

MT15N10

8A N-Channel 100V Power MOSFET

Features

- Typ $R_{DS(on)} = 100m\Omega$ (typ) @ $V_{GS} = 10V, I_D = 4A$
- Fast Switching Speed
- Low Gate Charge
- High Power and Current Handling Capability

General Description

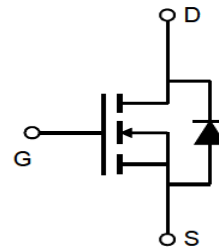
This N-Channel MOSFET is produced using MOS-TECH Semiconductor's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet



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Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



Applications

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

MOSFET Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain to Source Voltage	100	V
V_{GSS}	Gate to Source Voltage	± 25	V
I_D	Drain Current - Continuous (Silicon Limited) $T_C = 25^\circ\text{C}$	8	A
	- Continuous (Package Limited) $T_C = 25^\circ\text{C}$	4	
	- Continuous $T_C = 25^\circ\text{C}$ (Note 1a)	24	
	- Pulsed	24	A
E_{AS}	Single Pulsed Avalanche Energy (Note 3)	5.0	mJ
P_D	Power Dissipation - $T_C = 25^\circ\text{C}$ (Note 1a)	30	W
	- $T_A = 25^\circ\text{C}$ (Note 1b)	0.4	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

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

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
MT15N10	MT15N10	TO-252-2L	-	-	2500

Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	100	--	--	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250\text{ }\mu\text{A}$, Referenced to 25°C	--	0.09	--	$V/^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	μA
		$V_{DS} = 80\text{ V}, T_C = 125^\circ\text{C}$	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0	1.7	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 4\text{ A}$	--	100	130	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS} = 30\text{ V}, I_D = 2\text{ A}$ (Note 4)	--	11	--	S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	--	580	pF
C_{oss}	Output Capacitance		--	--	200	pF
C_{rss}	Reverse Transfer Capacitance		--	--	90	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 50\text{ V}, I_D = 2\text{ A}$ $R_G = 25\text{ }\Omega$ (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	$V_{DS} = 80\text{ V}, I_D = 2\text{ A}$ $V_{GS} = 5\text{ V}$ (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	--	--	8	A	
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current	--	--	32	A	
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 1 A	--	--	0.8	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = 1A	--	80	--	ns
Q _{rr}	Reverse Recovery Charge	dI _F / dt = 100 A/μs (Note 4)	--	0.195	--	μC

Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $L = 1.35\text{ mH}$, $I_{AS} = 1.6\text{ A}$, $V_{DD} = 25\text{ V}$, $R_G = 25\text{ }\Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 19\text{ A}$, $di/dt \leq 300\text{ A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
5. Essentially independent of operating temperature

Typical Characteristics

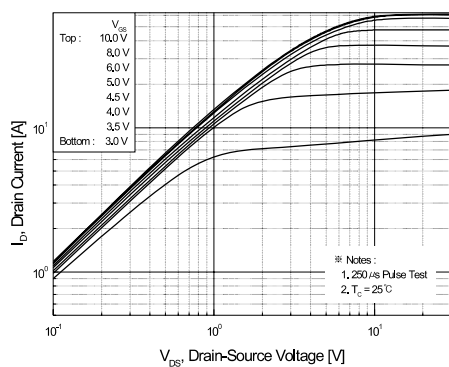


Figure 1. On-Region Characteristics

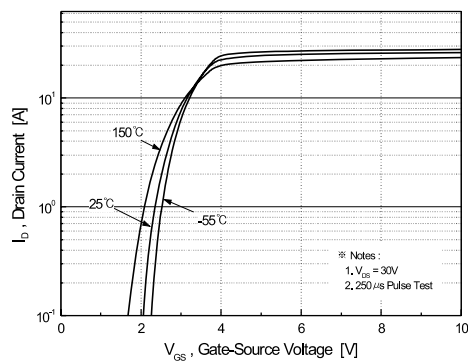


Figure 2. Transfer Characteristics

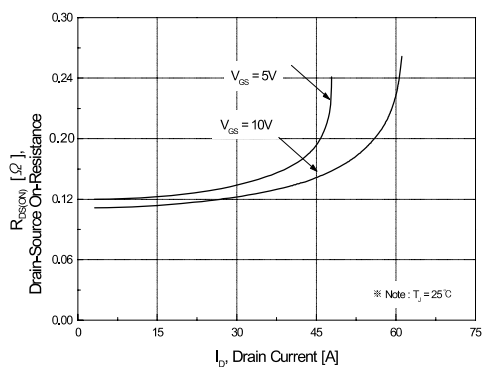


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

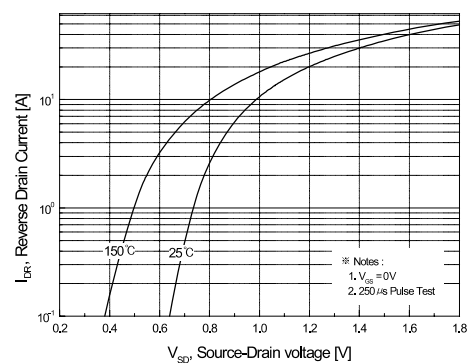


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

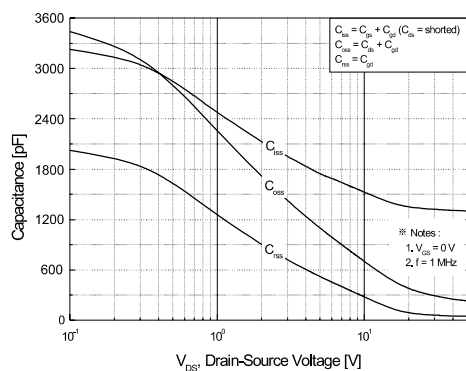


Figure 5. Capacitance Characteristics

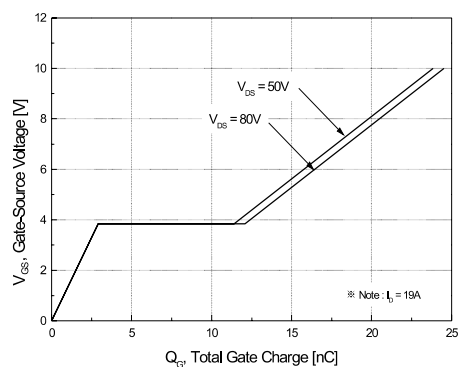


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

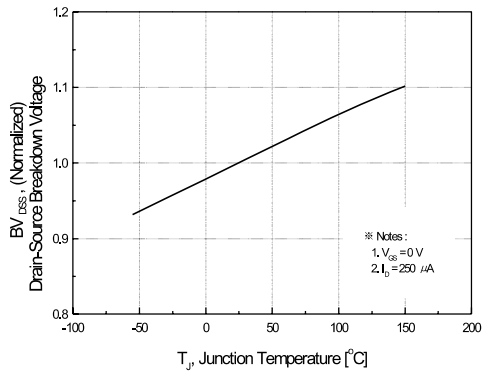


Figure 7. Breakdown Voltage Variation vs. Temperature

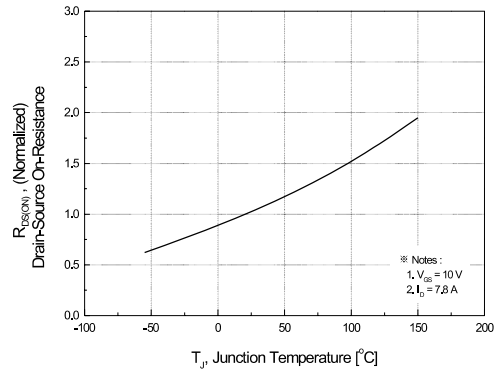


Figure 8. On-Resistance Variation vs. Temperature

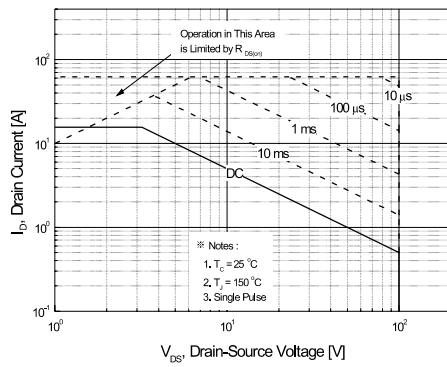


Figure 9. Maximum Safe Operating Area

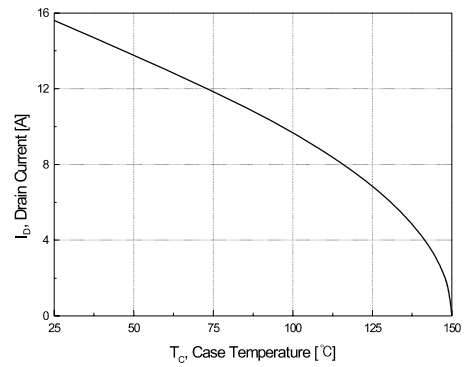


Figure 10. Maximum Drain Current vs. Case Temperature

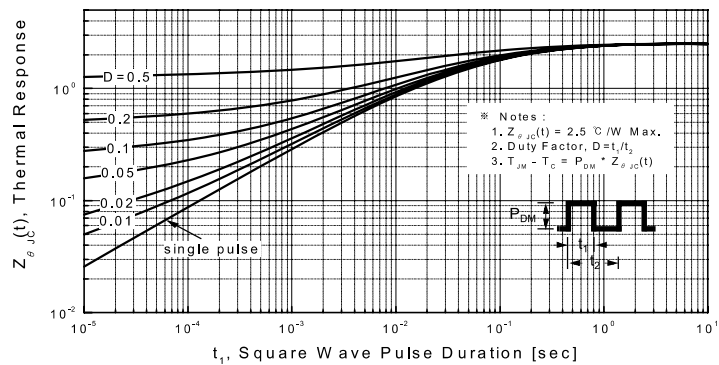
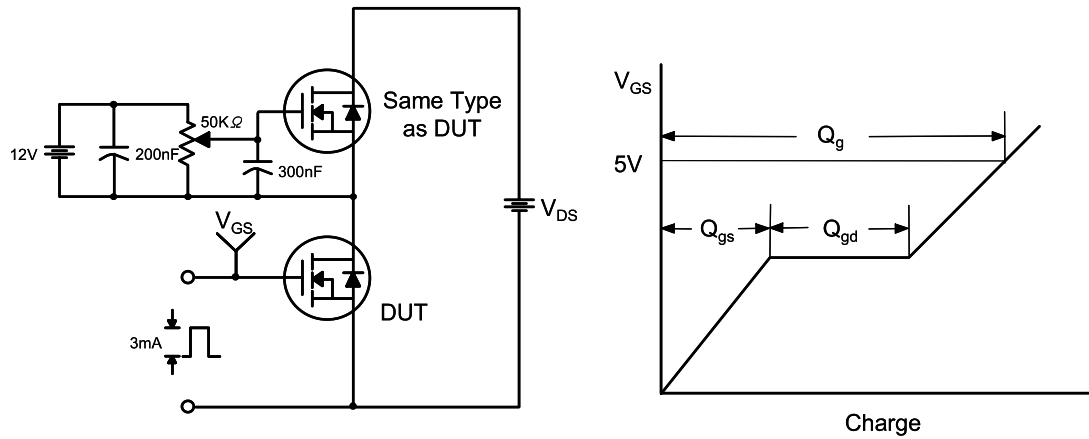
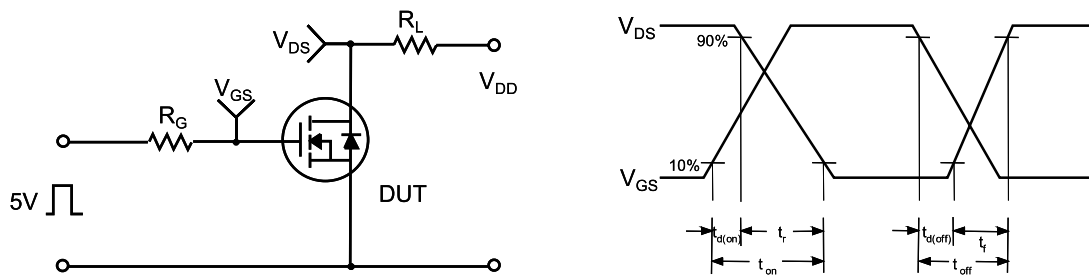


Figure 11. Transient Thermal Response Curve

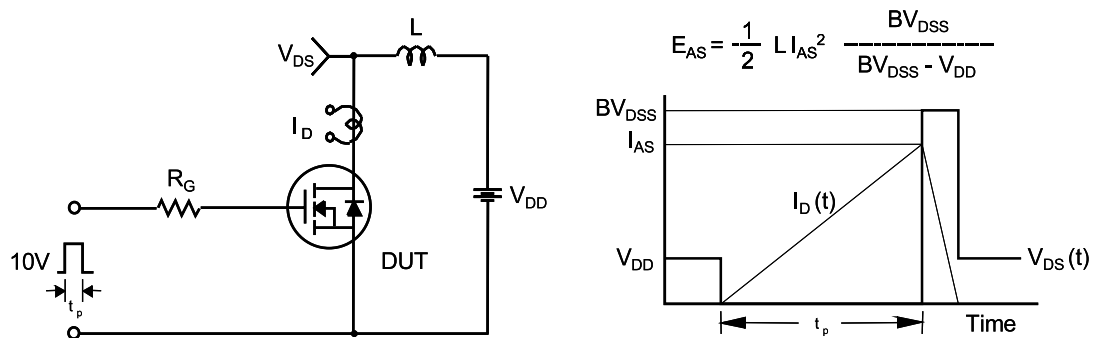
Gate Charge Test Circuit & Waveform



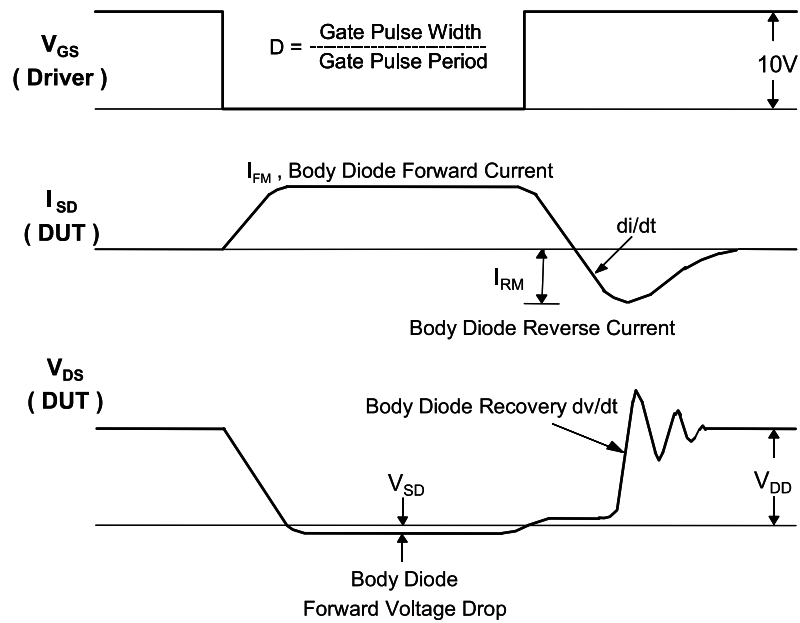
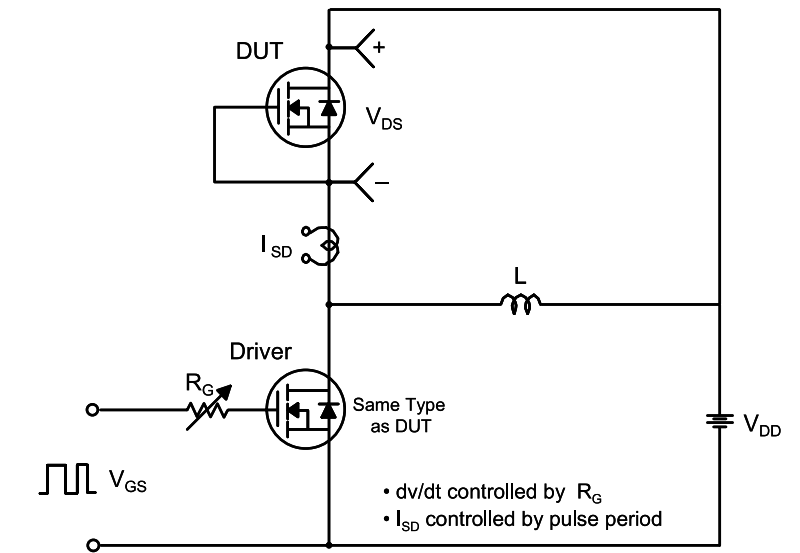
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

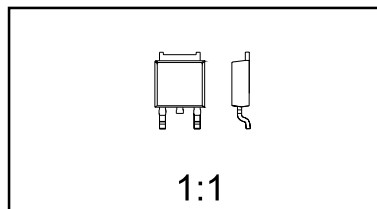
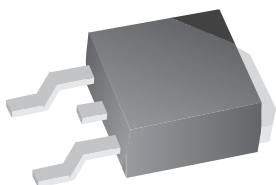


Peak Diode Recovery dv/dt Test Circuit & Waveforms



Package Dimensions

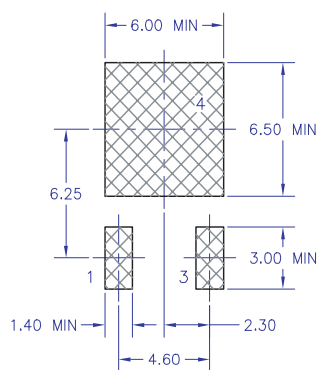
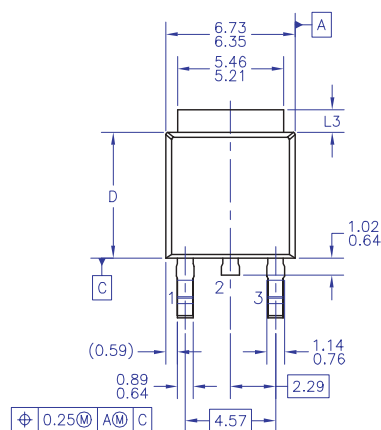
TO-252-2L



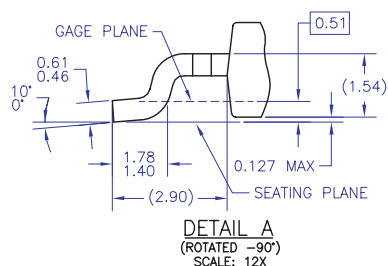
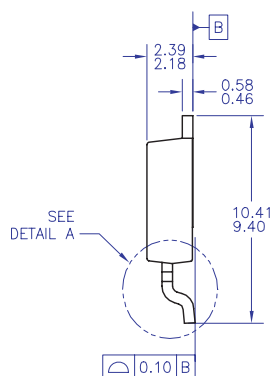
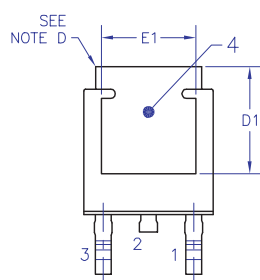
Scale 1:1 on letter size paper

Dimensions shown below are in:
millimeters

Part Weight per unit (gram): 0.33



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 B) THIS PACKAGE CONFORMS TO JEDEC, TO-252, ISSUE C, VARIATION AA & AB, DATED NOV. 1999.
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	OPTION AA	OPTION AB
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D1	5.21 MIN	4.57 MIN

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