100N03A

Mosfet

General Description

These N-channel enhancement mode power mosfets used advanced trench technology design, provided excellent Rdson and low gate charge. Which accords with the RoHS standard.

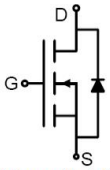
Features

- V_{DS} = 30V,ID =90A
  $R_{DS(ON)}$,3.8 mΩ (Typ) @ VGS =10V
  $R_{DS(ON)}$, 6.4mΩ (Typ) @ VGS =4.5V
- Low on resistance
- Low gate charge
- Fast switching
- Low reverse transfer capacitances

Application

- DC-DC converters
- Synchronous Rectifier

TO-252(DPAK) top view



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	QuantitY
100N03A	100N03A	TO-252	330mm	12mm	2500

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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous[Note3]	TC=25℃	I_D	90	A
	TC=100℃		63	A
Drain Current-Pulsed[Note1]		I_{DM}	200	A
Avalanche Energy[Note4]		E_{AS}	280	mJ
Avalanche Current		I_{AS}	33	A
Maximum Power Dissipation	TC=25℃	P_D	105	W
Storage Temperature Range		T_{STG}	-55 to +150	℃
Operating Junction Temperature Range		T_J	-55 to +150	℃

Thermal Resistance

Parameter	Symbol	Min.	Typ.	Max	Unit
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	-	3.3	-	℃/W

Electrical Characteristics(TJ=25℃ unless otherwise noted)

OFF CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_{DS}=250uA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V	-	-	1	uA
Gate-Body Leakage	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA

ON CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	VGS(TH)	V_{DS}=V_{GS},I_{DS}=250uA	1.0	1.7	2.5	V
Drain-Source On-State Resistance	RDS(ON)	V_{GS}=10V,I_{DS}=30A	-	3.8	4.9	mΩ
		V_{GS}=4.5V,I_{DS}=20A	-	6.4	7.9	

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C_{iss}	VDS =15V, VGS = 0V, f=1MHz	-	1963	-	pF
Output Capacitance	C_{oss}		-	248	-	
Reverse Transfer Capacitance	C_{rss}		-	221	-	
Gate Resisitance	Rg	VDD=0V,VGS=1V, F=1MHz	-	1.43	-	Ω

SWITCHING CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Delay Time	$T_{d(on)}$	V_{GS}=10V,V_{Ds}=15V, R_{GEN}=3Ω I_D=20A	-	55	-	ns
Rise Time	t_r		-	36.4	-	
Turn-Off Delay Time	$T_{d(off)}$		-	37.5	-	
Fall Time	t_f		-	14	-	
Total Gate Charge at 10V	Q_g	V_{DS}=15V,I_{DS}=45A, V_{GS}=10V	-	41	-	nC
Gate to Source Gate Charge	Q_{gs}		-	6.4	-	
Gate to Drain“Miller”Charge	Q_{gd}		-	11	-	

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_{DS}=20A	-	-	1.2	V
Reverse Recovery Time	trr	TJ=25℃,IF=20A di/dt=100A/us	-	21.7	-	nS
Reverse Recovery Charge	Qrr		-	7.2	-	nC

Notes:

1: Repetitive rating, pulse width limited by maximum junction temperature.

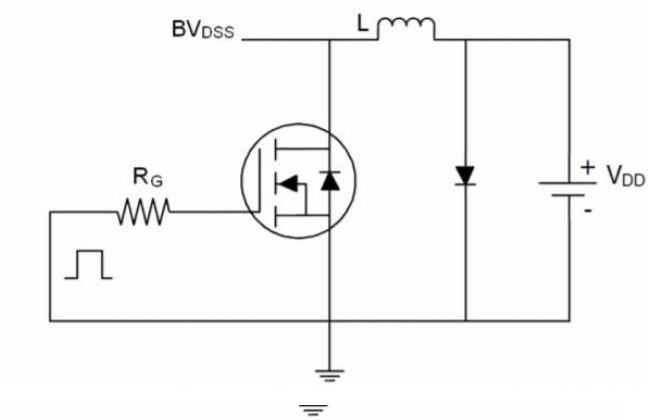
2: Surface mounted on FR4 Board, t≤10sec.

3: Pulse width ≤ 300μs, duty cycle ≤ 2%.

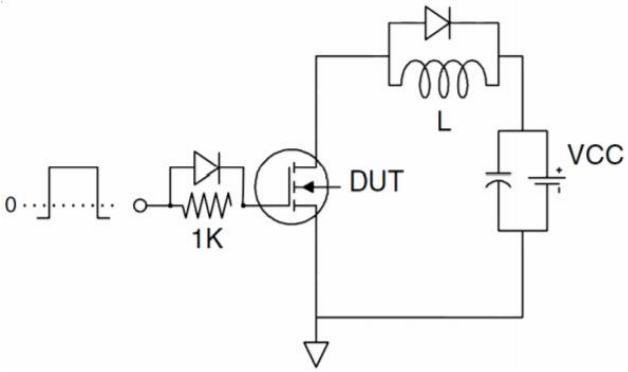
4: EAS condition: L=0.5mH,VDD=15V,VG=10V,V_{GATE}=30V,Start T_J=25℃.

Test Circuit

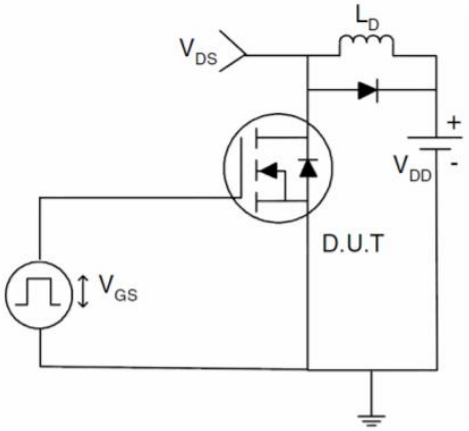
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

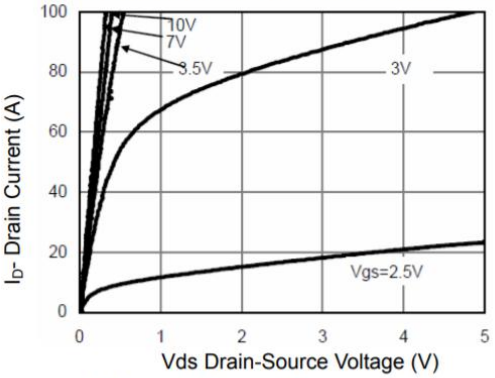


Figure 1 Output Characteristics

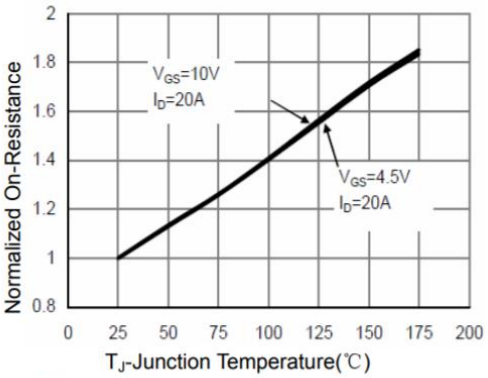


Figure 4 Rdson-Junction Temperature

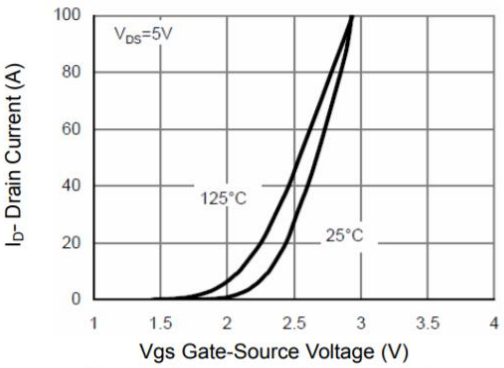


Figure 2 Transfer Characteristics

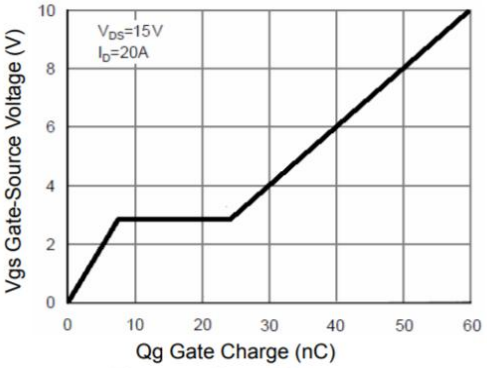


Figure 5 Gate Charge

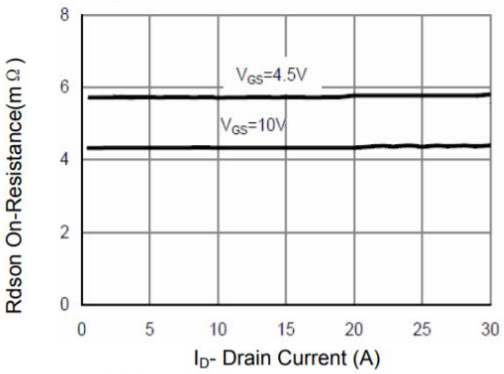


Figure 3 Rdson- Drain Current

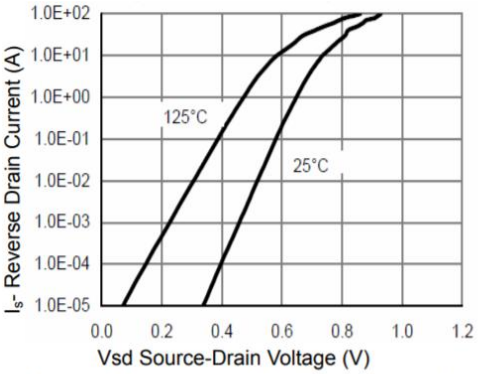


Figure 6 Source- Drain Diode Forward

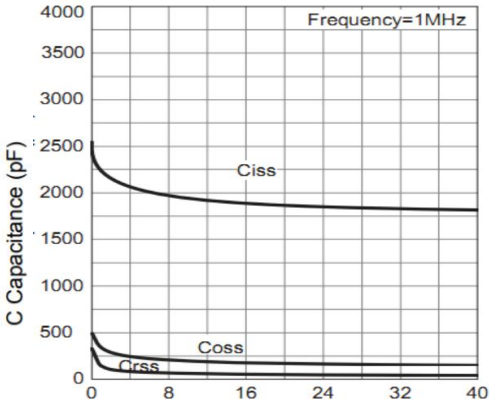


Figure 7 Capacitance vs Vds

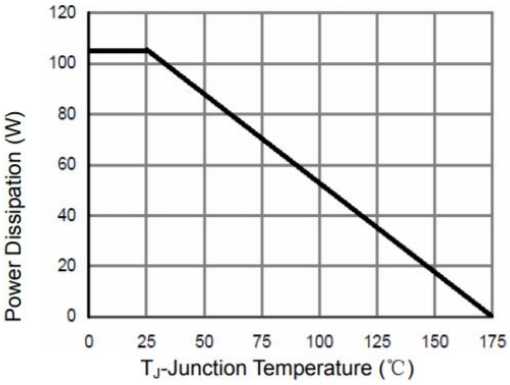


Figure 9 Power De-rating

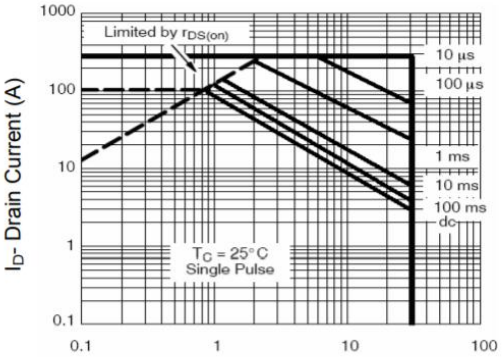


Figure 8 Safe Operation Area

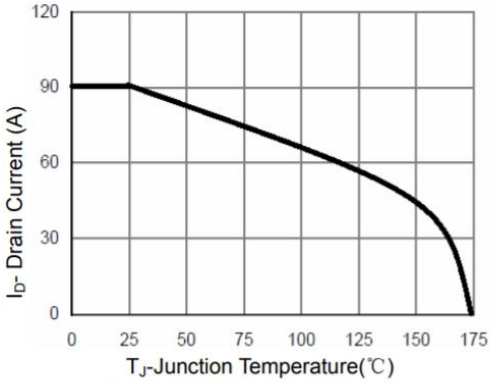


Figure 10 ID Current Derating

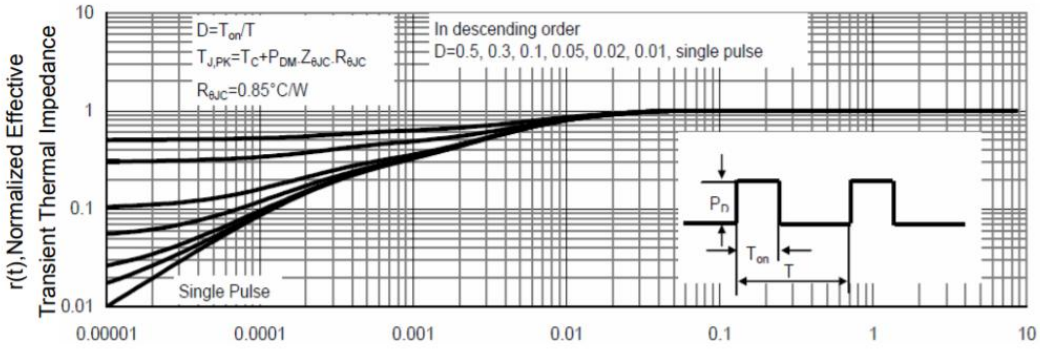
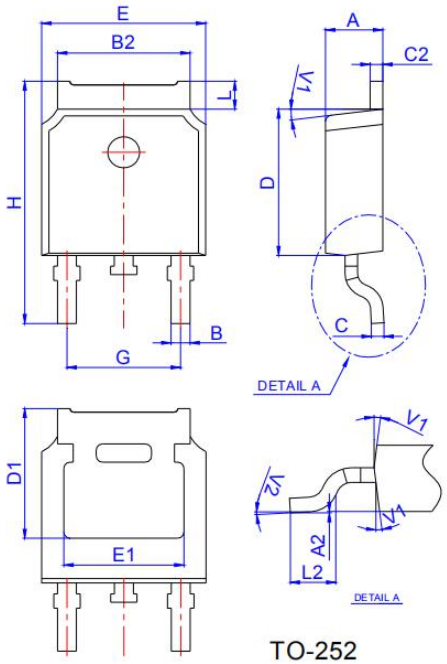


Figure 11 Normalized Maximum Transient Thermal Impedance

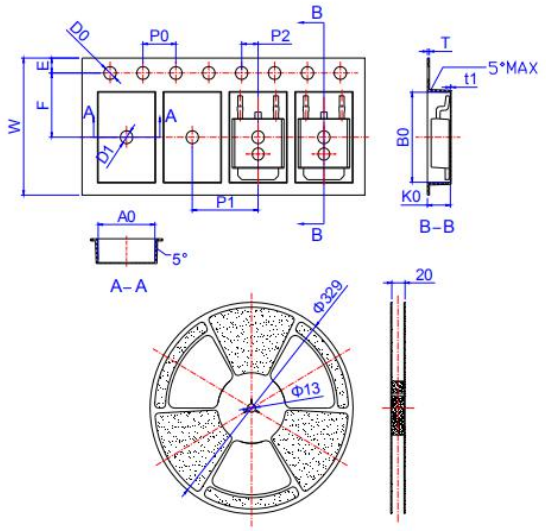
Package Mechanical Data



TO-252

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Spectification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583