

MT30N100S

N-Channel Power MOSFET
25 V, 130A, 3.0mΩ

Features

- Typ $R_{DS(on)} = 3.0m\Omega$ at $V_{GS} = 4.5V, I_D = 40A$
- 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

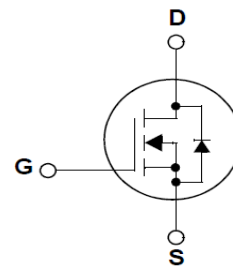
- DC-DC primary bridge
- DC-DC Synchronous rectification
- Power Management for Inverter Systems



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Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



TO-252-2L

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	25	V
V_{GSS}	Gate-Source Voltage	± 12	
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	$T_C = 25^\circ\text{C}$ 130	A

Mounted on Large Heat Sink

I_{DM}	Pulsed Drain Current *	390	A	
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	130	A
		$T_C = 100^\circ\text{C}$	80	
P_D	Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	50	W
		$T_C = 100^\circ\text{C}$	35	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1.3	$^\circ\text{C/W}$	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	32.5		
Avalanche Ratings				
E_{AS}	Avalanche Energy, Single Pulsed	$L = 0.3\text{mH}$ 460	mJ	

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

Symbol	Parameter	Test Conditions				Unit
			Min.	Typ.	Max.	
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} =24V, V _{GS} =0V T _J =85°C	-	-	1	μA
			-	-	10	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	0.5	0.7	1.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±12V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)*}	Drain-Source On-state Resistance	V _{GS} = 4.5 V, I _{DS} = 20 A	-	3.0	4.6	mΩ
Diode Characteristics						
V _{SD*}	Diode Forward Voltage	I _{SD} =40A, V _{GS} =0V	-	0.8	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} =40A, dI _{SD} /dt=100A/μs	-	33	-	ns
Q _{rr}	Reverse Recovery Charge		-	61	-	nC

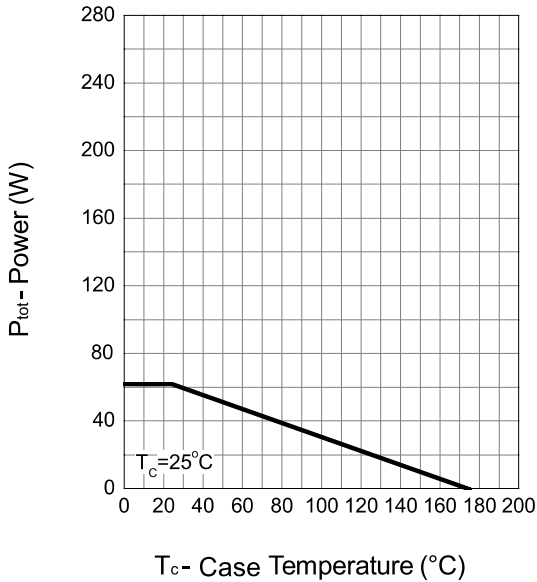
Electrical Characteristics (Cont.) (T_A = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions				Unit
			Min.	Typ.	Max.	
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} = 4.5V,	-	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} = 4.5V, I _{DS} =40A	-	84	-	nC
Q _{gs}	Gate-Source Charge		-	14	-	
Q _{gd}	Gate-Drain Charge		-	30	-	

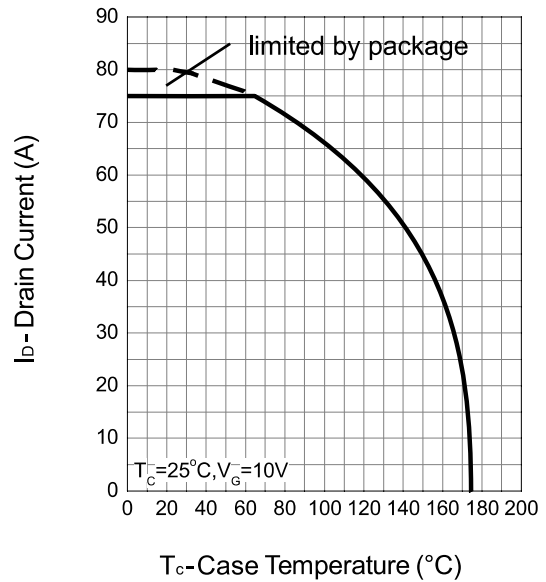
Note * : Pulse test ; pulse width ≤300μs, duty cycle ≤2%.

Typical Operating Characteristics

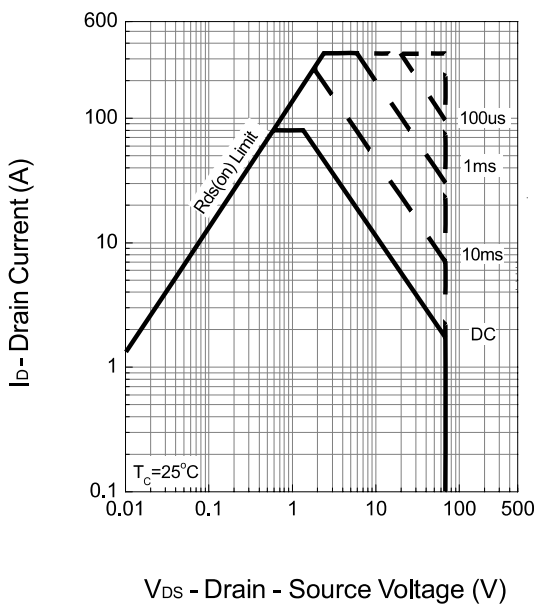
Power Dissipation



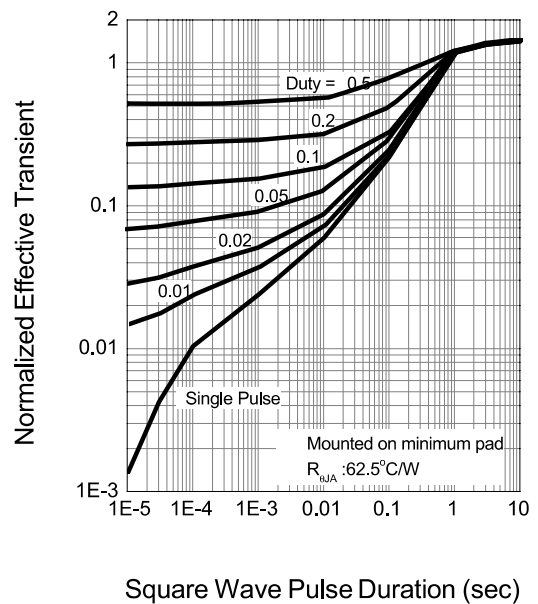
Drain Current



Safe Operation Area

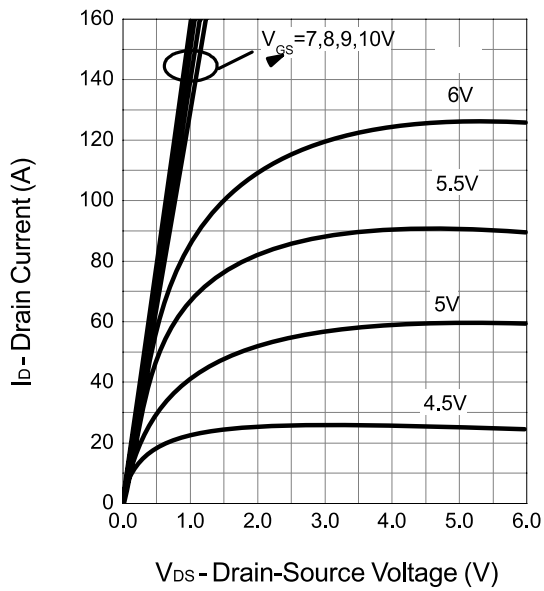


Thermal Transient Impedance

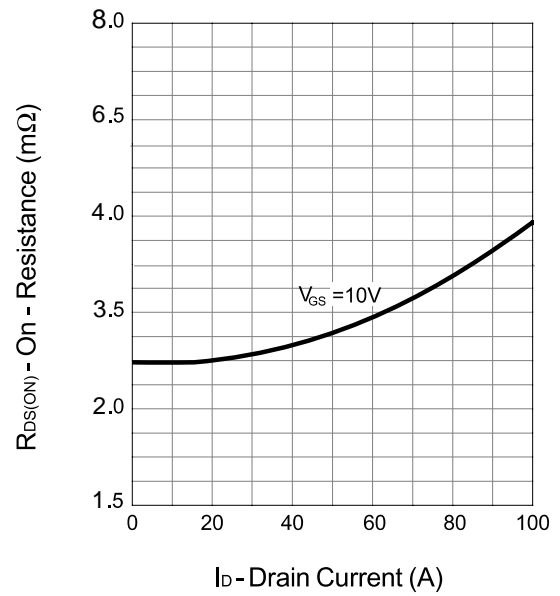


Typical Operating Characteristics (Cont.)

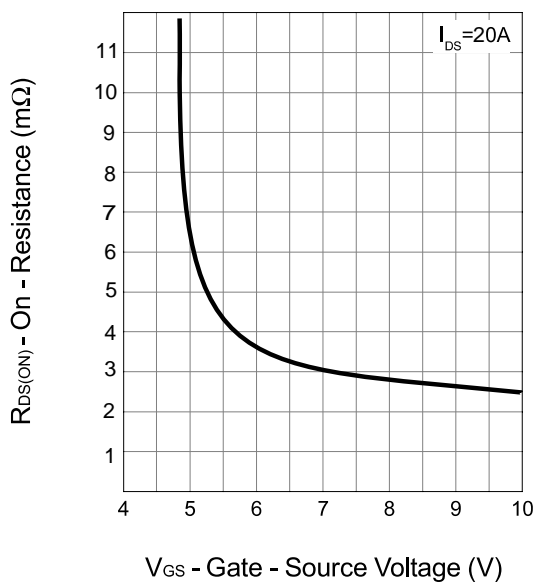
Output Characteristics



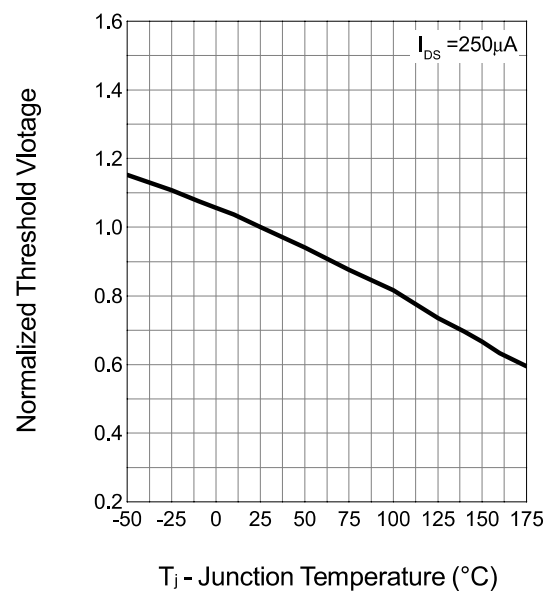
Drain-Source On Resistance



Drain-Source On Resistance

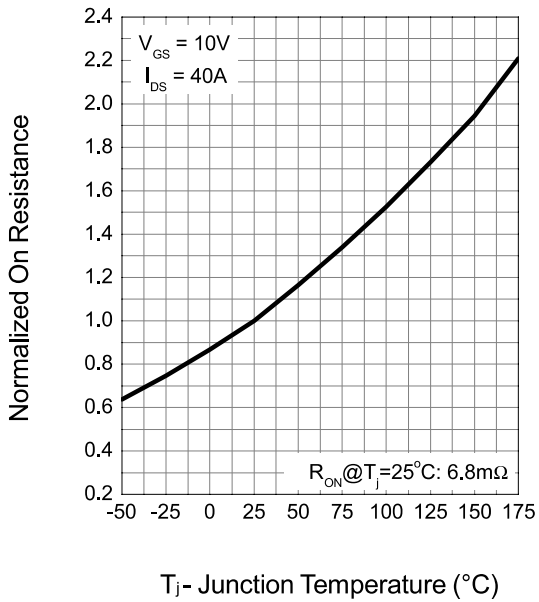


Gate Threshold Voltage

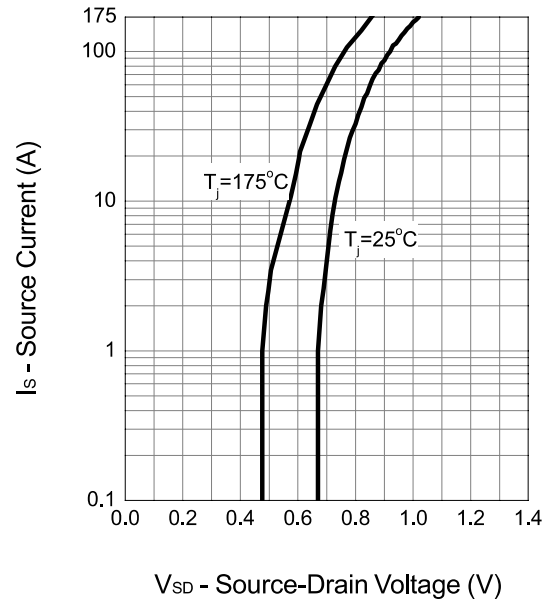


Typical Operating Characteristics (Cont.)

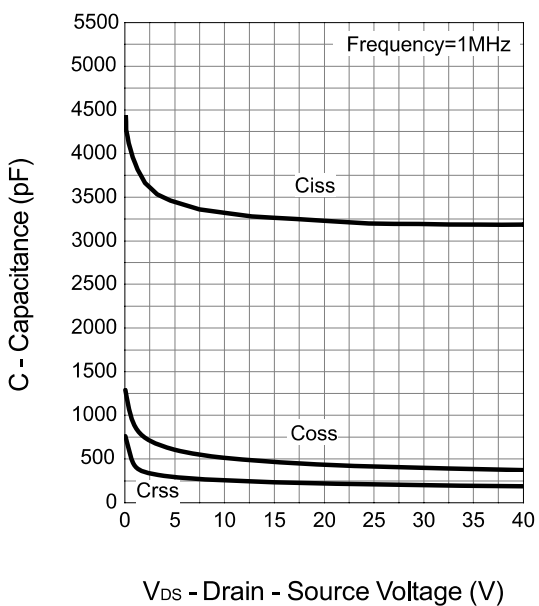
Drain-Source On Resistance



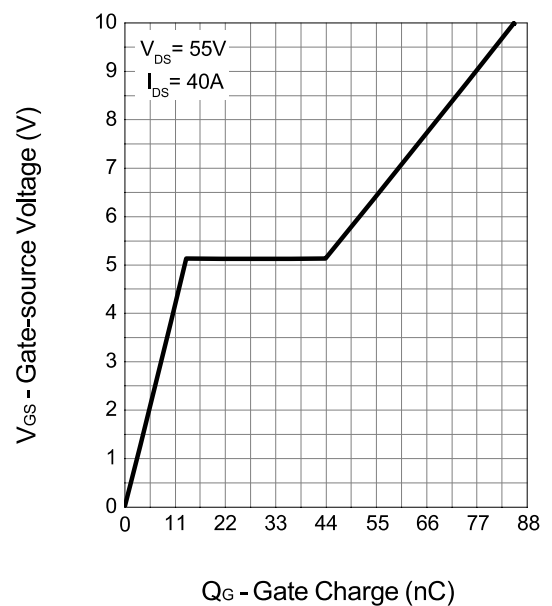
Source-Drain Diode Forward



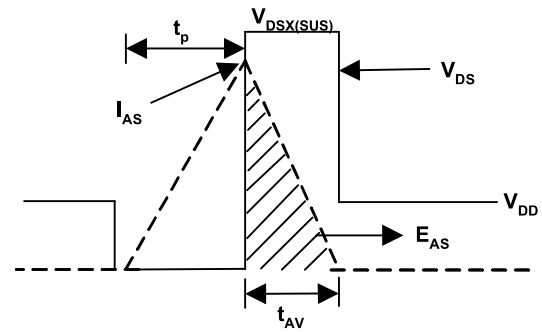
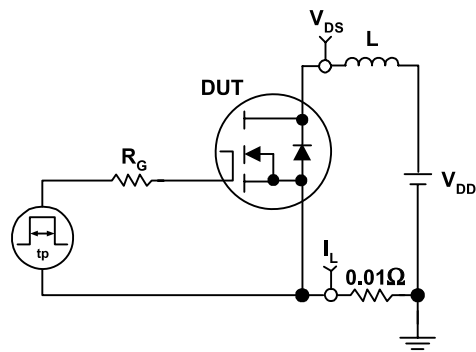
Capacitance



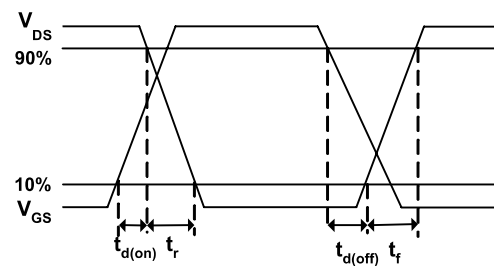
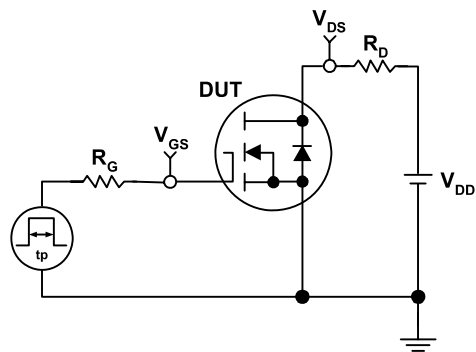
Gate Charge



Avalanche Test Circuit and Waveforms

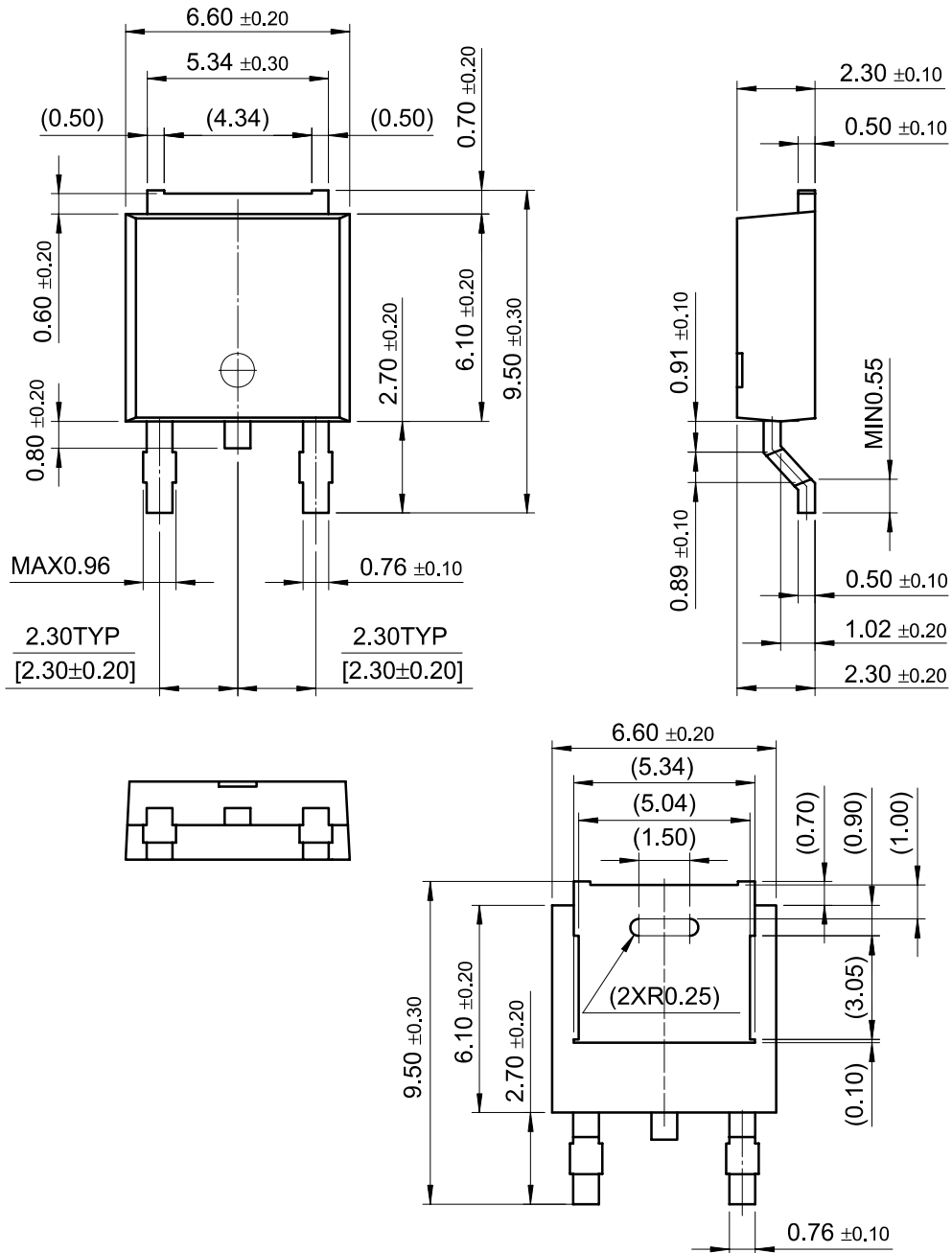


Avalanche Test Circuit and Waveforms



Package Dimensions

TO-252-2L



Dimensions in Millimeters

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