MT30033S

N-Channel Power MOSFET

30 V,100A,3.3mΩ

MT Semiconductor®

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Features

- Typ R_{DS}(on)= 3.3mΩ at V_{GS} =10V,I_D =10A
- High performance trench technology for extremely low R_{DS}(on)
- High power and current handing capability

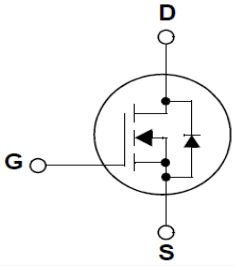
General Description

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 Managemement for Inverter Systems

Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT

TO-252-2L

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_A=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		30	V
V_{GSS}	Gate-Source Voltage		±20	
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	100	A
Mounted on Large Heat Sink				
I_{DM}	Pulsed Drain Current *		300	A
I_D	Continuous Drain Current	T_C=25°C	100	A
		T_C=100°C	70	
P_D	Maximum Power Dissipation	T_C=25°C	50	W
		T_C=100°C	35	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		1.3	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		32.5	
Avalanche Ratings				
E_{AS}	Avalanche Energy, Single Pulsed	L=0.5mH	220***	mJ

Electrical Characteristics (T_A = 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	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	10	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1	1.6	3	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}=10A	-	3.3	4.0	mΩ
Diode Characteristics						
V_{SD}*	Diode Forward Voltage	I_{SD}=10A, V_{GS}=0V	-	0.8	1.3	V
t_{rr}	Reverse Recovery Time	I_{SD}=10 A, dI_{SD}/dt=100A/μs	-	33	-	ns
Q_{rr}	Reverse Recovery Charge		-	61	-	nC

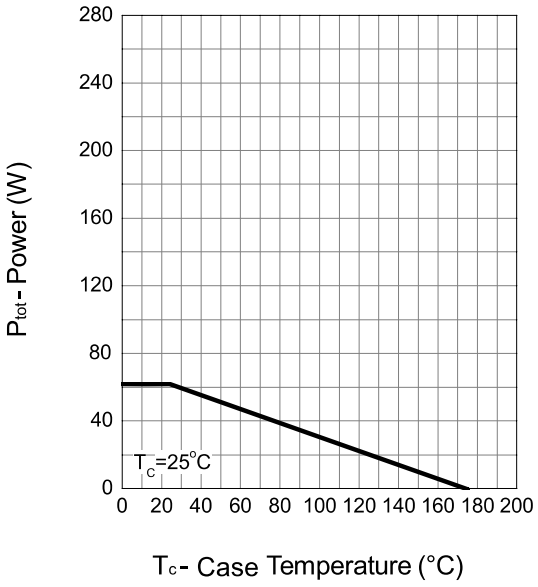
Electrical Characteristics (Cont.) (T_A = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	1.8	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, Frequency=1.0MHz	-	3203	-	pF
C_{oss}	Output Capacitance		-	362	-	
C_{rss}	Reverse Transfer Capacitance		-	277	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=24V, R_G=3 Ω, I_{DS}=40A, V_{GS}=10V,	-	15	-	ns
T_r	Turn-on Rise Time		-	13	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	20	-	
T_f	Turn-off Fall Time		-	8	-	
Gate Charge Characteristics						
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}=10V, I_{DS}=40A	-	84	-	nC
Q_{gs}	Gate-Source Charge		-	14	-	
Q_{gd}	Gate-Drain Charge		-	30	-	

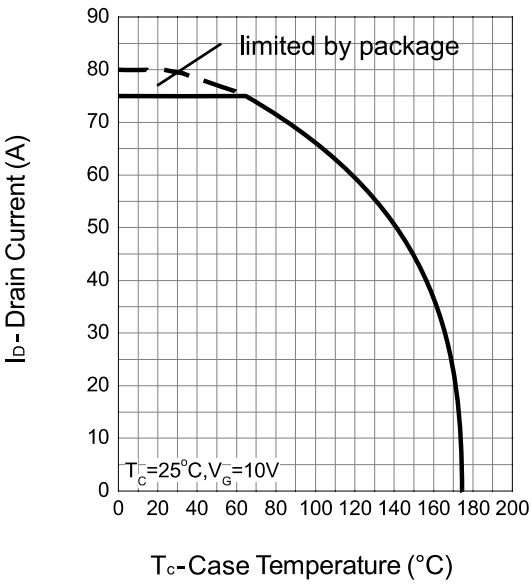
Note * : Pulse test ; pulse width ≤300μs, duty cycle≤2%.

Typical Operating Characteristics

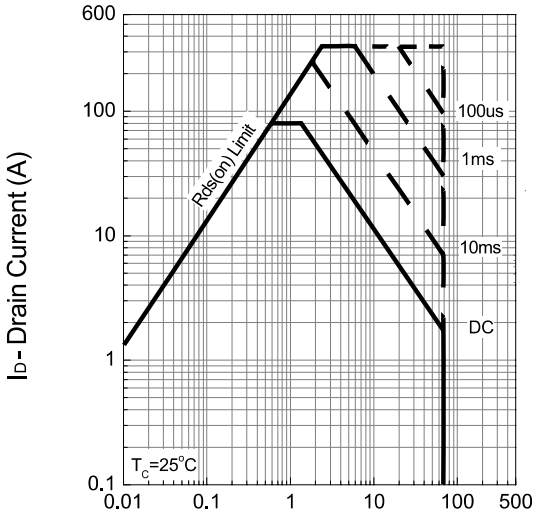
Power Dissipation



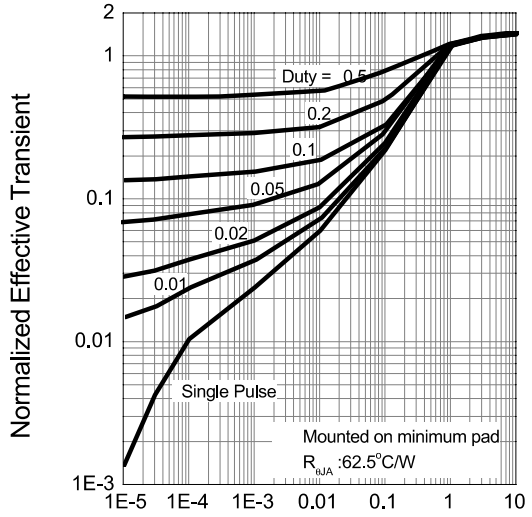
Drain Current



Safe Operation Area

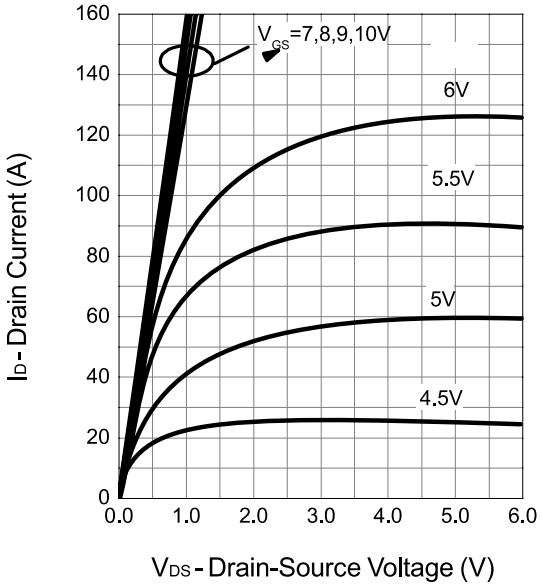


Thermal Transient Impedance

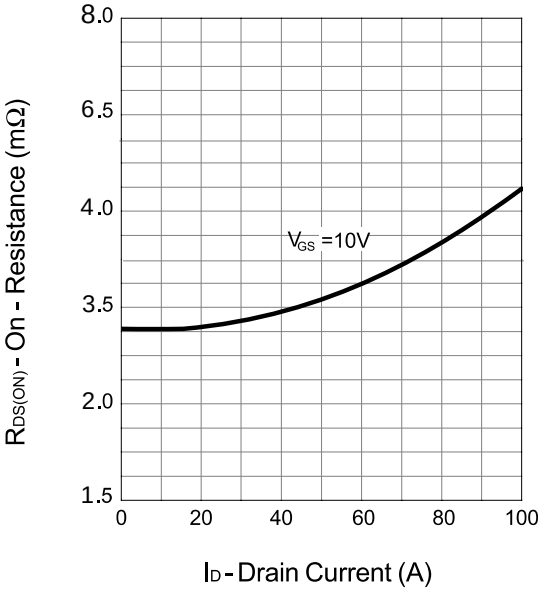


Typical Operating Characteristics (Cont.)

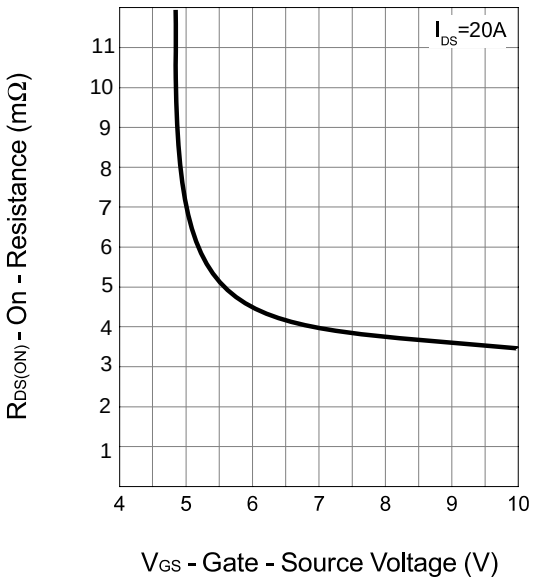
Output Characteristics



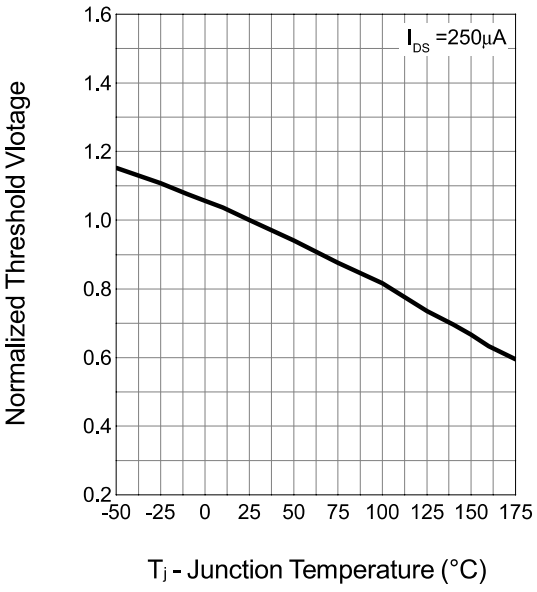
Drain-Source On Resistance



Drain-Source On Resistance

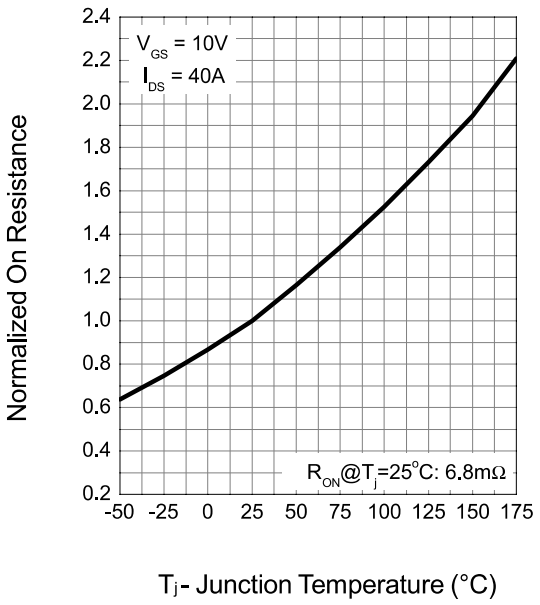


Gate Threshold Voltage

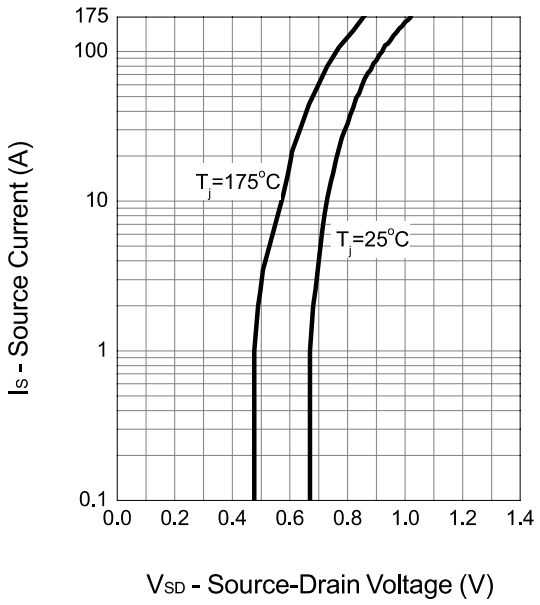


Typical Operating Characteristics (Cont.)

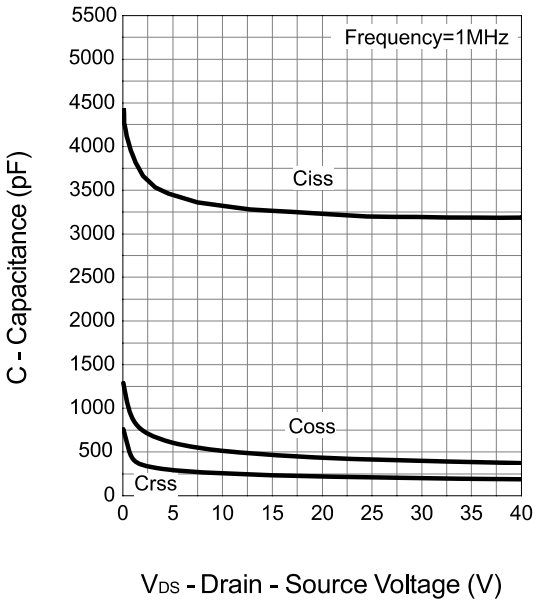
Drain-Source On Resistance



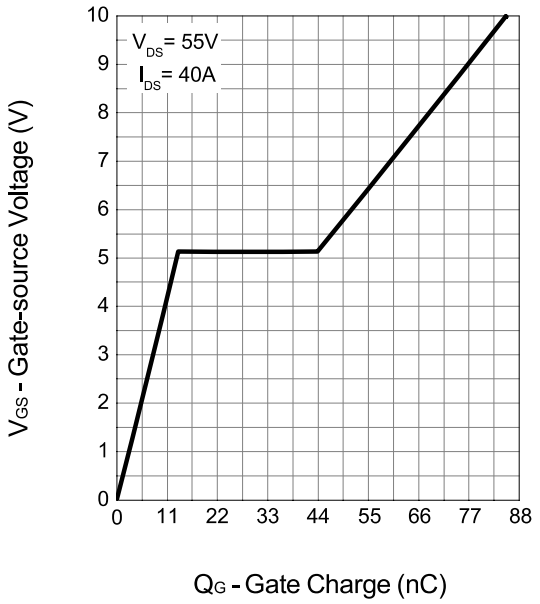
Source-Drain Diode Forward



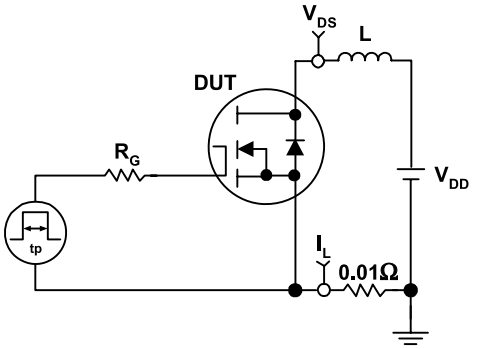
Capacitance

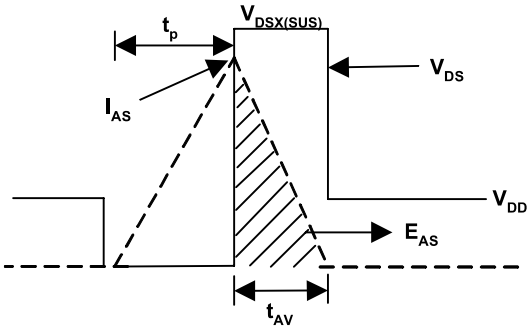


Gate Charge



Avalanche Test Circuit and Waveforms





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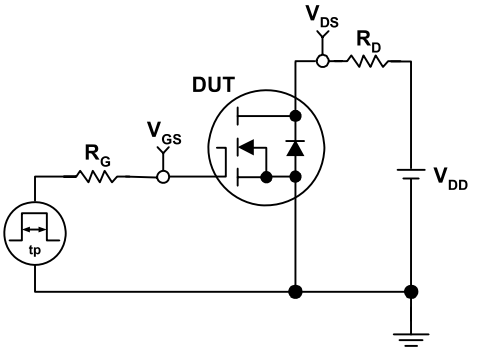
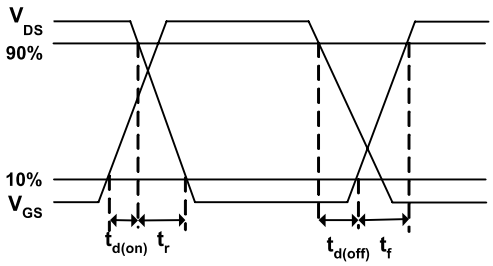
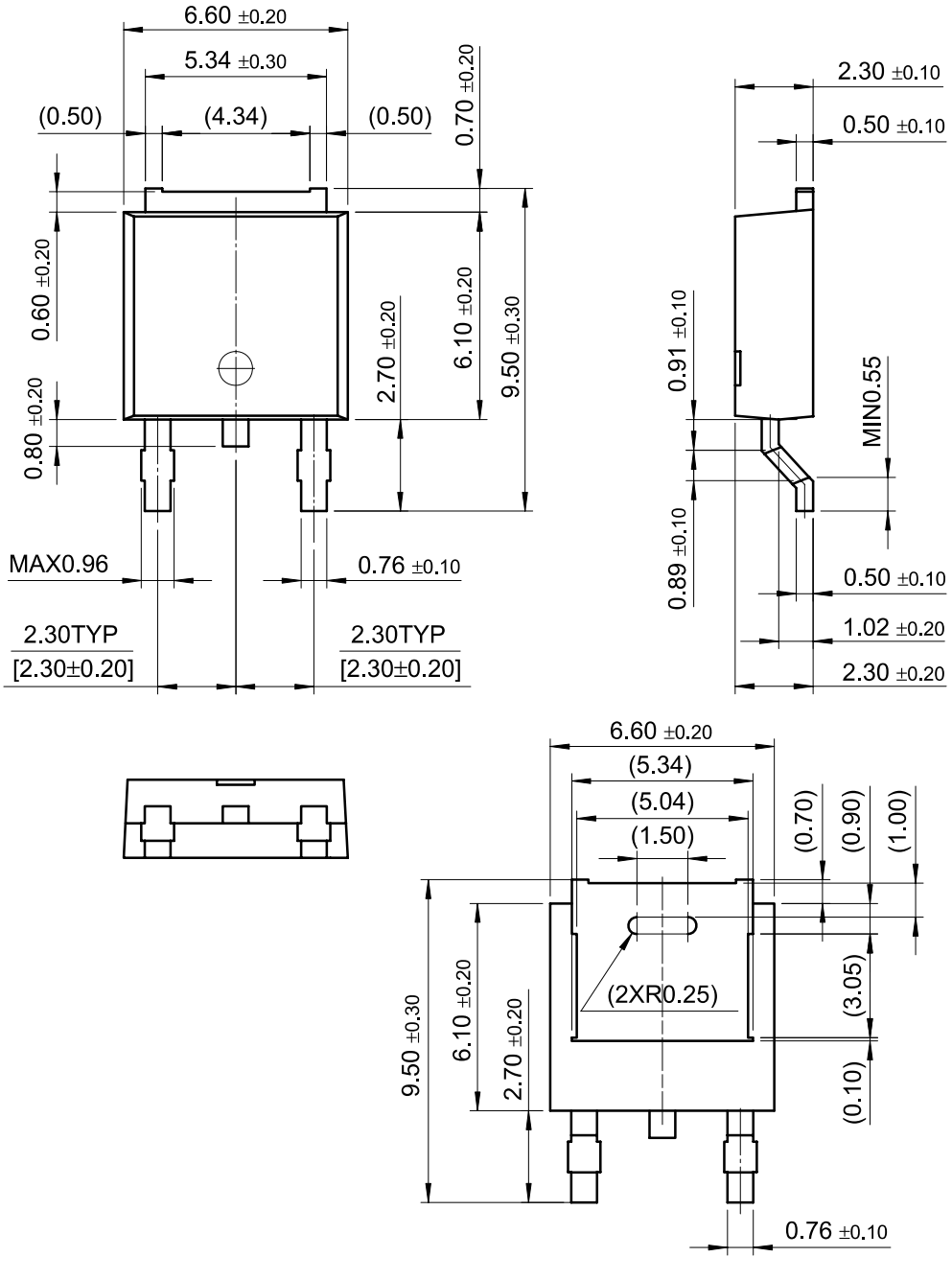




Package Dimensions

TO-252-2L



Dimensions in Millimeters

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