Description

N-channel Enhancement Mode Power MOSFET

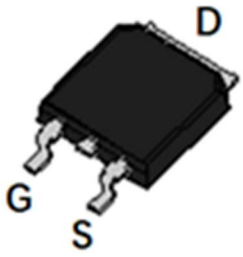
Features

- 30V , 120A
  $R_{DSON\ (typ)}$= 2.8mΩ @ V_{GS} =10V
  $R_{DSON\ (typ)}$= 4.3mΩ @ V_{GS} =4.5V
- Advanced Trench Technology
- Provide Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

Application

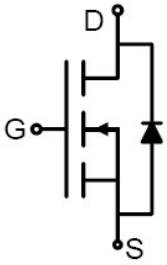
- Load Switch
- PWM Application
- Power management

100% UIS TESTED!
100% ΔVds TESTED!



TO-252(DPAK) top view

Marking and pin Assignment



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
120N03B	TF120N03B	TAPING	TO-252	13inch	2500	-

Absolute Maximum Ratings (T_C=25℃ unless otherwise specified)

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		30	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C = 25℃	120	A
		T_C = 100℃	65	A
I_{DM}	Pulsed Drain Current note1		300	A
E_{AS}	Single Pulsed Avalanche Energy note2		245	mJ
P_D	Power Dissipation	T_C = 25℃	70	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		2.5	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +175	℃

Electrical Characteristics (T_J=25℃ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =30V, V_{GS} = 0V,	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS} =0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	1.0	1.4	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note3	V_{GS} =10V, I_D =20A	-	2.8	3.6	mΩ
		V_{GS} =4.5V, I_D =15A	-	4.3	5.7	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} =15V, V_{GS} =0V, f = 1.0MHz	-	2764	-	pF
C_{oss}	Output Capacitance		-	289	-	pF
C_{rss}	Reverse Transfer Capacitance		-	265	-	pF
Q_g	Total Gate Charge	V_{DS} =15V, I_D =20A, V_{GS} =10V	-	48	-	nC
Q_{gs}	Gate-Source Charge		-	5.2	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	9.6	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=15V, I_D=20A, R_{GEN}=3Ω, V_{GS} =10V	-	14	-	ns
t_r	Turn-on Rise Time		-	36	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	44	-	ns
t_f	Turn-off Fall Time		-	22	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	120	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	300	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S=20A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F=20A,dI/dt=100A/μs	-	56	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	42	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: T_J=25℃, V_{DD}=20V, V_G=10V, R_G=25Ω, L=0.5Mh, I_{AS}=22A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

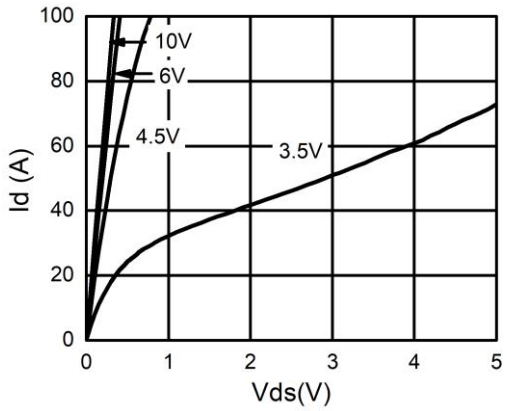


Figure 2. Transfer Characteristics

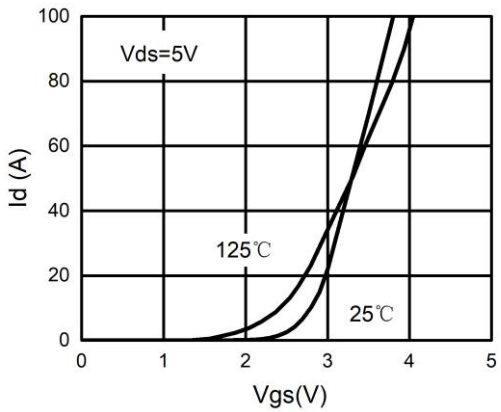


Figure 3. Power Dissipation

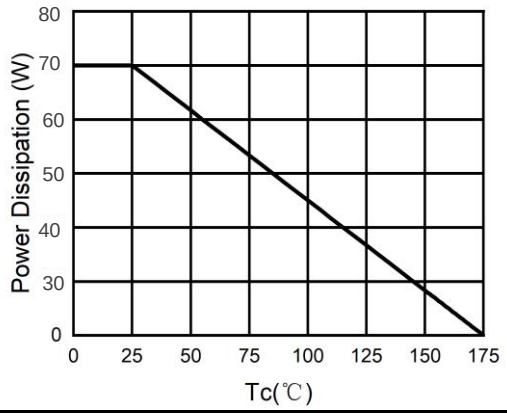


Figure 4. Drain Current

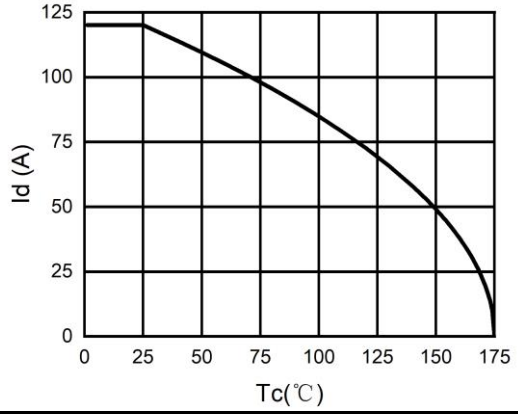


Figure 5. BV_{DSS} vs Junction Temperature

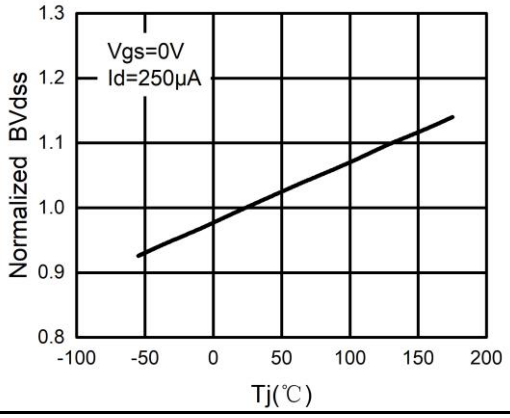
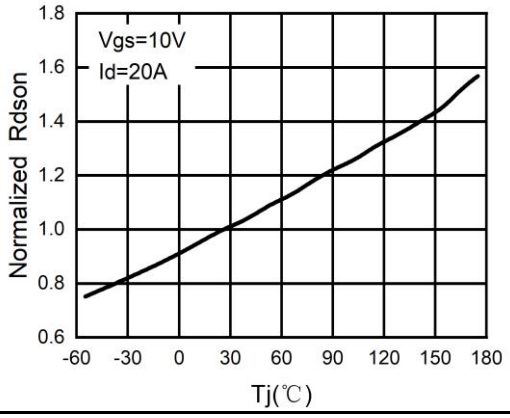


Figure 6. $R_{DS(ON)}$ vs Junction Temperature



Typical Electrical And Thermal Characteristics (Curves)

Figure 7. Gate Charge Waveforms

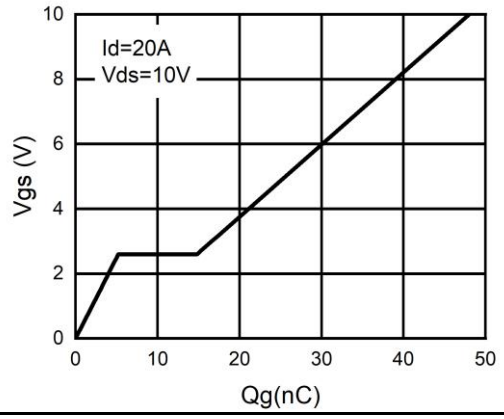


Figure 8. Capacitance

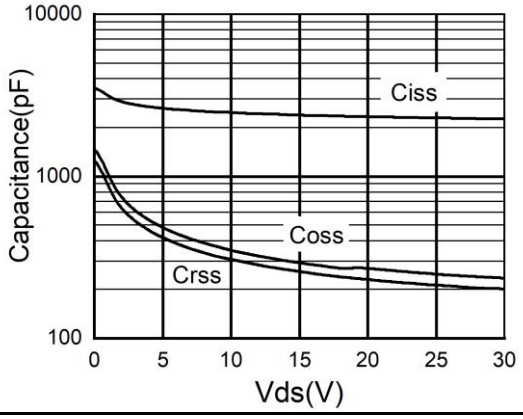


Figure 9. Body-Diode Characteristics

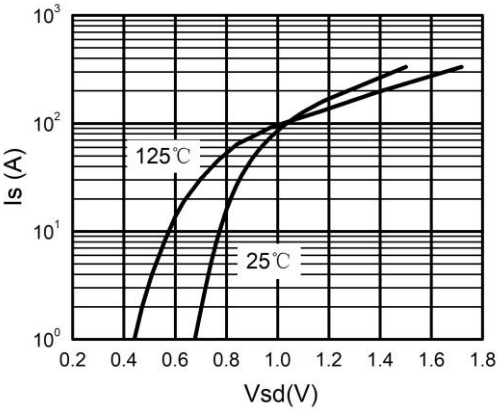
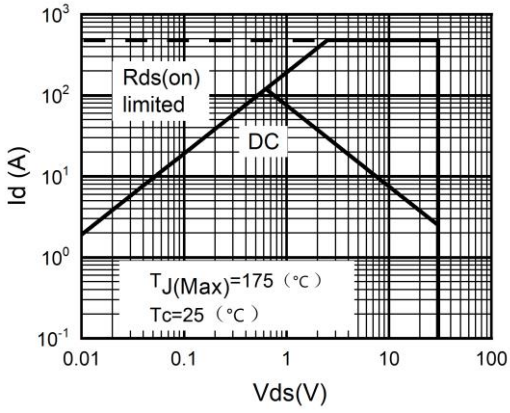


Figure 10. Maximum Safe Operating Area



Test Circuit

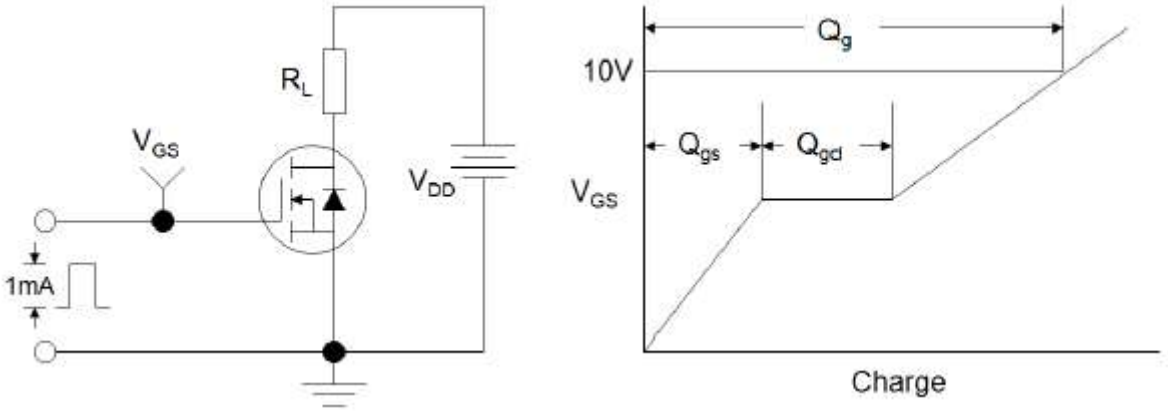


Figure1:Gate Charge Test Circuit & Waveform

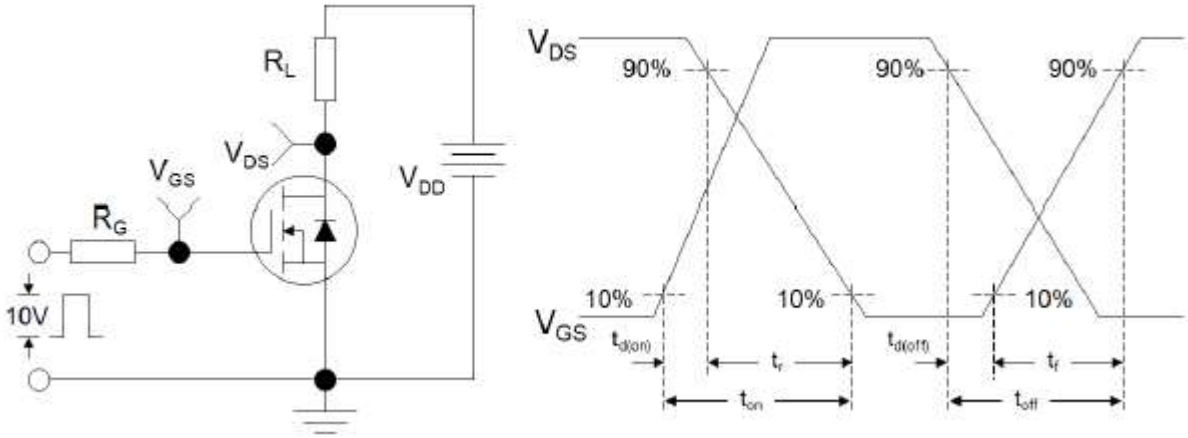


Figure 2: Resistive Switching Test Circuit & Waveforms

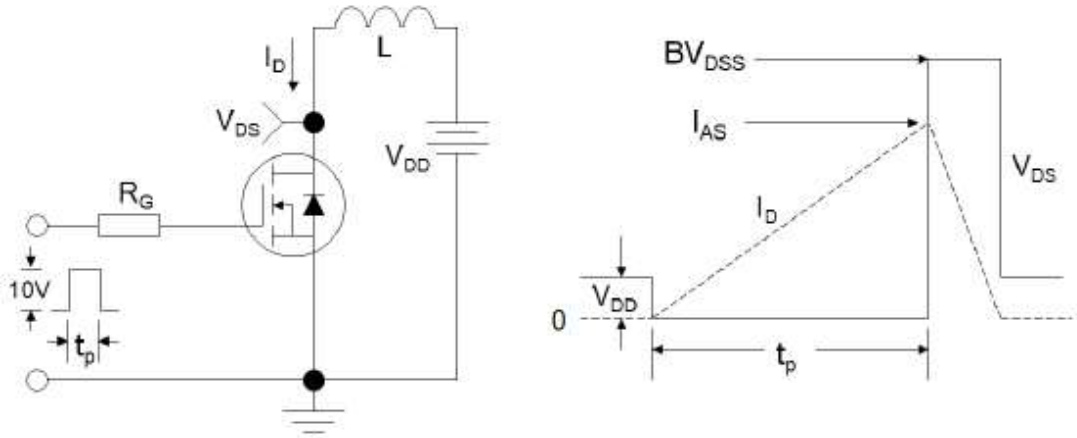
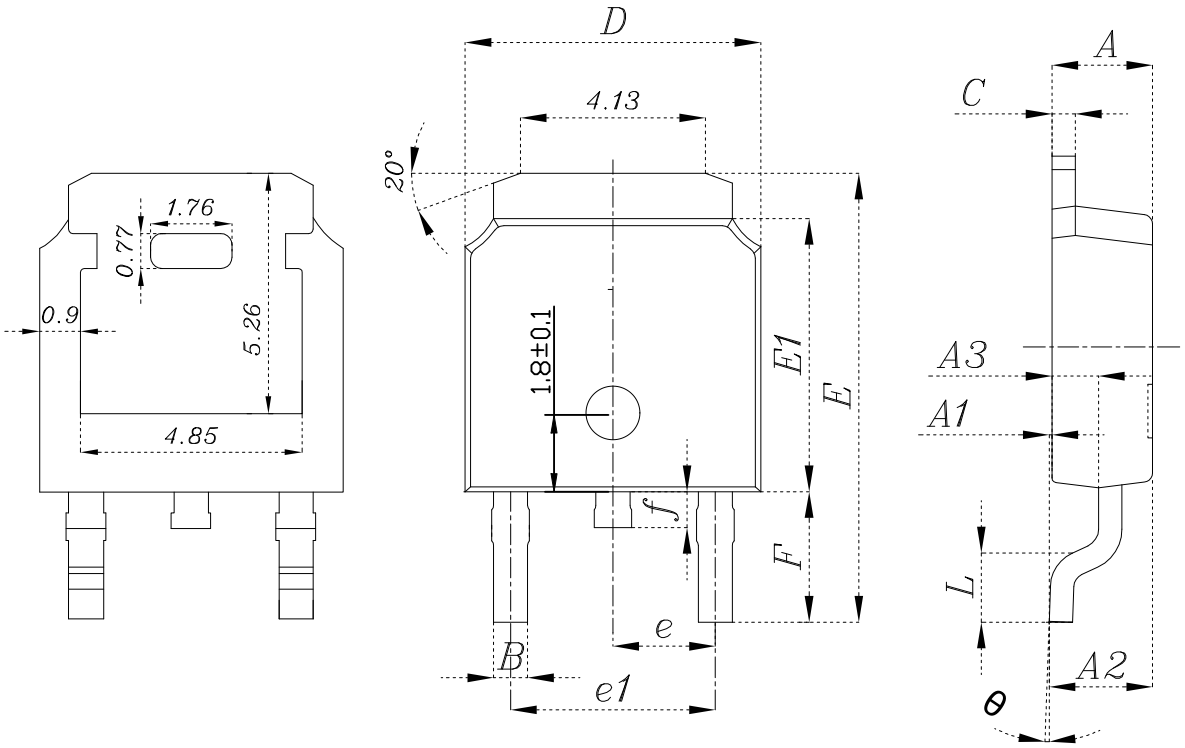


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Package Mechanical Data-TO-252



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.01	0.06	0.11
A2	2.27	2.37	2.47
A3	0.90	1.00	1.10
B	0.65	0.75	0.85
C	0.47	0.52	0.57
D	6.40	6.60	6.80
E	9.82	10.02	10.22
E1	5.90	6.10	6.30
e	2.286 BSC		
e1	4.572 BSC		
F	2.8	2.95	3.1
f	0.75	0.85	0.95
L	1.40	1.60	1.80
θ	0°	2.5°	5°