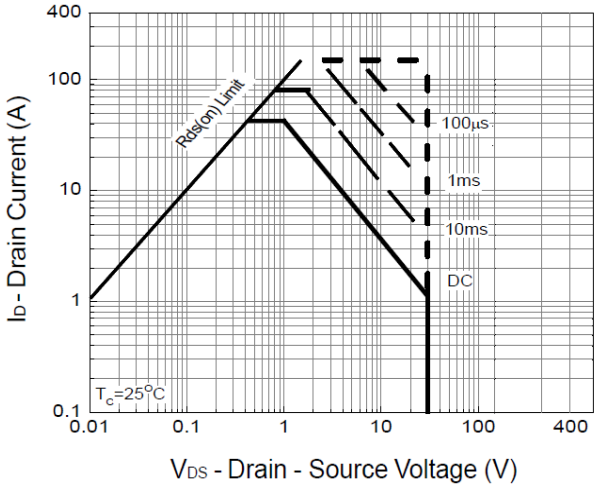
Power Dissipation



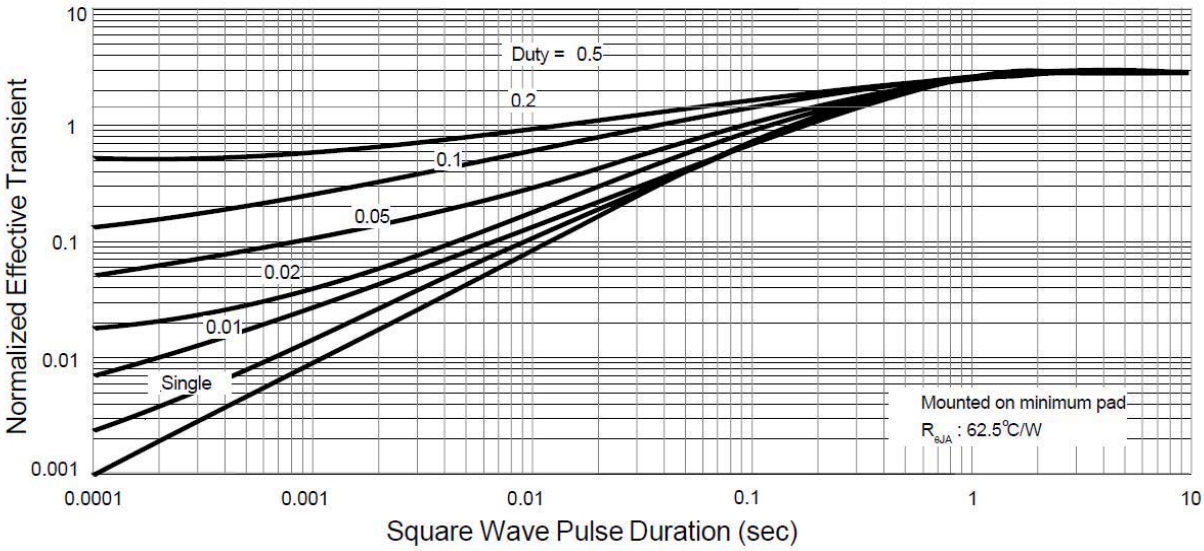
Drain Current



Safe Operation Area

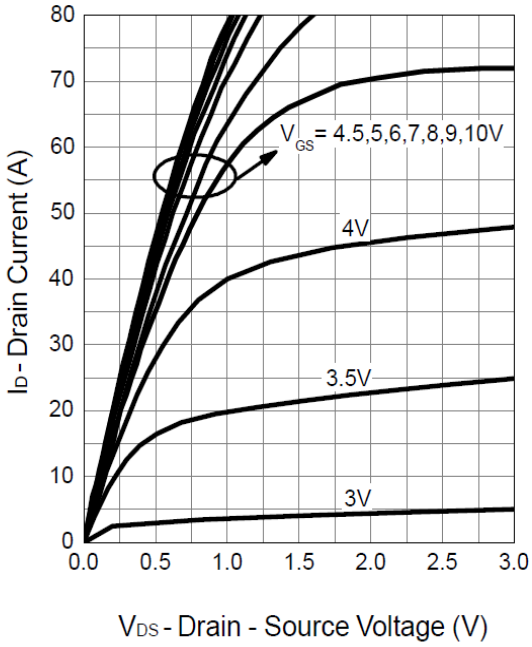


Thermal Transient Impedance

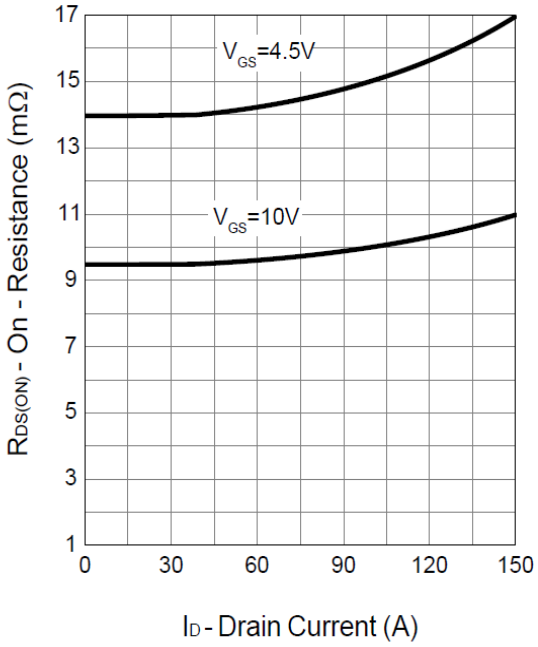


Typical Operating Characteristics (Cont.)

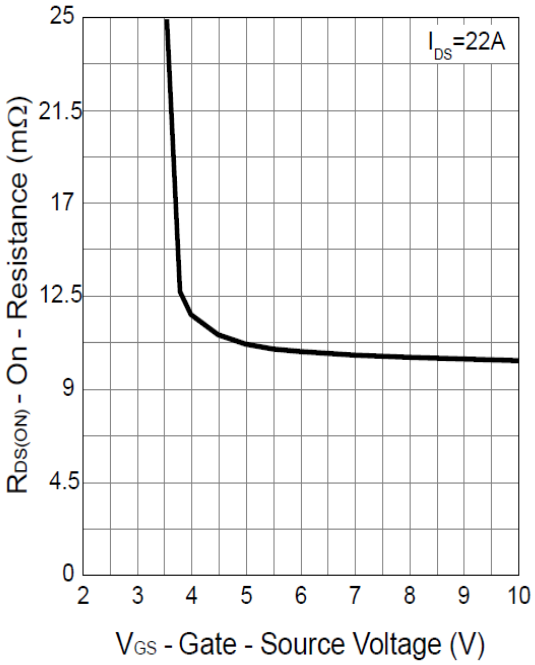
Output Characteristics



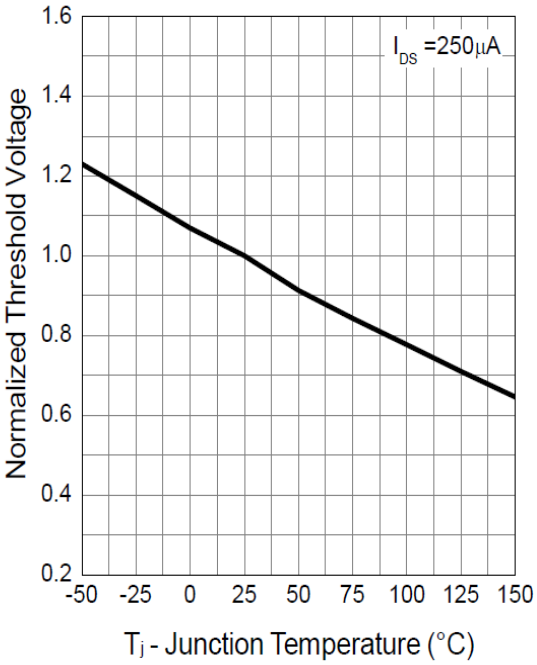
Drain-Source On Resistance



Gate-Source On Resistance

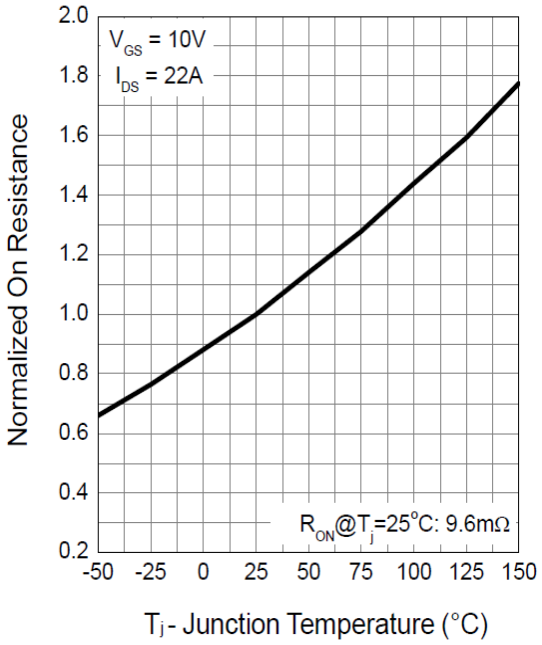


Gate Threshold Voltage

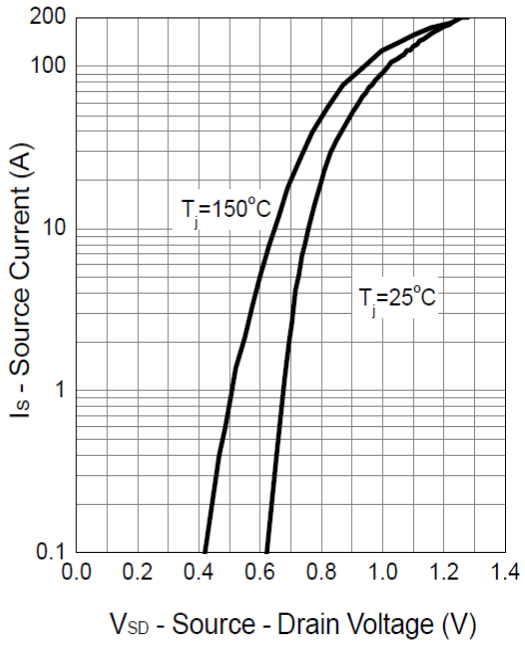


Typical Operating Characteristics (Cont.)

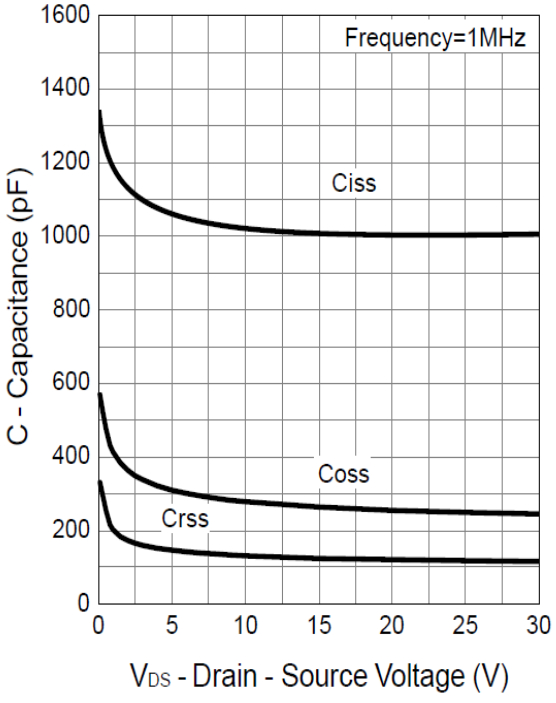
Drain-Source On Resistance



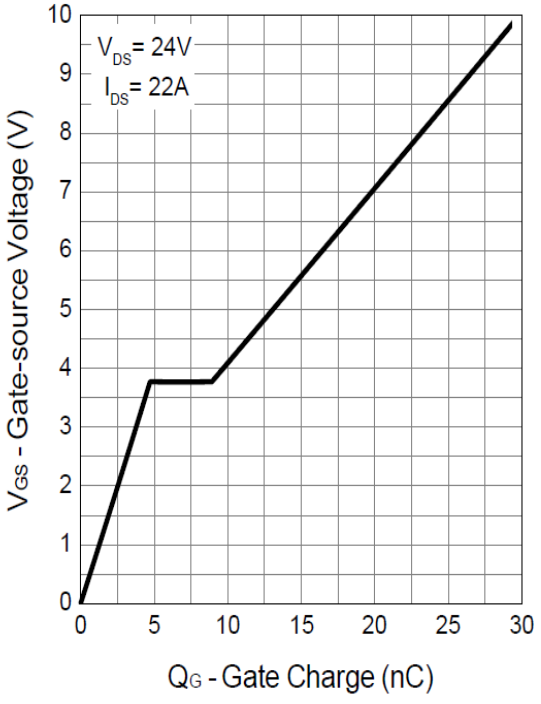
Source-Drain Diode Forward



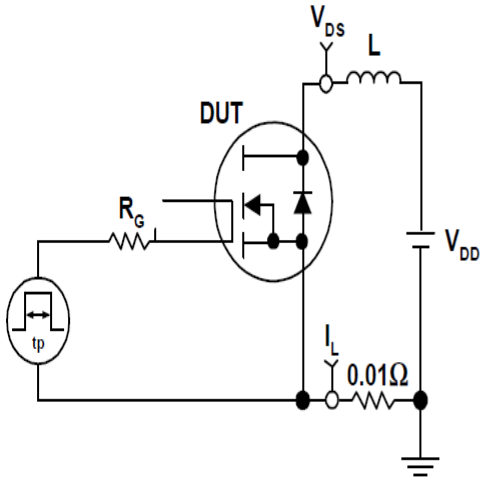
Capacitance

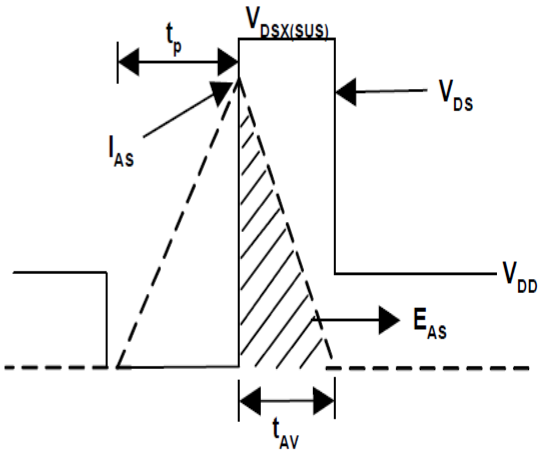


Gate Charge

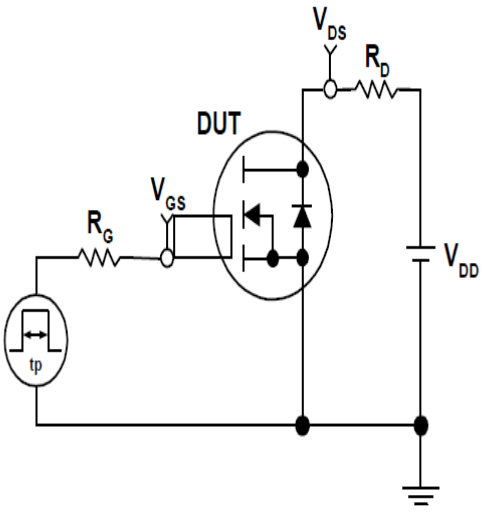


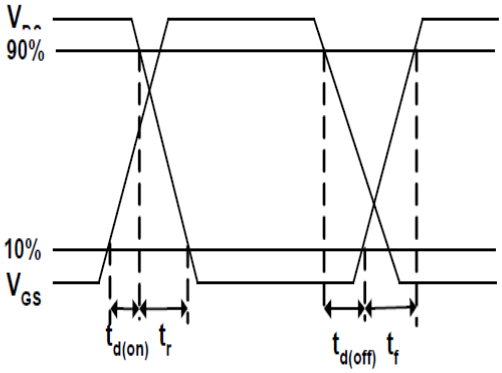
Avalanche Test Circuit and Waveforms





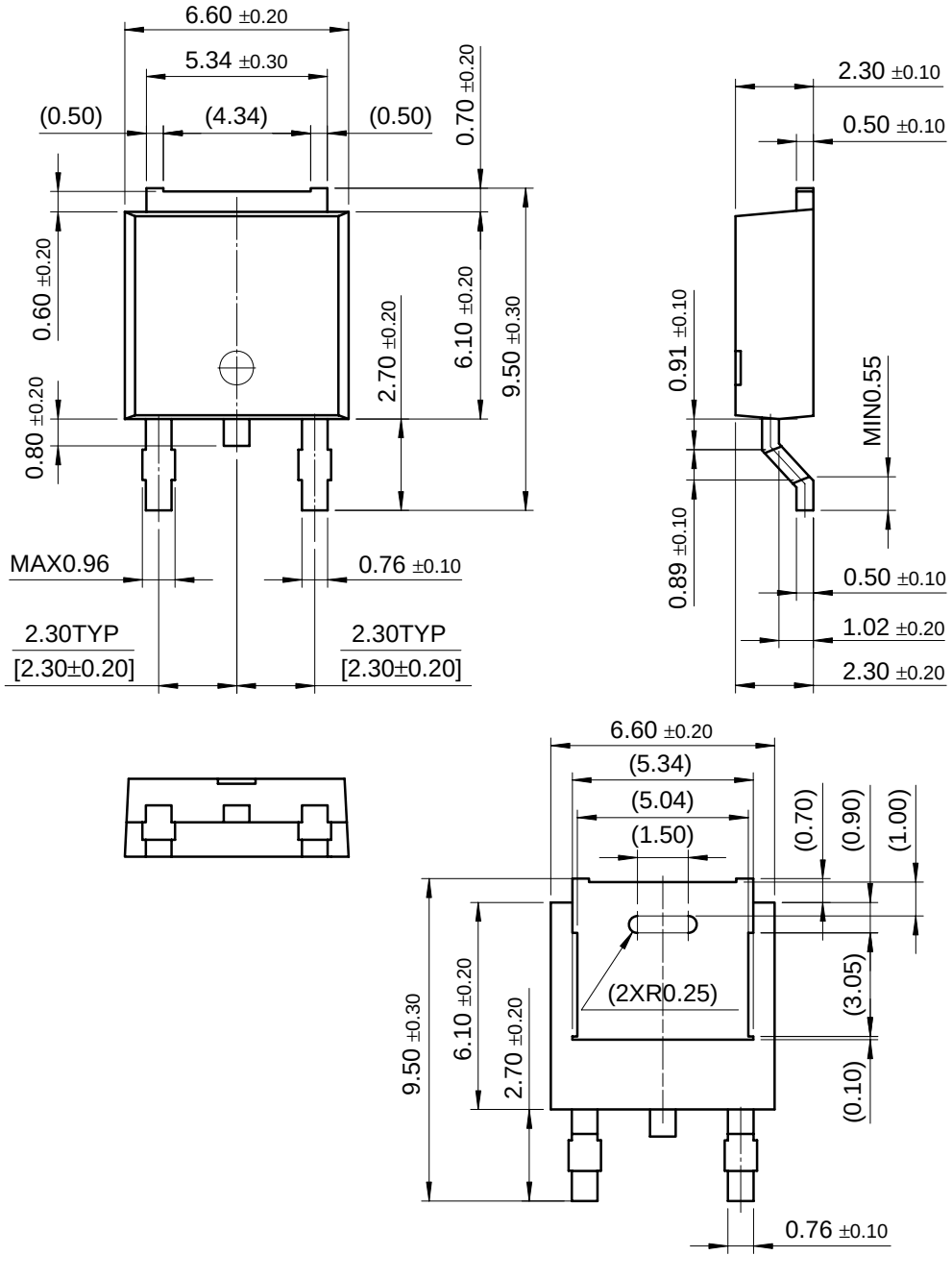
Switching Time Test Circuit and Waveforms





Package Dimensions

TO-252-2L



Dimensions in Millimeters

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