

MT3264S

N-Channel Power[®] MOSFET

40V;80A; 4.5mΩ

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.

Features

- $R_{DS(on)} = 4.5m\Omega$ (Typ.) @ $V_{GS} = 10V$, $I_D = 15A$
- High performance trench technology for extremely low $R_{DS(on)}$
- High power and current handling capability
- RoHS compliant

Applications

- DC/DC converters

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Symbol	Parameter		Ratings	Units
V_{DSS}	Drain to Source Voltage		40	V
V_{GSS}	Gate to Source Voltage		± 20	V
I_D	Drain Current	-Continuous ($T_C = 25^\circ C$) (Note 1)	80	A
I_{DM}	Drain Current	- Pulsed	195	A
E_{AS}	Single Pulsed Avalanche Energy (Note 2)		365	mJ
P_D	Power Dissipation	($T_C = 25^\circ C$)	50	W
		- Derate above $25^\circ C$	1.0	W/ $^\circ C$
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	$^\circ C$

Thermal Characteristics

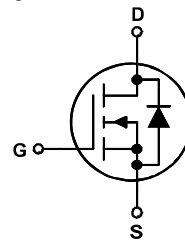
Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.75	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	40	



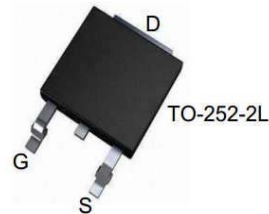
MT Semiconductor[®]

<http://www.mtsemi.com>

Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



Package Marking and Ordering Information $T_C = 25^\circ\text{C}$ unless otherwise noted

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
MT3264S	MT3264S	TO-252-2L	-	-	2500 units

Electrical Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
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Off Characteristics

BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$, $T_J = 25^\circ\text{C}$	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 32\text{V}$, $V_{GS} = 0\text{V}$	-	-	1	μA
		$V_{DS} = 32\text{V}$, $T_C = 150^\circ\text{C}$	-	-	30	
I_{GSS}	Gate to Body Leakage Current	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$	-	-	± 100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 250\mu\text{A}$	1	1.7	3	V
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10\text{V}$, $I_D = 15\text{A}$	-	4.5	6.5	m Ω
		$V_{GS} = 10\text{V}$, $I_D = 15\text{A}$ $T_J = 175^\circ\text{C}$	-	12	-	

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$	-	2500	3350	pF
C_{oss}	Output Capacitance		-	420	580	pF
C_{rss}	Reverse Transfer Capacitance		-	220	340	pF
R_G	Gate Resistance	$V_{GS} = 0\text{V}$, $f = 1\text{MHz}$	-	1.5	-	Ω
$Q_{g(tot)}$	Total Gate Charge at 10V	$V_{GS} = 0\text{V}$ to 10V	-	93	120	nC
$Q_{g(th)}$	Threshold Gate Charge	$V_{GS} = 0\text{V}$ to 2V	-	25.5	33	nC
Q_{gs}	Gate to Source Gate Charge	$V_{DS} = 44\text{V}$ $I_D = 15\text{A}$ $I_g = 1\text{mA}$	-	35	-	nC
Q_{gs2}	Gate Charge Threshold to Plateau		-	9.5	-	nC
Q_{gd}	Gate to Drain "Miller" Charge		-	32	-	nC

Switching Characteristics

t_{ON}	Turn-On Time	$V_{DD} = 28\text{V}$, $I_D = 15\text{A}$ $V_{GS} = 10\text{V}$, $R_{GEN} = 2.5\Omega$	-	97	110	ns
$t_{d(on)}$	Turn-On Delay Time		-	13	25	ns
t_r	Turn-On Rise Time		-	107	205	ns
$t_{d(off)}$	Turn-Off Delay Time		-	42	60	ns
t_f	Turn-Off Fall Time		-	18	46	ns
t_{OFF}	Turn-Off Time		-	60	83	ns

Drain-Source Diode Characteristics

V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS} = 0\text{V}$, $I_{SD} = 15\text{A}$	-	0.85	1.3	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{V}$, $I_{SD} = 15\text{A}$	-	43.3	-	ns
Q_{rr}	Reverse Recovery Charge	$di_F/dt = 100\text{A}/\mu\text{s}$	-	70.8	-	nC

Notes:

- 1: Calculated continuous current based on maximum allowable junction temperature. Package limited to 75A continuous, see Figure 9.
- 2: $L = 0.21\text{mH}$, $I_{AS} = 59\text{A}$, $V_{DD} = 50\text{V}$, $V_{GS} = 10\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

Typical Performance Characteristics

Figure 1. On-Region Characteristics

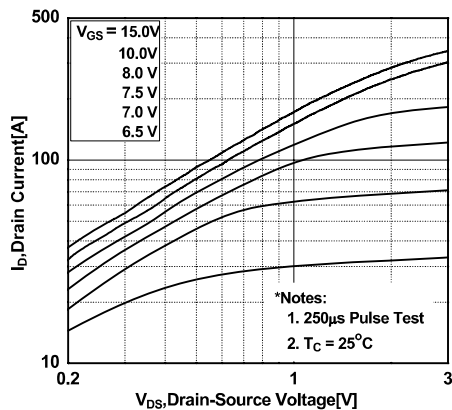


Figure 2. Transfer Characteristics

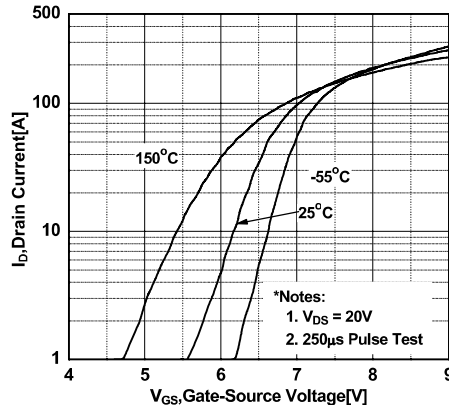


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

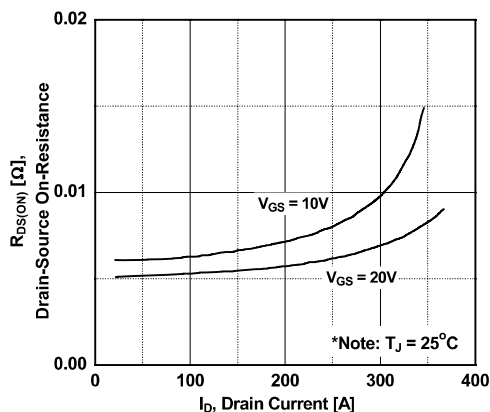


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

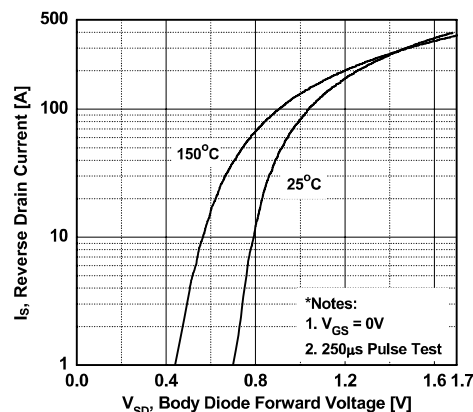


Figure 5. Capacitance Characteristics

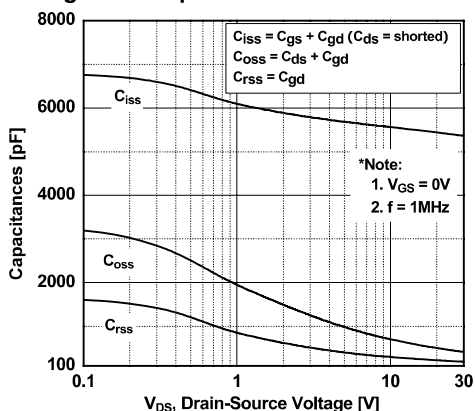
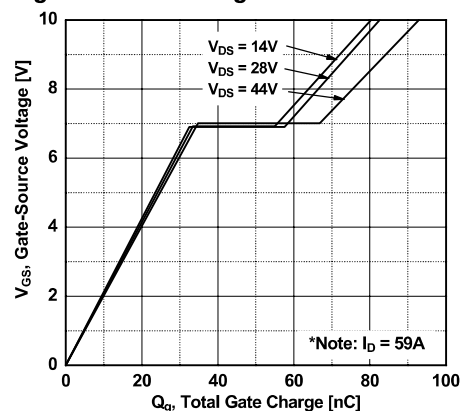


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

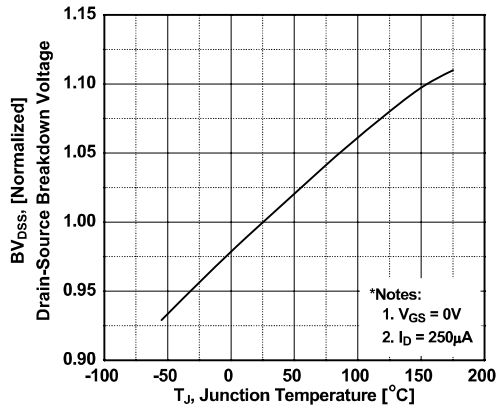


Figure 8. On-Resistance Variation vs. Temperature

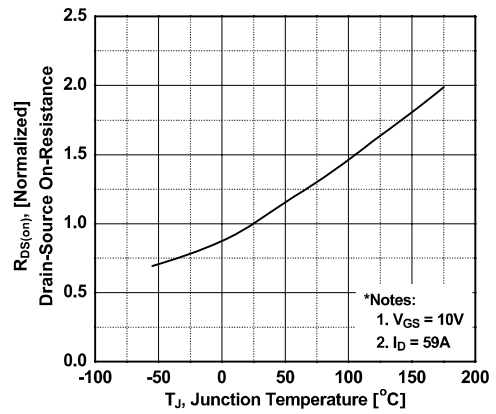


Figure 9. Maximum Safe Operating Area

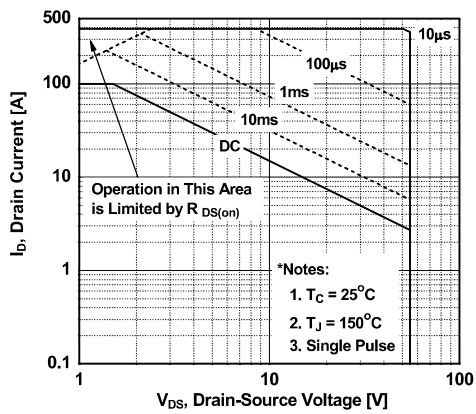


Figure 10. Maximum Drain Current vs. Case Temperature

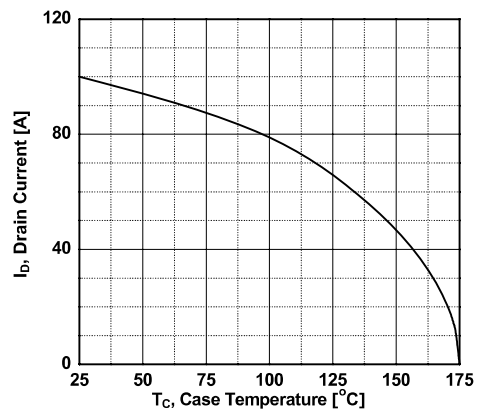
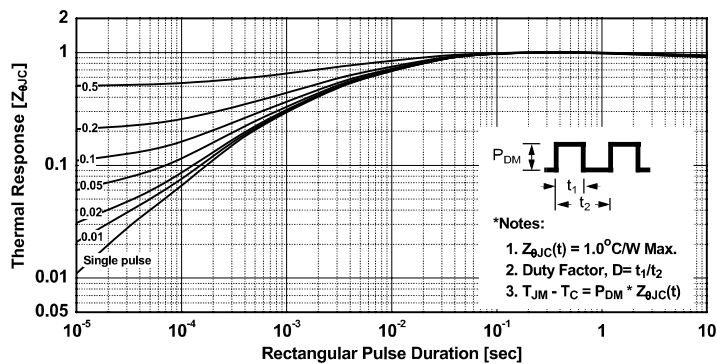
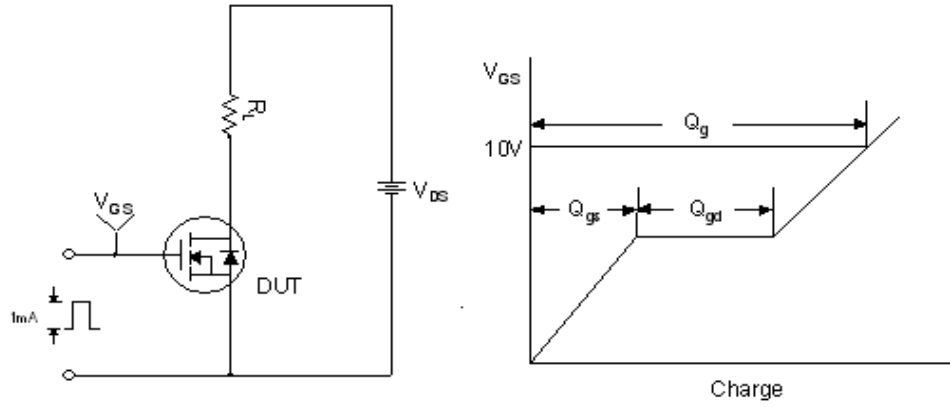


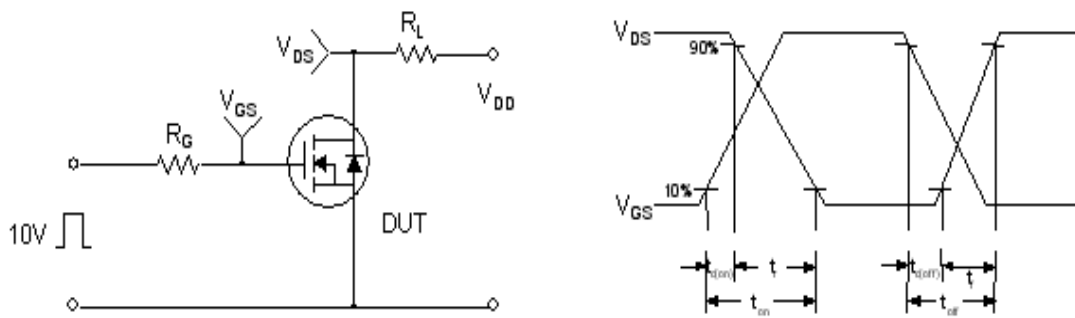
Figure 11. Transient Thermal Response Curve



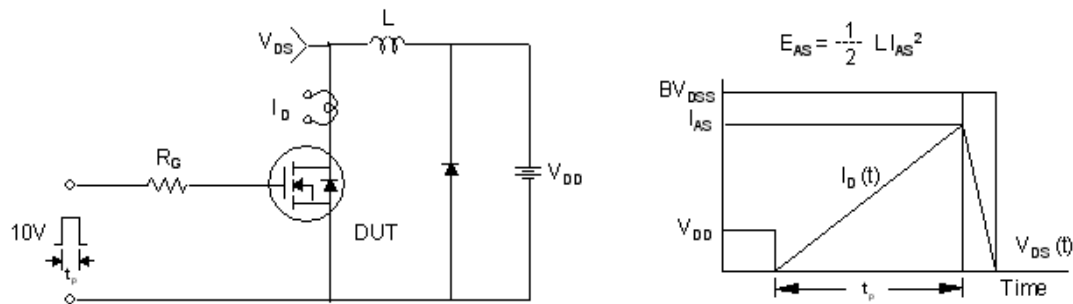
Gate Charge Test Circuit & Waveform



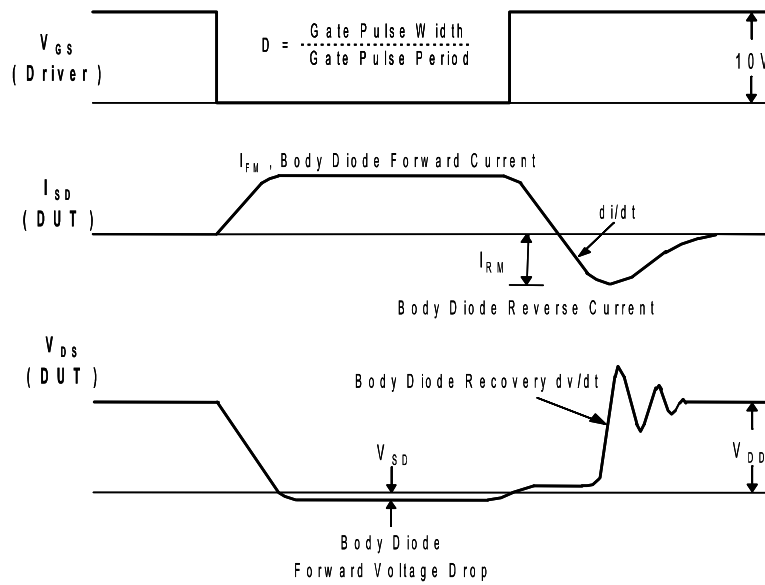
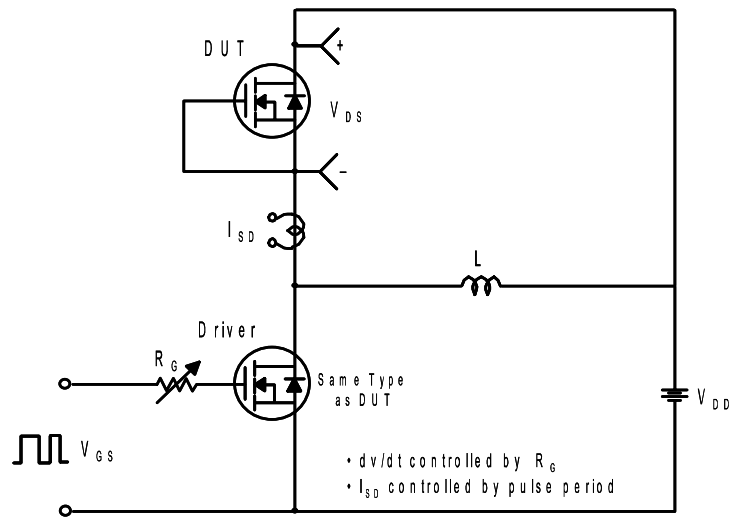
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

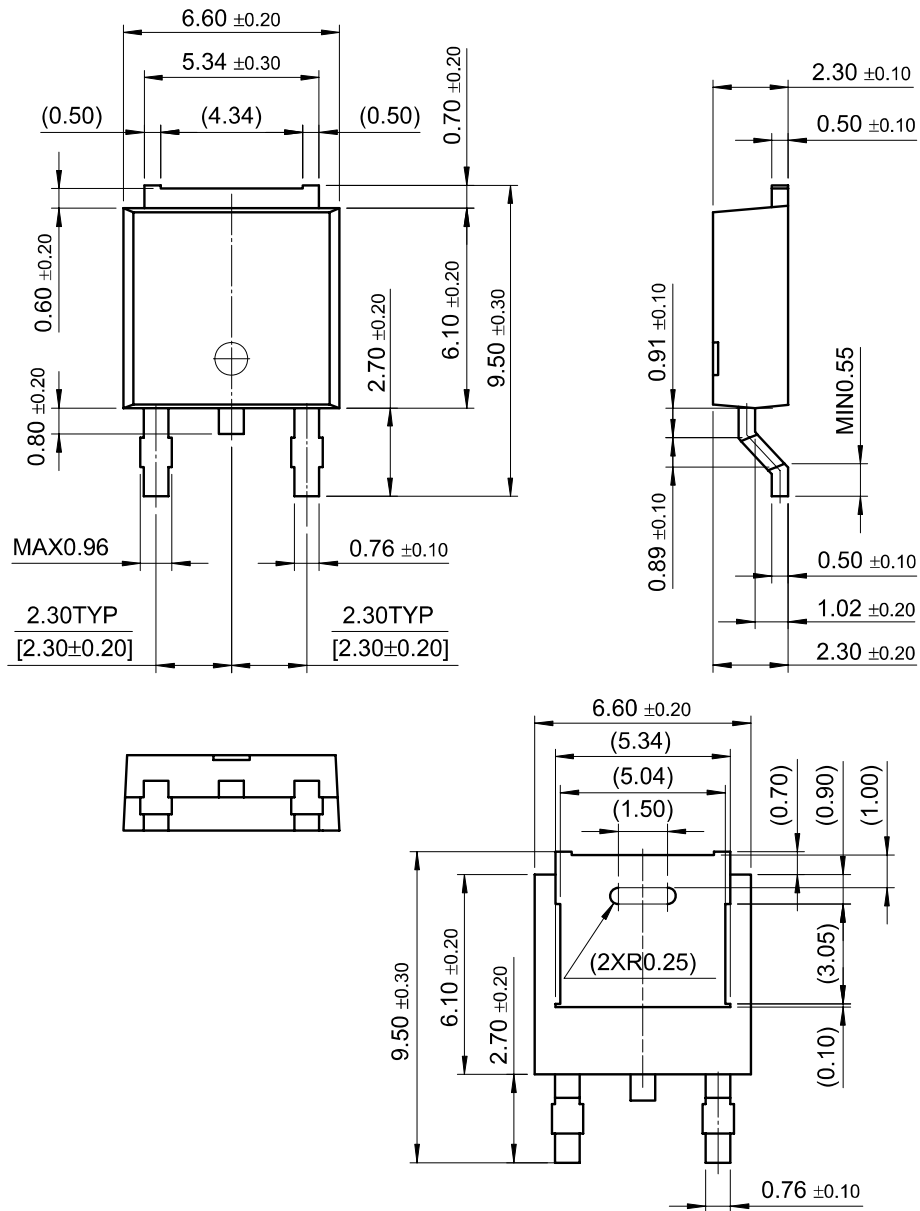


Peak Diode Recovery dv/dt Test Circuit & Waveforms



Package Dimensions

TO-252-2L



Dimensions in Millimeters

Notes regarding these materials

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