

Silicon P-Channel Power MOSFET

Description

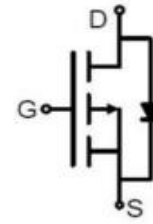
The MDT50P10D uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

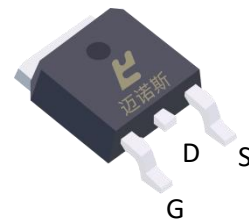
- ① $V_{DS}=-100V$, $I_D=-50A$
- ② Low ON Resistance
- ③ Low Reverse transfer capacitance
- ④ 100% Single Pulse avalanche energy Test

Application

- ① Power switching application
- ② Adapter and charger



Schematic diagram



TO-252

Package Marking And Ordering Information:

Ordering Codes	Package	Product Code	Packing
MDT50P10D	TO-252	MDT50P10D	Reel

ABSOLUTE RATINGS (at $T_C=25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Value	Units
V_{DS}	Drain-to-Source Breakdown Voltage	-100	V
I_D	Drain Current (continuous) at $T_C=25^{\circ}C$	-50	A
I_{DM}	Drain Current (pulsed)	-120	A
V_{GS}	Gate to Source Voltage	+/-20	V
P_{tot}	Total Dissipation at $T_C=25^{\circ}C$	180	W
T_j	Max. Operating Junction Temperature	175	$^{\circ}C$
E_{AS}	Single Pulse Avalanche Energy	700	mJ

Thermal characteristics

Symbol	Parameter	Typ	Units
$R_{\theta JC}$	Junction-to-Case	2.5	$^{\circ}C/W$

Electrical Characteristics (at $T_c=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{DS}	Drain-source Voltage	$V_{GS}=0V, I_D=-250\mu A$	-100	--	--	V
$R_{DS(on)}$	Static Drain-to-Source on-Resistance	$V_{GS}=-10V, I_D=-15A$	--	35	40	m Ω
$V_{GS(th)}$	Gated Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.5	-2.4	V
I_{DSS}	Drain to Source leakage Current	$V_{DS}=-100V, V_{GS}=0V$	--	--	-1.0	μA
$I_{GSS(F)}$	Gated Body Forward Leakage	$V_{GS}=+20V$	--	--	100	nA
$I_{GSS(R)}$	Gated Body Reverse Leakage	$V_{GS}=-20V$	--	--	-100	nA
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=-25V, f=1.0MHz$	--	2315	--	pF
C_{oss}	Output Capacitance		--	190	--	pF
C_{rss}	Reverse Transfer Capacitance		--	11	--	pF

Switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=-20V, I_D=-15A, R_G=10\Omega$	--	28	--	nS
t_r	Turn-on Rise Time		--	21	--	nS
$t_{d(off)}$	Turn-off Delay Time		--	62	--	nS
t_f	Turn-off Fall Time		--	32	--	nS
Q_g	Total Gate Charge	$V_{DS}=-20V, I_D=-15A, V_{GS}=-10V$	--	40	--	nC
Q_{gs}	Gate-Source Charge		--	9.2	--	nC
Q_{gd}	Gate-Drain Charge		--	14	--	nC

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
I _{SD}	S-D Current(Body Diode)		--	--	-50	A
I _{SDM}	Pulsed S-D Current(Body Diode)		--	--	-140	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _{DS} =-50A	--	--	-1.5	V
t _{rr}	Reverse Recovery Time	T _J =25℃, I _F =-50A di/dt=100A/us	--	--	555	nS
Q _{rr}	Reverse Recovery Charge		--	--	4550	μC
	*Pulse Test: Pulse Width <= 300μs, Duty Cycle< =2%					

Characteristics Curves

Figure 1 Output Characteristics

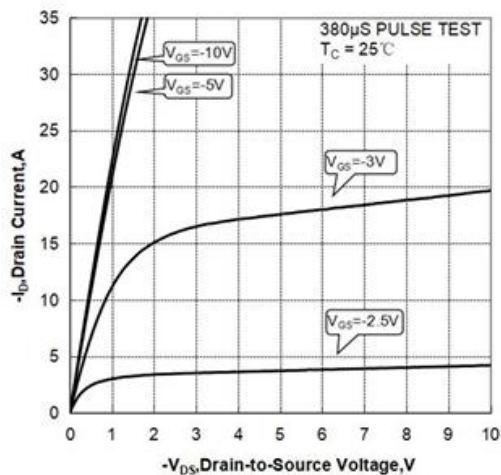


Figure 2 Transfer Characteristics

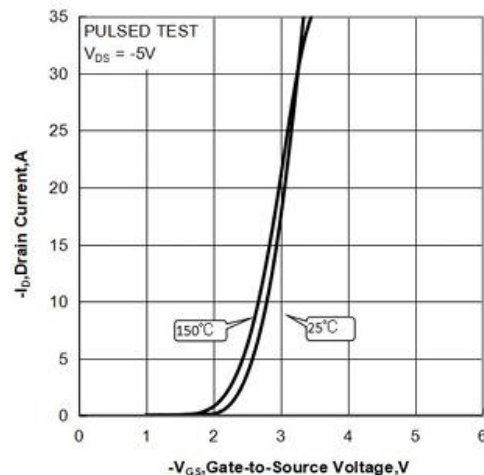


Figure 3 On-Resistance vs. ID

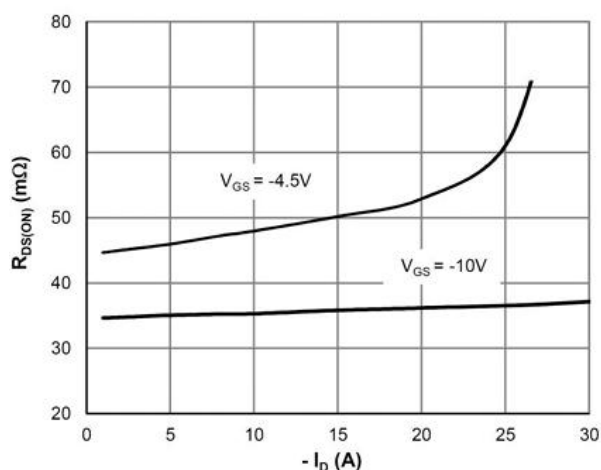


Figure 4 On-Resistance vs. Junction Temperature

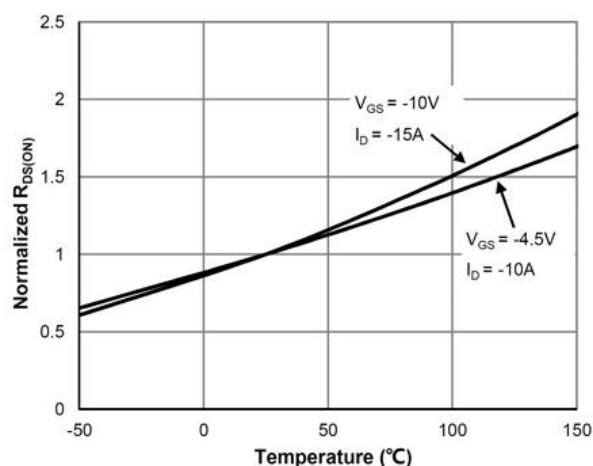


Figure 5 BV vs Junction Temperature

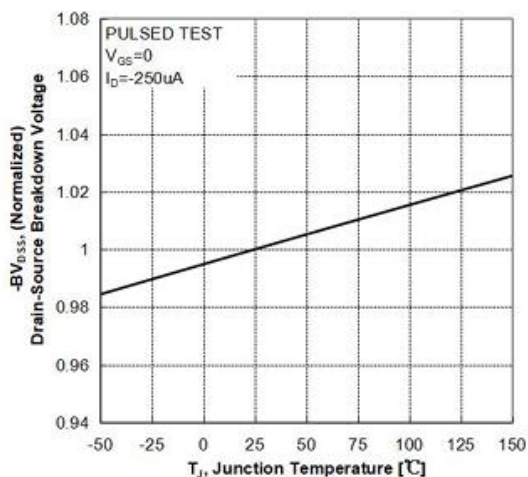


Figure 6 Vth vs Junction Temperature

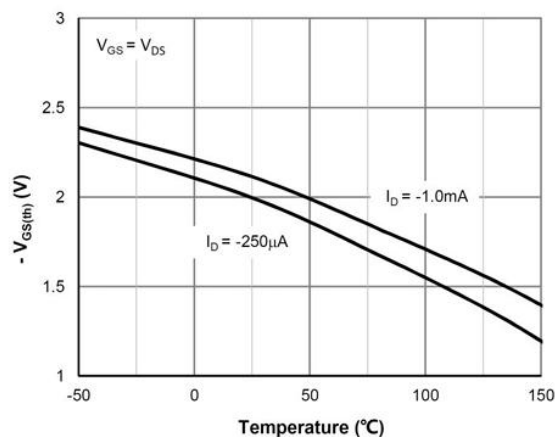


Figure 7 Gate-Charge Characteristics

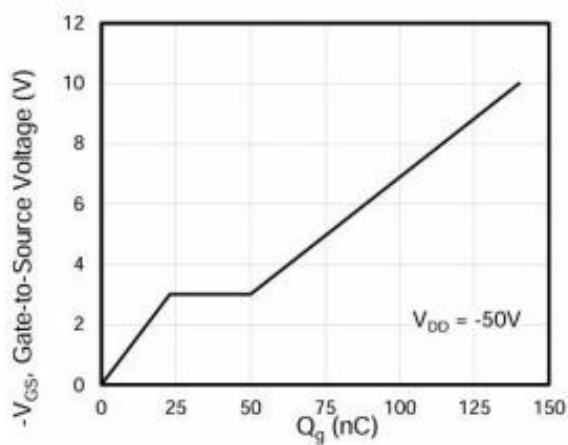


Figure 8 Capacitance Characteristics

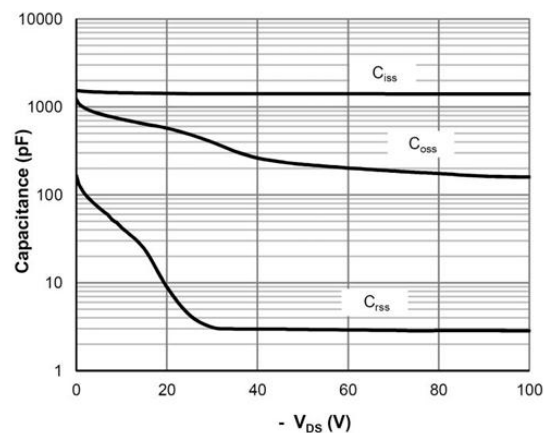


Figure 9 Body Diode Forward Voltage

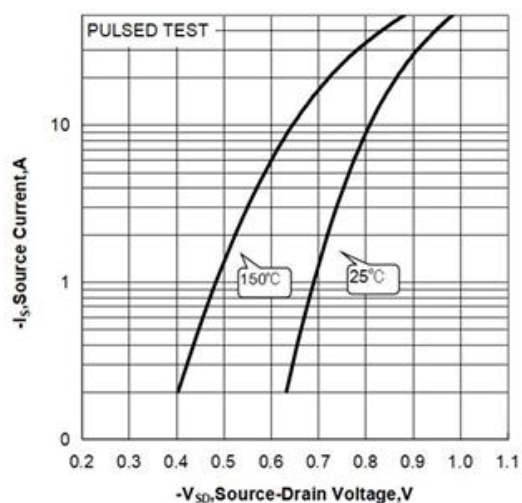


Figure 10 Maximum Safe Operating Area

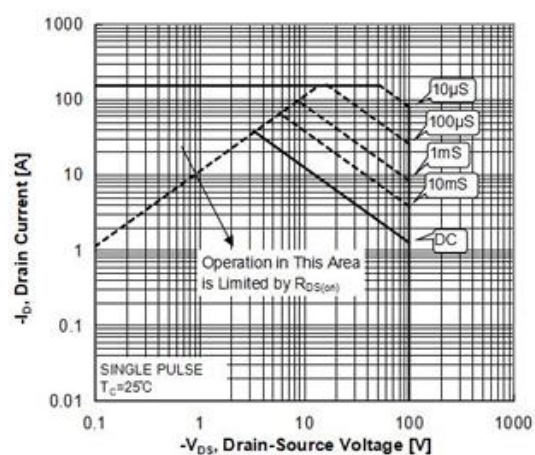
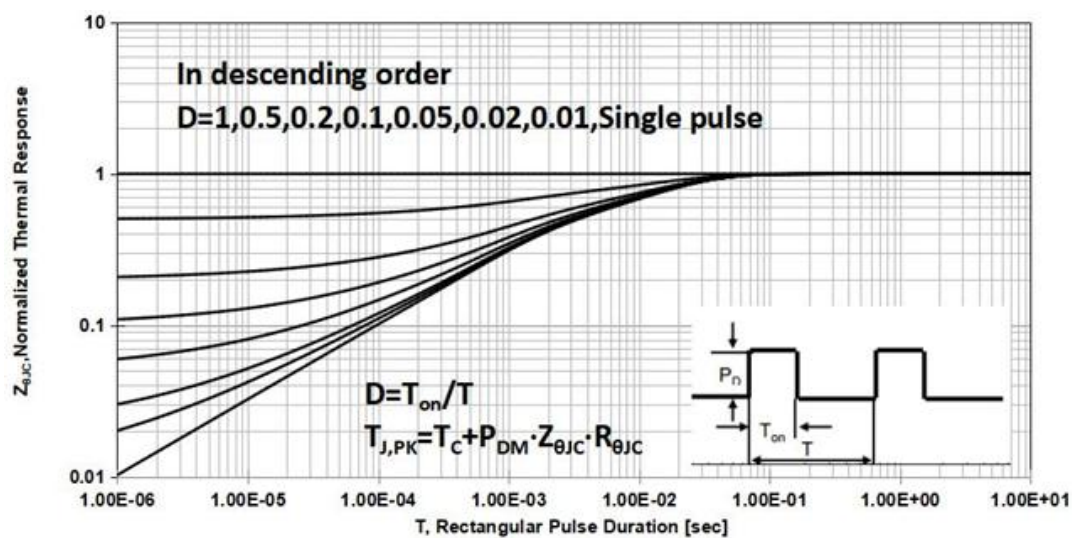


Figure 11 Transient Thermal Impedance



Test Circuit and Waveform

Figure A: Gate Charge Test Circuit and Waveform

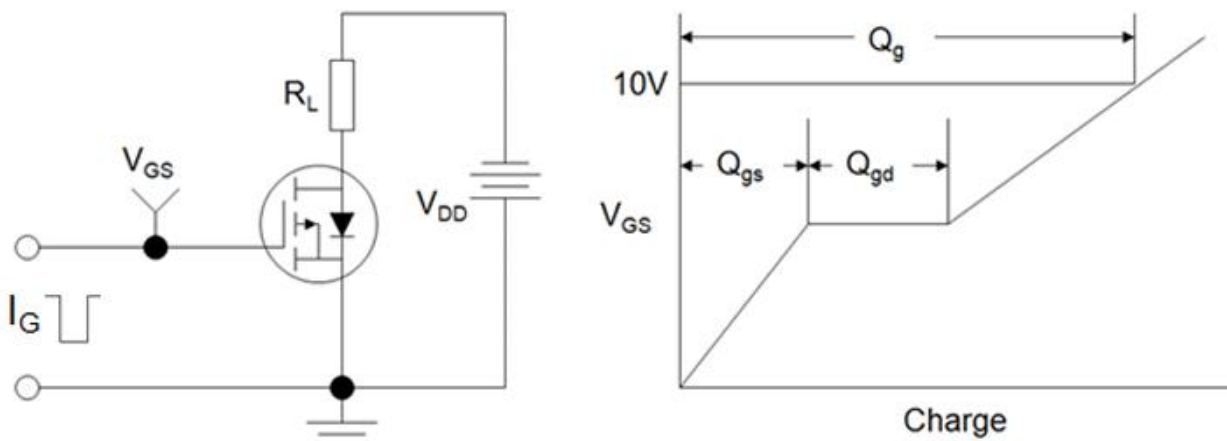


Figure B: Resistive Switching Test Circuit and Waveform

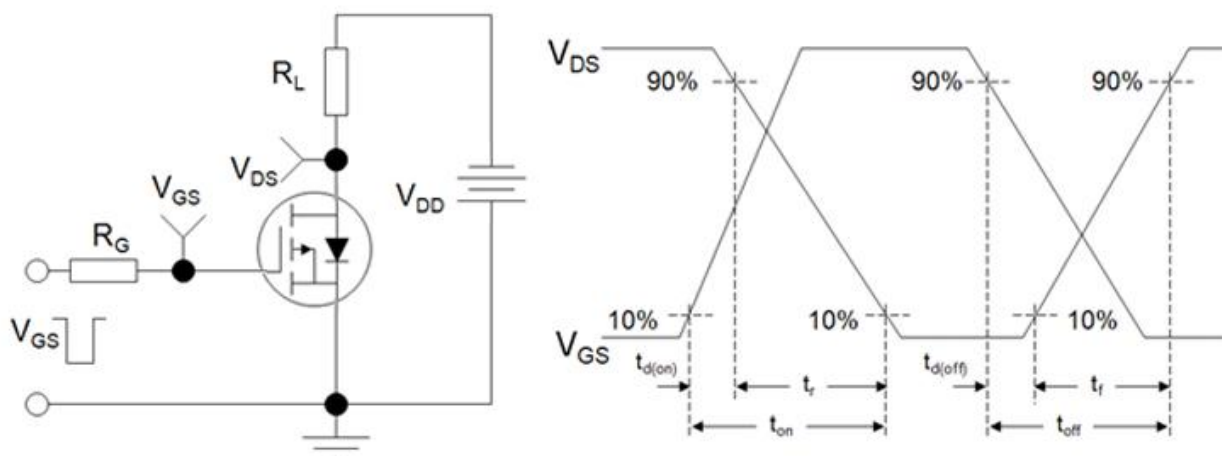
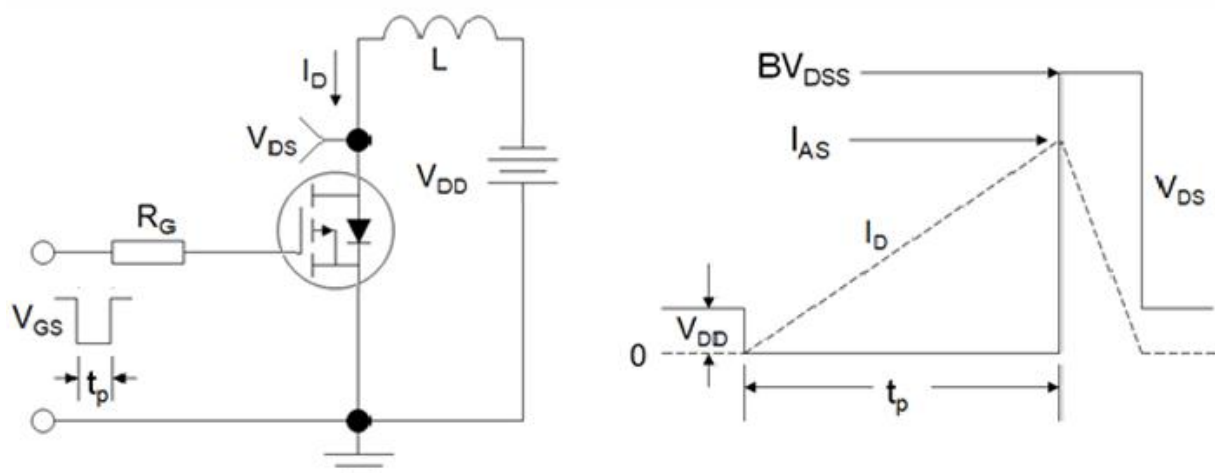
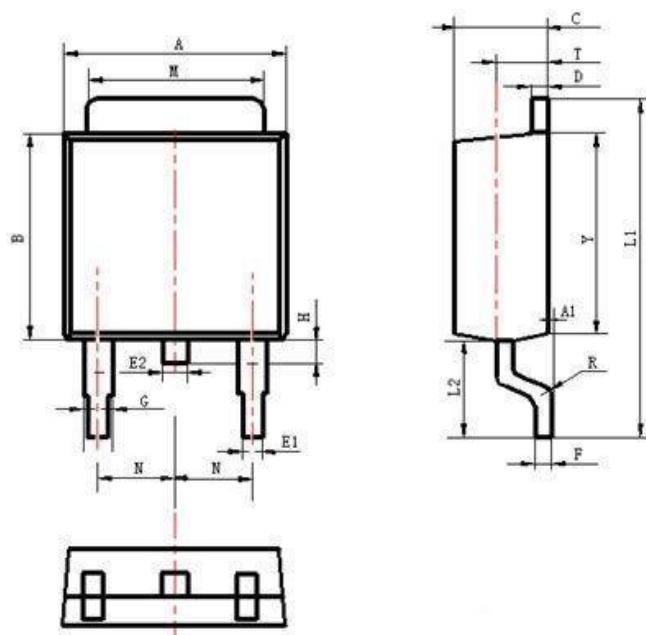


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



Package Description



Items	Values(mm)	
	MIN	MAX
A	6.30	6.90
A1	0	0.13
B	5.70	6.30
C	2.10	2.50
D	0.30	0.60
E1	0.60	0.90
E2	0.70	1.00
F	0.30	0.60
G	0.70	1.20
L1	9.60	10.50
L2	2.70	3.10
H	0.60	1.00
M	5.10	5.50
N	2.09	2.49
R	0.3	
T	1.40	1.60
Y	5.10	6.30

TO-252 Package



迈诺斯科技

MDT50P10D

NOTE:

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when circuit designing.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. MOSFETs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. Shenzhen Minos reserves the right to make changes in this specification sheet and is subject to change without prior notice.

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