MT19N10

N-Channel 100V Power MOSFET

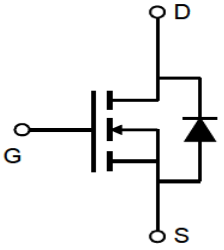
MT Semiconductor®

http://www.mtsemi.com

Features

- Typ R_{DS}(on)=90mΩ(typ)@ V_{GS} =10V,I_D =8A
- Fast Switching Speed
- Low Gate Charge
- High Power and Current Handling Capability

Simplified Schematic

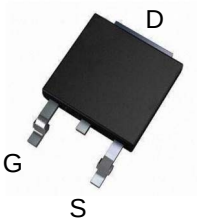


General Description

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.

MARKING DIAGRAM & PIN ASSIGNMENT

TO-252-2L



Applications

- DC-DC primary bridge
- DC-DC Synchronous rectification
- DC FAN

MOSFET Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter			Ratings	Units
V_{DSS}	Drain to Source Voltage			100	V
V_{GSS}	Gate to Source Voltage			±20	V
I_D	Drain Curren	- Continuous (Silicon Limited)	T_C = 25°C	15.6	A
		- Continuous(Package Limited)	T_C = 25°C	8.5	
		- Continuous	T_C = 25°C(Note 1a)	45	
		- Pulsed		62.4	A
E_{AS}	Single Pulsed Avalanche Energy		(Note3)	25	mJ
P_D	Power Dissipation	- T_C = 25°C	(Note 1a)	50	W
		- T_A = 25°C	(Note 1b)	0.4	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range			-55 to +150	°C

Thermal Characteristics

Symbol	Parameter		Ratings	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	(Note 1)	3.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1a)	55	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
MT19N10	MT19N10	TO-252-2L	-	-	2500

Electrical Characteristics

T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	100	--	--	V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C	--	0.09	--	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 100 V, V_{GS} = 0 V	--	--	1	μA
		V_{DS} = 80 V, T_C = 125°C	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 20 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -20 V, V_{DS} = 0 V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 μA	1.0	--	2.9	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 8A	--	90	--	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 30 V, I_D = 7.8 A (Note 4)	--	11	--	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	--	1600	pF
C_{oss}	Output Capacitance		--	--	800	pF
C_{rss}	Reverse Transfer Capacitance		--	--	290	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 50 V, I_D = 19 A, R_G = 25 Ω (Note 4, 5)	--	12	31	ns
t_r	Turn-On Rise Time		--	400	800	ns
$t_{d(off)}$	Turn-Off Delay Time		--	20	50	ns
t_f	Turn-Off Fall Time		--	120	250	ns
Q_g	Total Gate Charge	V_{DS} = 80 V, I_D = 19 A, V_{GS} = 5 V (Note 4, 5)	--	12	14	nC
Q_{gs}	Gate-Source Charge		--	2.5	--	nC
Q_{gd}	Gate-Drain Charge		--	9.0	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	15.6	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	62.4	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 15.6 A	--	--	0.8	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_S = 19 A, dI_F / dt = 100 A/μs (Note 4)	--	80	--	ns
Q_{rr}	Reverse Recovery Charge		--	0.195	--	μC

Notes:
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 1.35mH, I_{AS} = 15.6A, V_{DD} = 25V, R_G = 25 Ω, Starting T_J = 25°C
3. I_{SD} ≤ 19A, di/dt ≤ 300A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

Typical Characteristics

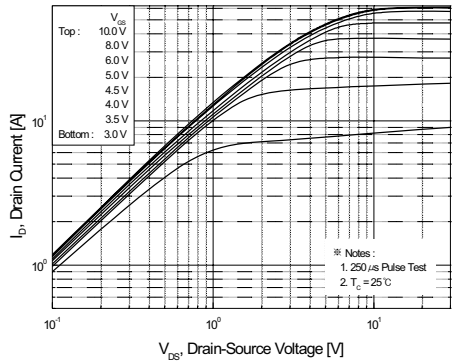


Figure 1. On-Region Characteristics

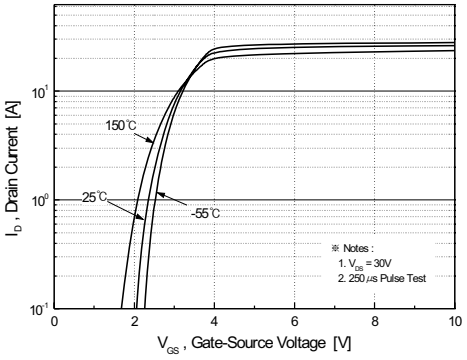


Figure 2. Transfer Characteristics

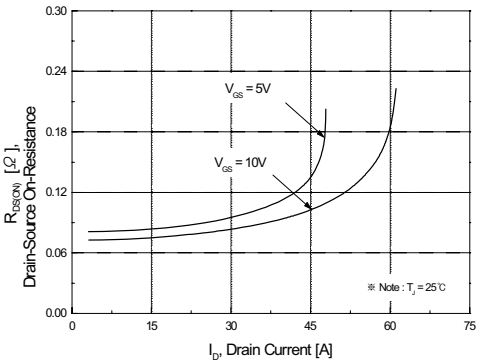


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

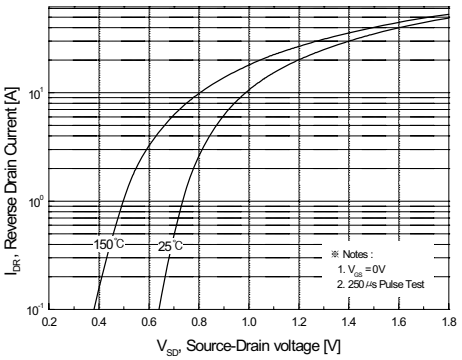


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

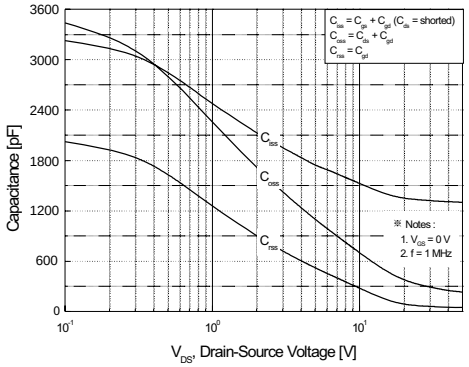


Figure 5. Capacitance Characteristics

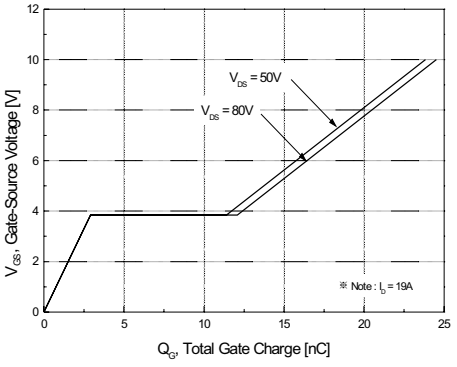


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

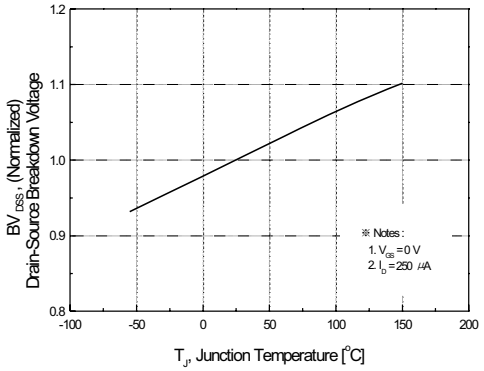


Figure 7. Breakdown Voltage Variation vs. Temperature

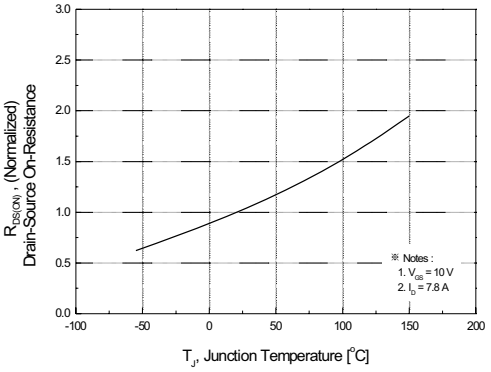


Figure 8. On-Resistance Variation vs. Temperature

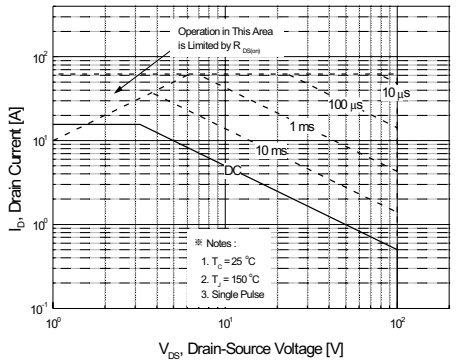


Figure 9. Maximum Safe Operating Area

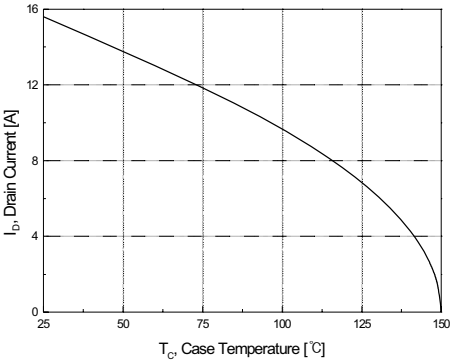


Figure 10. Maximum Drain Current vs. Case Temperature

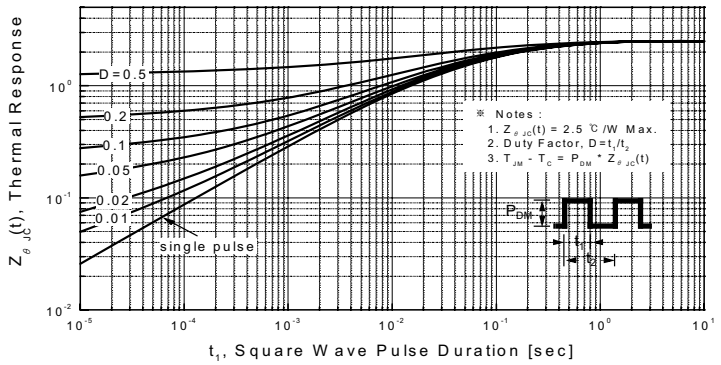
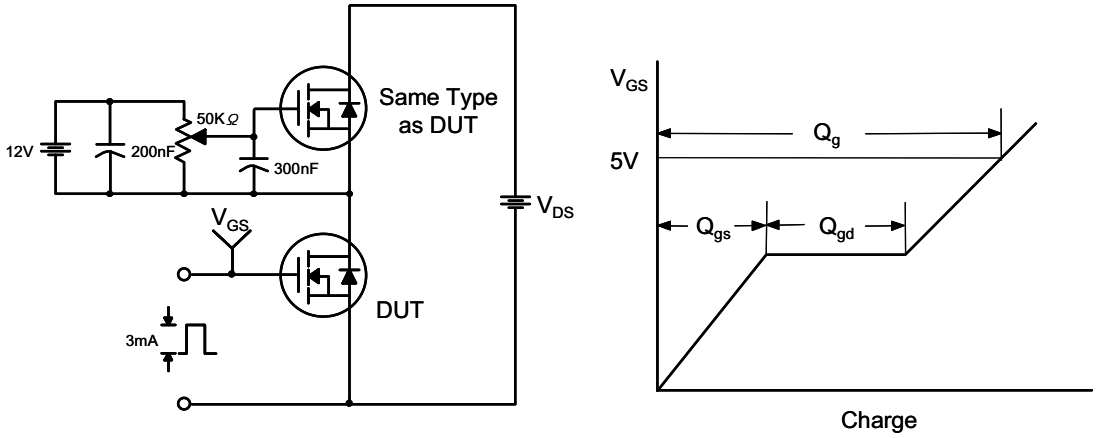
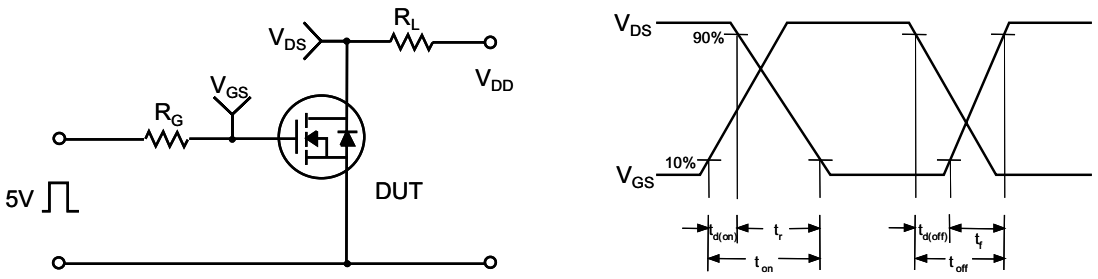


Figure 11. Transient Thermal Response Curve

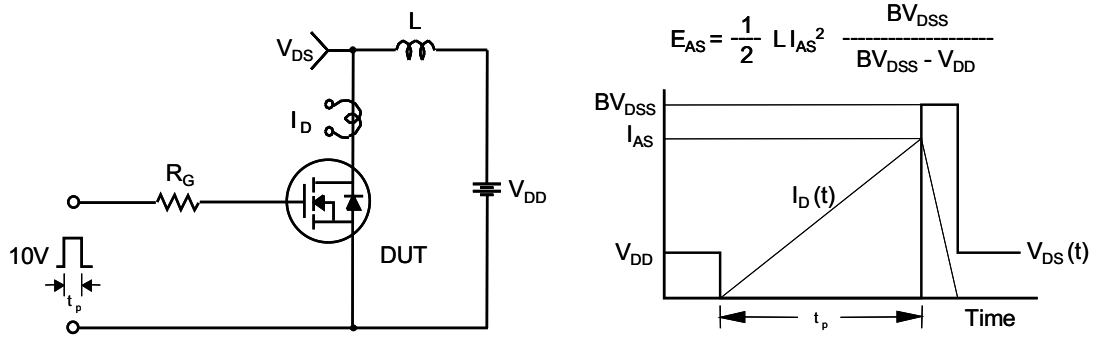
Gate Charge Test Circuit & Waveform



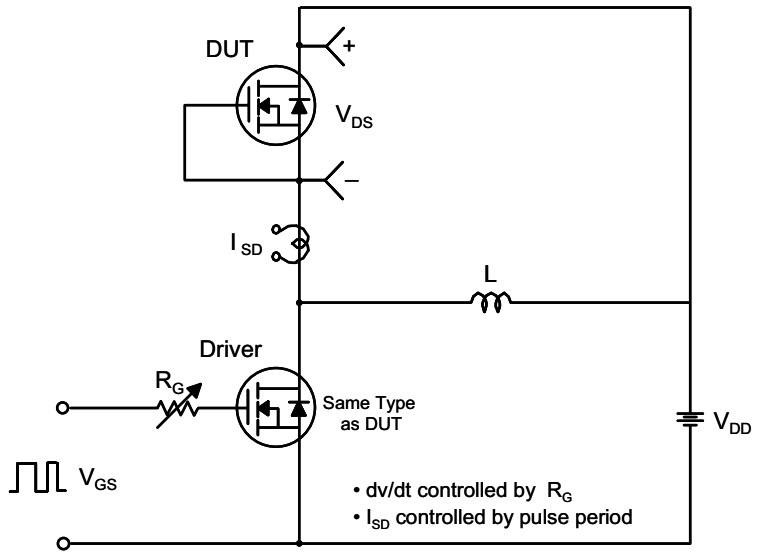
Resistive Switching Test Circuit & Waveforms

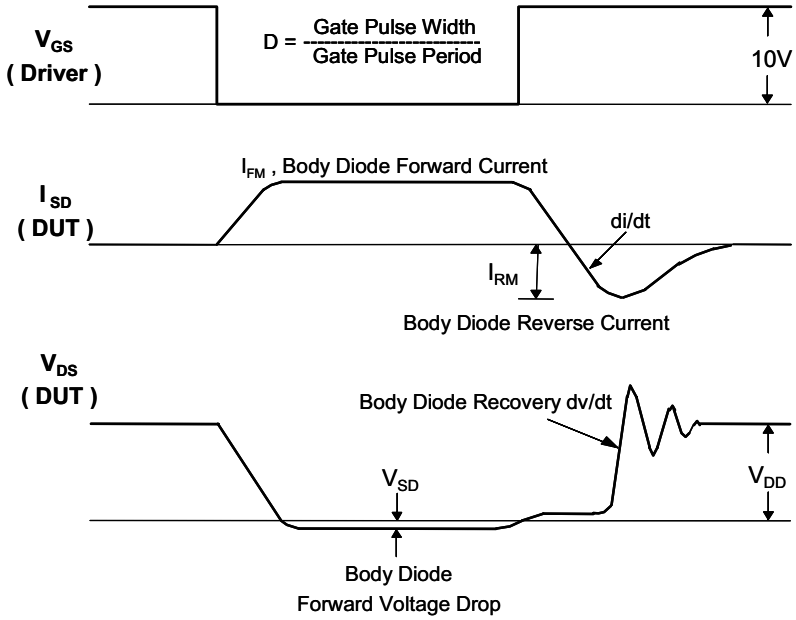


Unclamped Inductive Switching Test Circuit & Waveforms



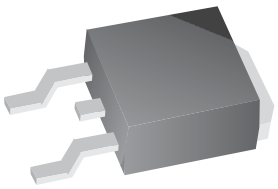
Peak Diode Recovery dv/dt Test Circuit & Waveforms

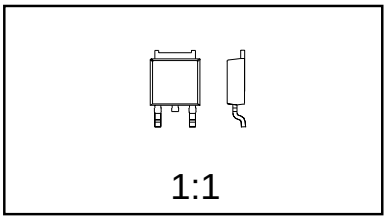




Package Dimensions

TO-252-2L

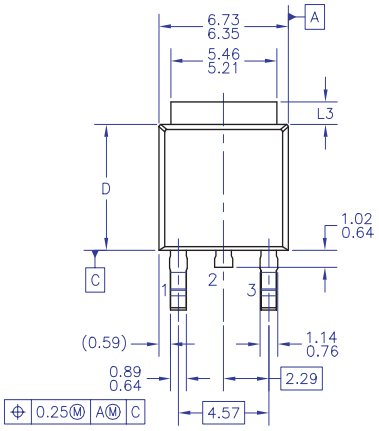


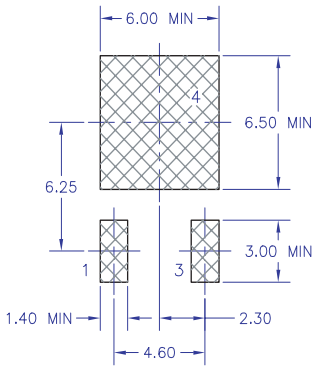


Scale 1:1 on letter size paper

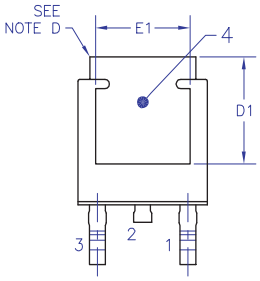
Dimensions shown below are in:
millimeters

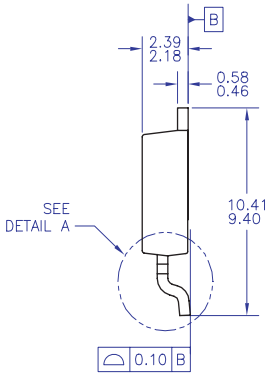
Part Weight per unit (gram): 0.33

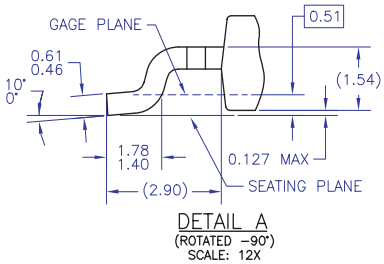




LAND PATTERN RECOMMENDATION







DETAIL A
(ROTATED −90°)
SCALE: 12X

NOTES: UNLESS OTHERWISE SPECIFIED

A) ALL DIMENSIONS ARE IN MILLIMETERS.

B) THIS PACKAGE CONFORMS TO JEDEC, TO−252, ISSUE C, VARIATION AA & AB, DATED NOV. 1999.

C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M−1994.

D) HEAT SINK TOP EDGE COULD BE IN CHAMFERED CORNERS OR EDGE PROTRUSION.

E) DIMENSIONS L3,D,E1&D1 TABLE:

	OPTION AA	OPTION AB
L3	0.89−1.27	1.52−2.03
D	5.97−6.22	5.33−5.59
E1	4.32 MIN	3.81 MIN
D1	5.21 MIN	4.57 MIN

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Keep safety first in your circuit designs!

1. MOS-TECH Semiconductor Corp. puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.
   Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.