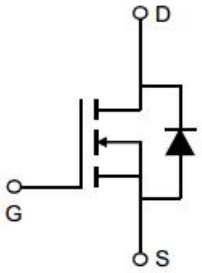
迈诺斯科技

MDT70N03

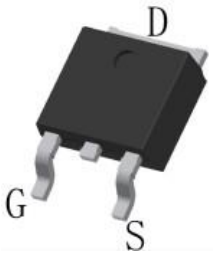
Silicon N-Channel Power MOSFET

Description

The MDT70N03 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.



Schematic diagram



TO-252

KEY CHARACTERISTICS

① V_{DS} =30V,I_D =70A
$R_{DS(ON)}$ < 6mΩ @ V_{GS}=10V
$R_{DS(ON)}$ < 8mΩ @ V_{GS}=5V
② High density cell design for ultra low R_{dson}
③ Fully characterized Avalanche voltage and current
④ Good stability and uniformity with high EAS
⑤ Excellent package for good heat dissipation
⑥ Special process technology for high ESD capability

APPLICATIONS

①Power switching application
②Hard switched and high frequency circuits
③Uninterruptible Power Supply

ORDERING INFORMATION

Ordering Codes	Package	Product Code	Packing
MDT70N03	TO-252	MDT70N03	Tube

Absolute Maximum Ratings (TC=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	70	A
Drain Current-Continuous(TC=100℃)	I_D (100℃)	35	A
Pulsed Drain Current	I_{DM}	140	A
Maximum Power Dissipation	P_D	60	W
Derating factor		0.4	W/℃
Single pulse avalanche energy (Note 5)	E_{AS}	225	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

Thermal Characteristic

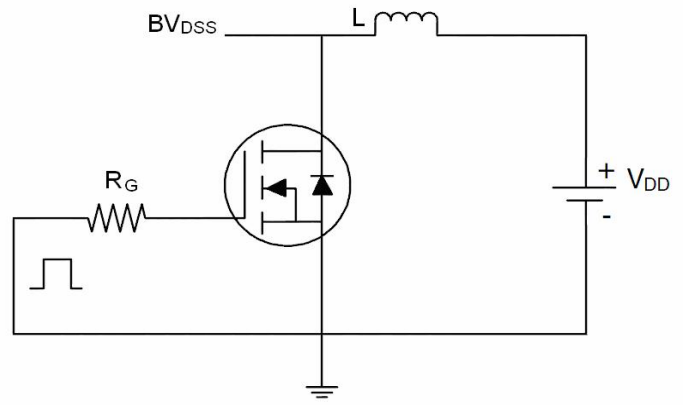
Thermal Resistance,Junction-to-Case(Note 2)	$R_{\theta JC}$	2.5	℃/W

Electrical Characteristics (TC=25℃unless otherwise noted)

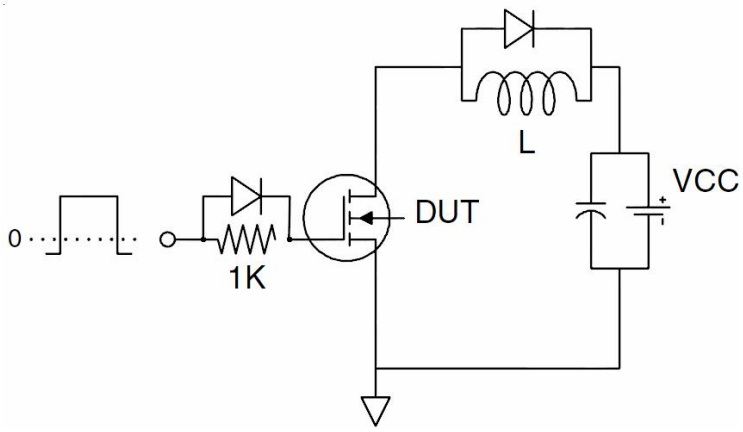
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	30	33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.0	1.1	1.4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=25A	-	6	8	mΩ
		V_{GS}=4.5V, I_D=20A	-	8	12	
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=20A	15	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=15V,V_{GS}=0V, F=1.0MHz	-	2000	-	PF
Output Capacitance	C_{oss}		-	280	-	PF
Reverse Transfer Capacitance	C_{rss}		-	160	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=15V,I_D=25A V_{GS}=10V,R_{GEN}=1.8Ω	-	10	-	nS
Turn-on Rise Time	t_r		-	8	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	nS
Turn-Off Fall Time	t_f		-	5	-	nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=25A, V_{GS}=10V	-	23	-	nC
Gate-Source Charge	Q_{gs}		-	7	-	nC
Gate-Drain Charge	Q_{gd}		-	4.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=25A	-	0.85	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	50	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF = 25A di/dt = 100A/μs(Note3)	-	22	35	nS
Reverse Recovery Charge	Qrr		-	11	18	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:
Repetitive Rating: Pulse width limited by maximum junction temperature.
Surface Mounted on FR4 Board, t ≤ 10 sec.
Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
Guaranteed by design, not subject to production
EAS condition： Tj=25℃, VDD=15V,VG=10V,L=0.5mH, Rg=25Ω

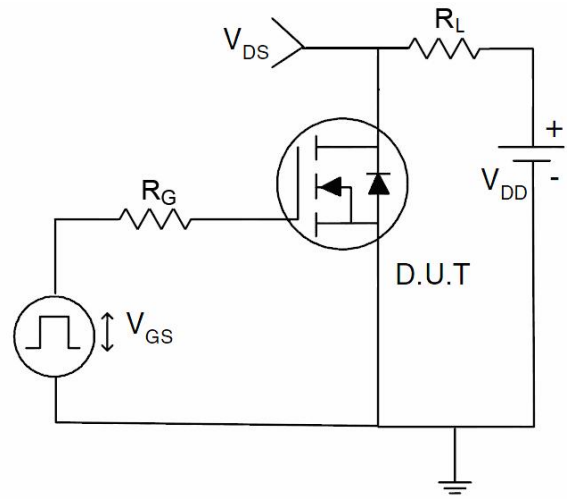
1）EAS test Circuits



2）Gate charge test Circuit:



3）Switch Time Test Circuit：



Typical Electrical and Thermal Characteristics (Curves)

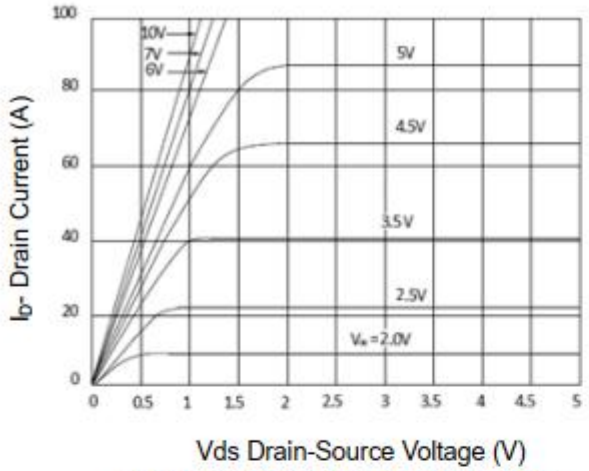


Figure 1 Output Characteristics

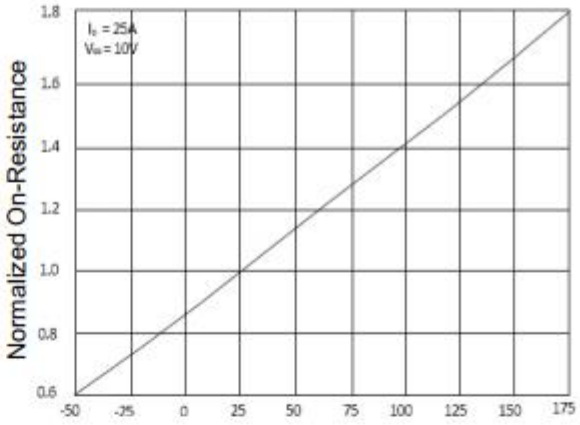


Figure 4 Rdson-JunctionTemperature

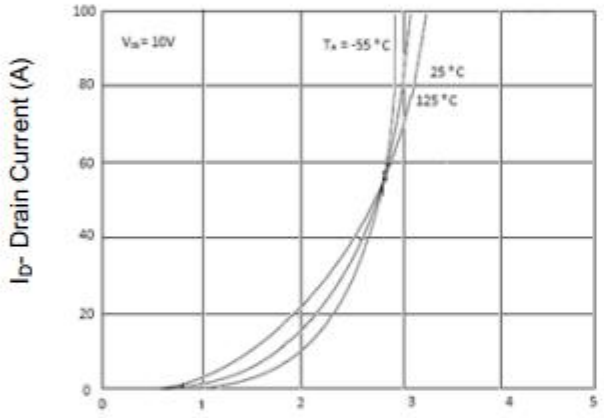


Figure 2 Transfer Characteristics

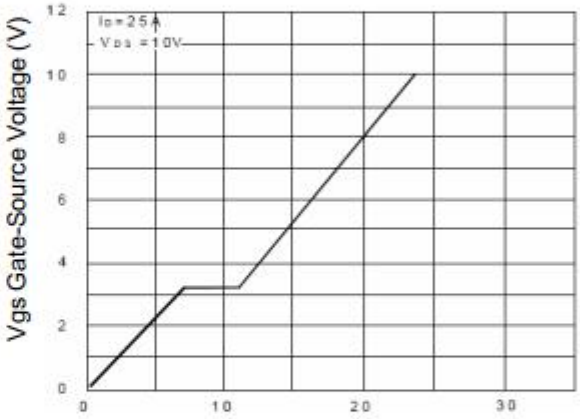


Figure 5 Gate Charge

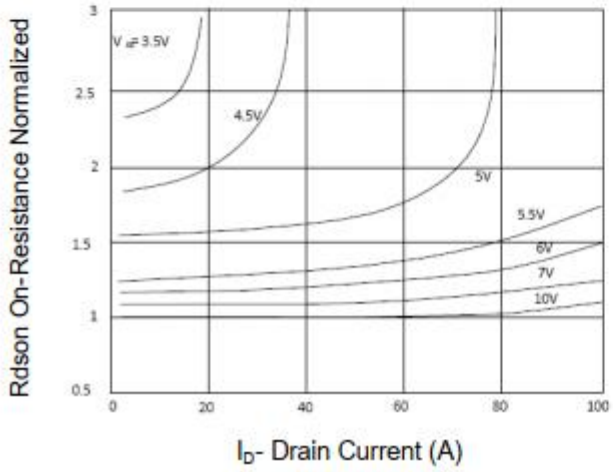


Figure 3 Rdson- Drain Current

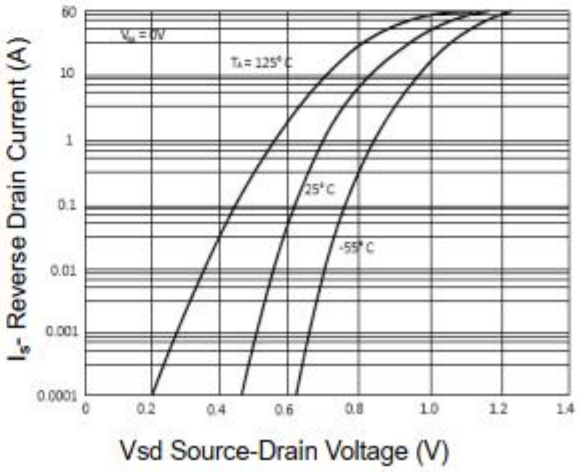


Figure 6 Source- Drain Diode Forward

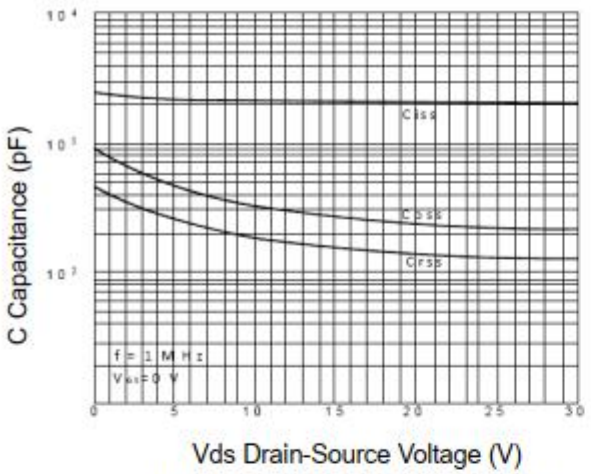


Figure 7 Capacitance vs Vds

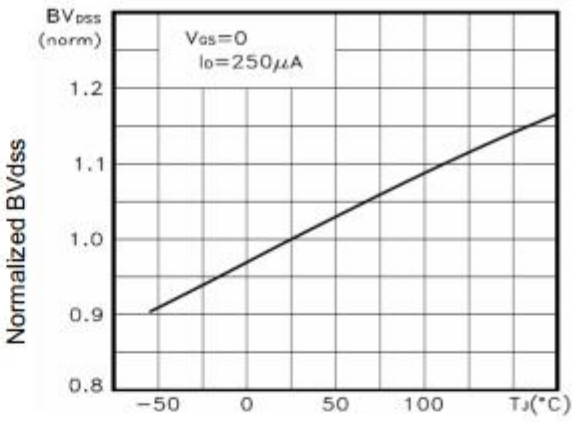


Figure 9 BV_{DSS} vs Junction Temperature

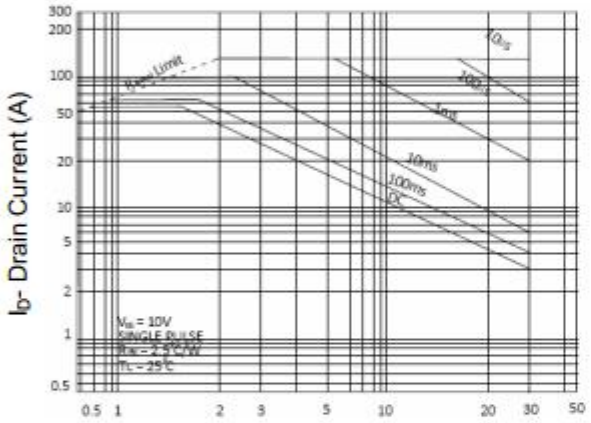


Figure 8 Safe Operation Area

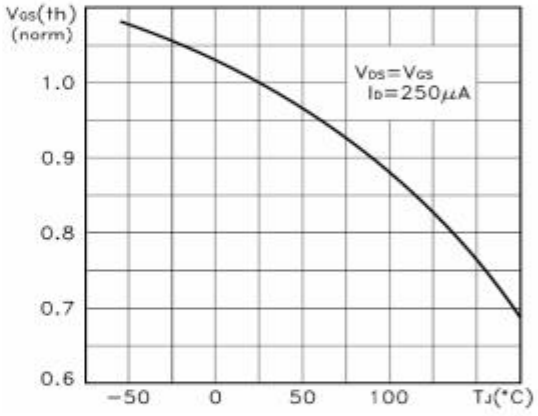


Figure 10 $V_{GS(th)}$ vs Junction Temperature

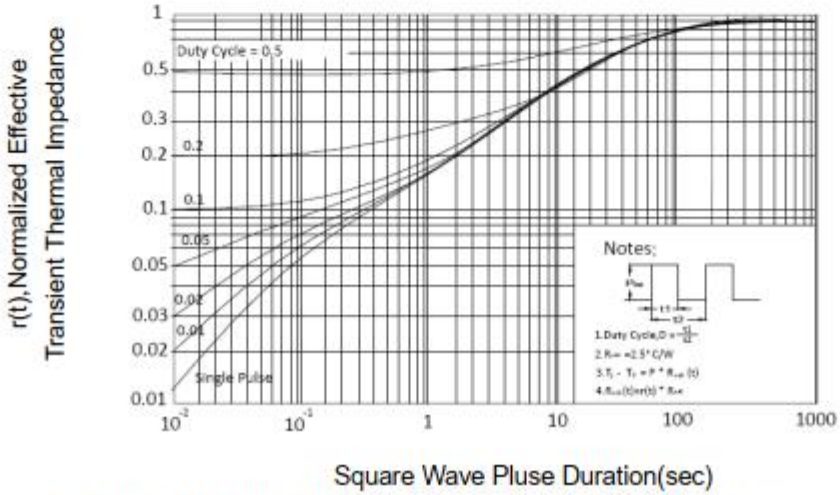
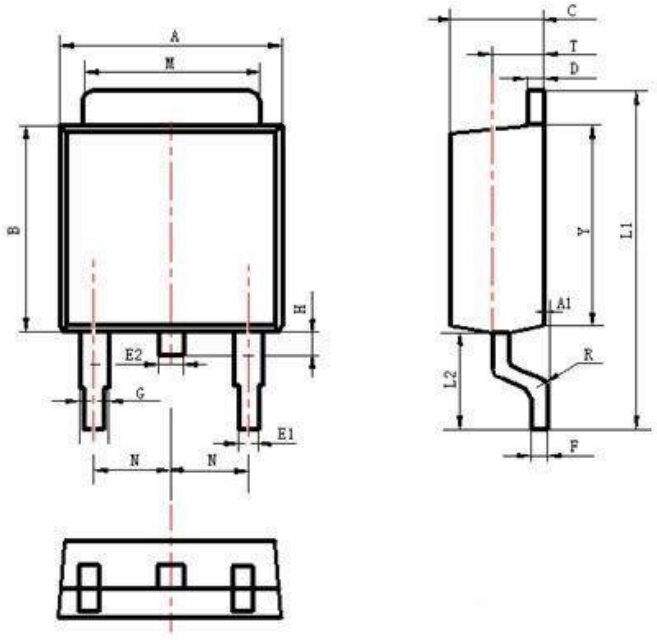


Figure 11 Normalized Maximum Transient Thermal Impedance

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

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 withoutprior notice.

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