N-CHANNEL ENHANCEMENT MODE POWER MOSFET

SGT MOS、低内阻、低结电容开关损耗小 **TF050N03MG**

● General Description

The TF050N03MG uses advanced trench technology and design to provide excellent RDS(ON) withlowgate charge. It can be used in a wide variety ofapplications.

● Features

Advance device constructure

Low $R_{DS(ON)}$ to minimize conduction loss

Low Gate Charge for fast switching

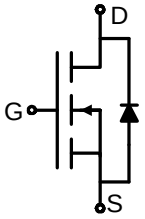
Low Thermal resistance

●Application

Synchronous Rectification for AC-DC/DC-DC converter

Power Tools

● Product Summary

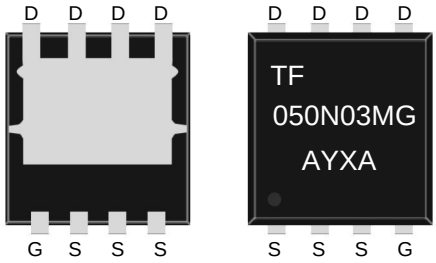


V_{DS} =30V I_D=50A

$R_{DS(10V\ TYP)}$ =5.3mΩ

$R_{DS(4.5V\ TYP)}$ =7.5mΩ

RoHS compliant



PDFNWB3.3x3.3-8L

●Package Marking and Ordering Information:

Part NO.	TF050N03MG
Marking1	050N03MG:TF050N03MG
Marking2	TF:tuofeng; Y:year code; X:Week; AA:device code;
Basic ordering unit (pcs)	5000

●Absolute Maximum Ratings (T_C =25℃)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	$I_{D@}$TC=25℃	50	A
	$I_{D@}$TC=75℃	35	A
	$I_{D@}$TC=100℃	30	A
Pulsed Drain Current ①	I_{DM}	150	A
Total Power Dissipation	P_D@TC=25℃	30	W
Total Power Dissipation	P_D@TA=25℃	1.0	W
Operating Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃
Single Pulse Avalanche Energy	E_{AS}	45	mJ

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	5.0	°C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	65	°C/W
Soldering temperature, wavesoldering for 8 s	T_{sold}	-	-	265	°C

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V,I_D =250uA	30	-	-	V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS}, I_D =250uA	1.1	1.6	2.1	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30 V_{GS} =0V	-	-	1.0	uA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±20V ,V_{DS} =0V	-	-	±100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	5.3	6.5	mΩ
		V_{GS}=4.5V, I_D=15A	-	7.5	9.5	mΩ
Forward Transconductance	g_{FS}	V_{DS} =10V, I_D=20A	-	45	-	S
Source-drain voltage	V_{SD}	Is=15A	-	0.81	1.20	V

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	Ciss	f = 1MHz V_{DS}=15V V_{GS} = 0V	-	625	-	pF
Output capacitance	Coss		-	240	-	
Reverse transfer capacitance	Crss		-	25.0	-	

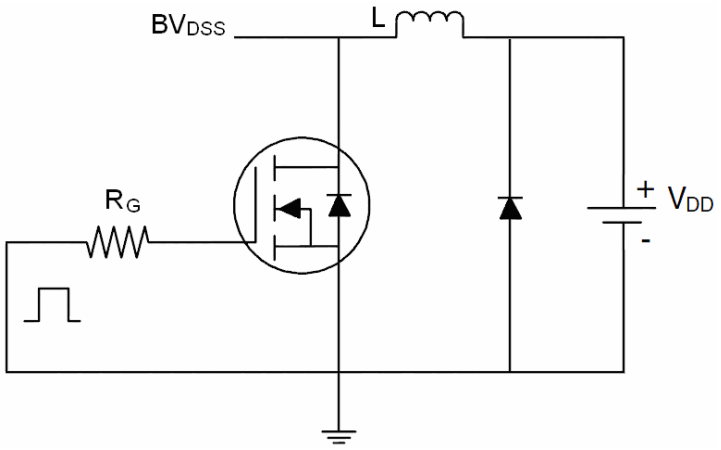
●Switching Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Turn-on delay time	td(on)	V_{DD} = 15V I_D = 20A R_G =3.0Ω V_{GS} = 10V	-	4.4	-	nS
Rise time	tr		-	3.6	-	
Turn-off delay time	td(off)		-	12.2	-	
Fall time	tf		-	2.7	-	
Total Gate Charge	Qg	I_D = 20A V_{DS}=15V V_{GS} = 10V	-	10.3	-	nC
Gate -Source Charge	Qgs		-	1.80	-	
Gate -Drain Charge	Qgd		-	1.70	-	

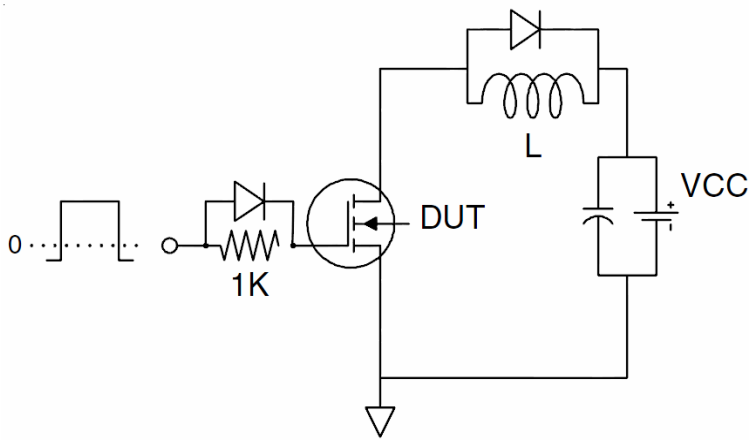
Note: ① Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2% ;

Test Circuit

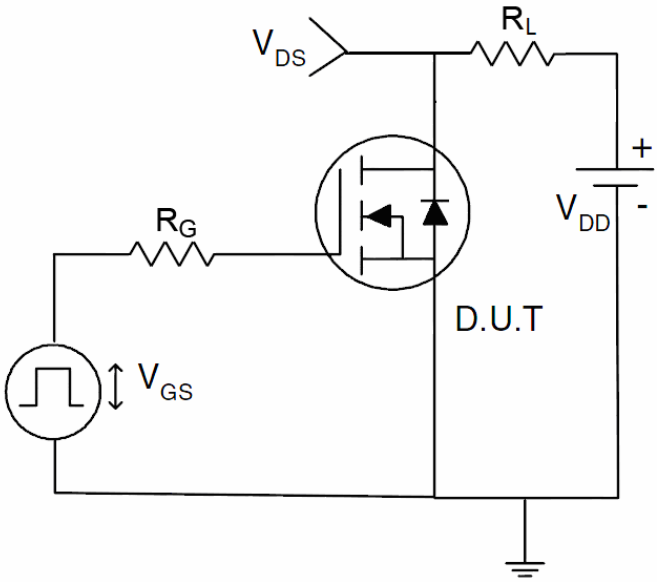
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Characteristics

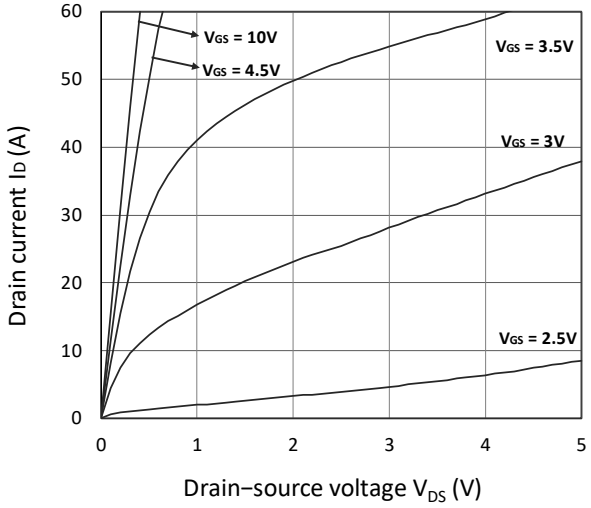


Figure 1. Output Characteristics

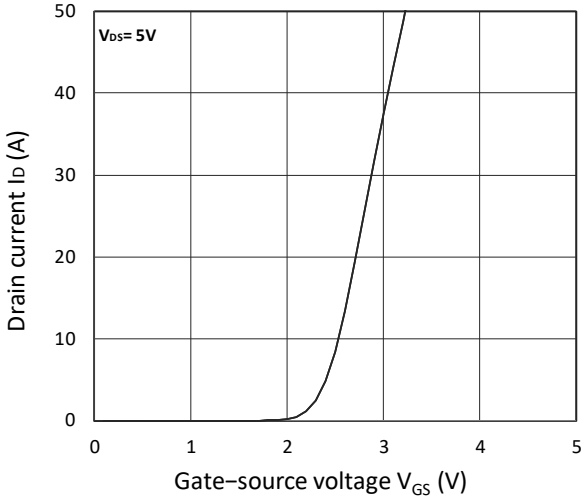


Figure 2. Transfer Characteristics

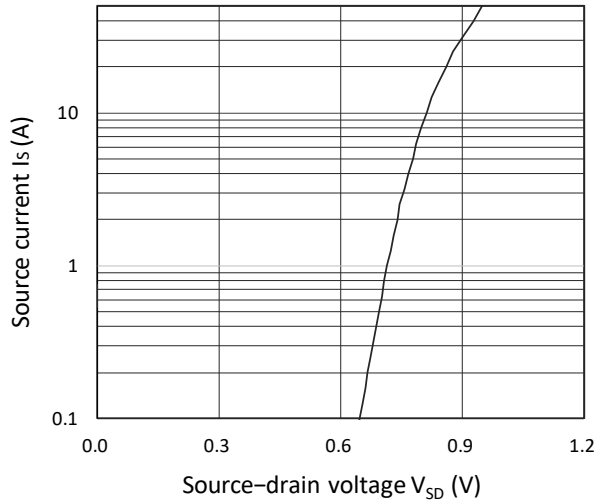


Figure 3. Forward Characteristics of Reverse

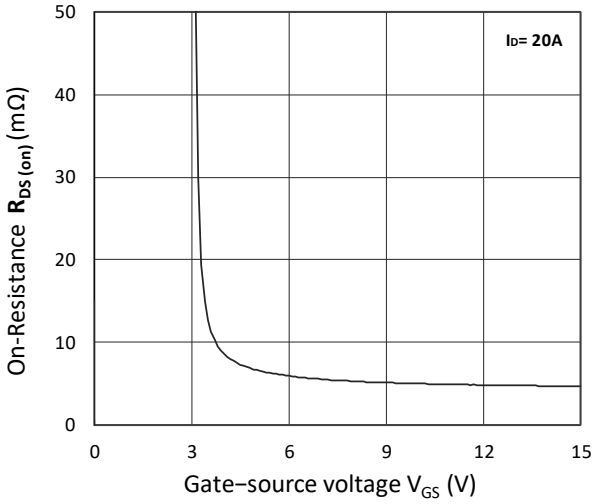


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

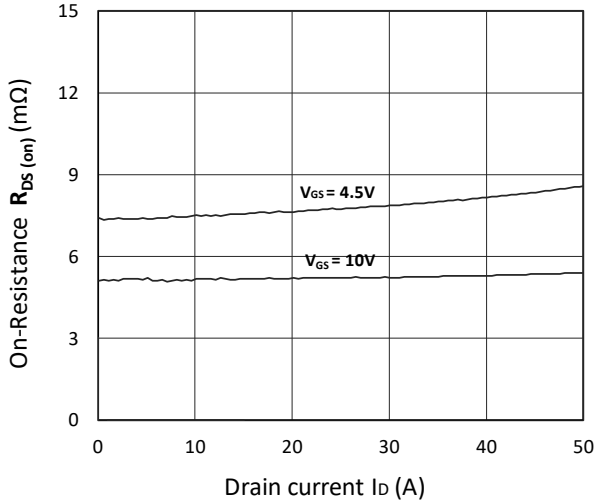


Figure 5. $R_{DS(ON)}$ vs. I_D

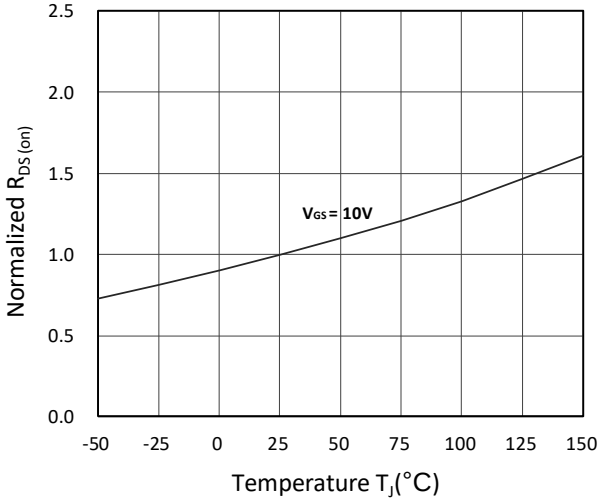


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

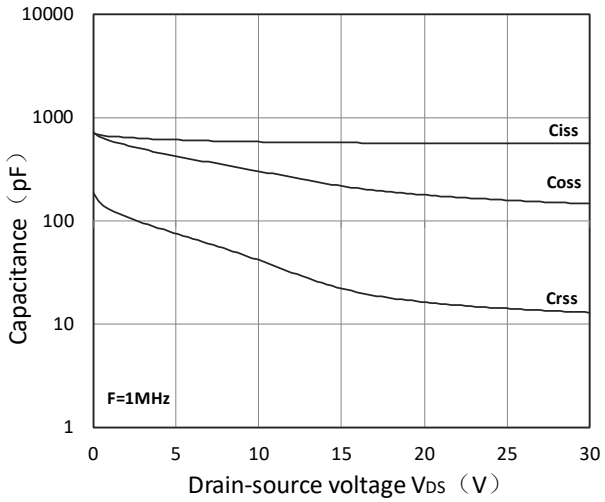


Figure 7. Capacitance Characteristics

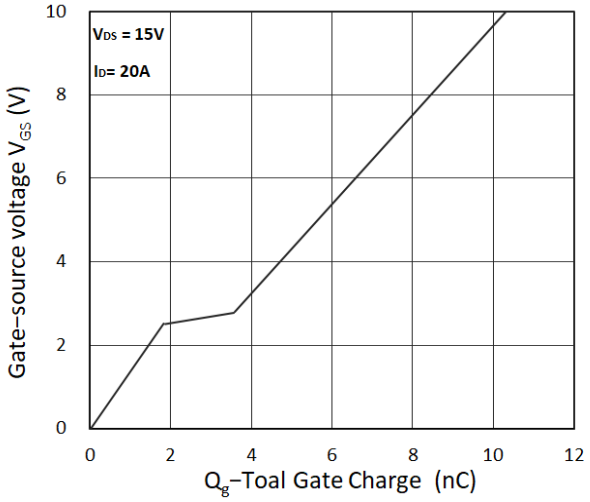


Figure 8. Gate Charge Characteristics

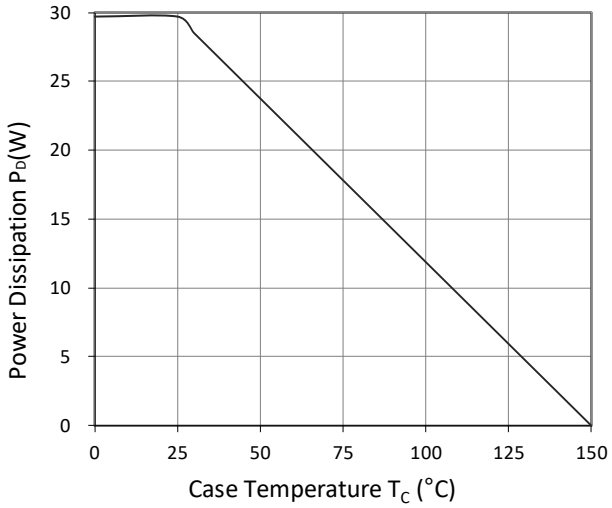


Figure 9. Power Dissipation

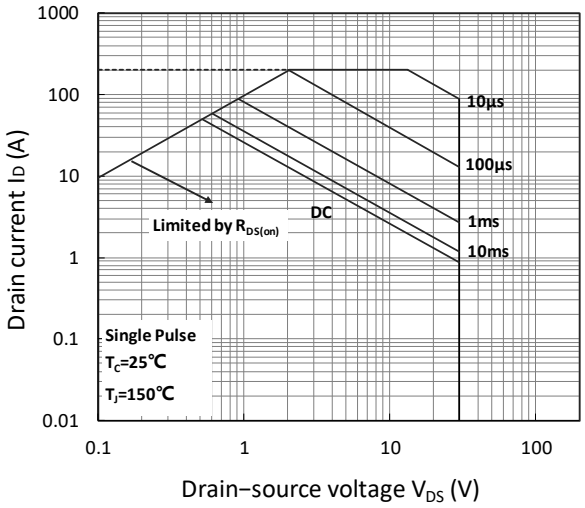


Figure10. Safe Operating Area

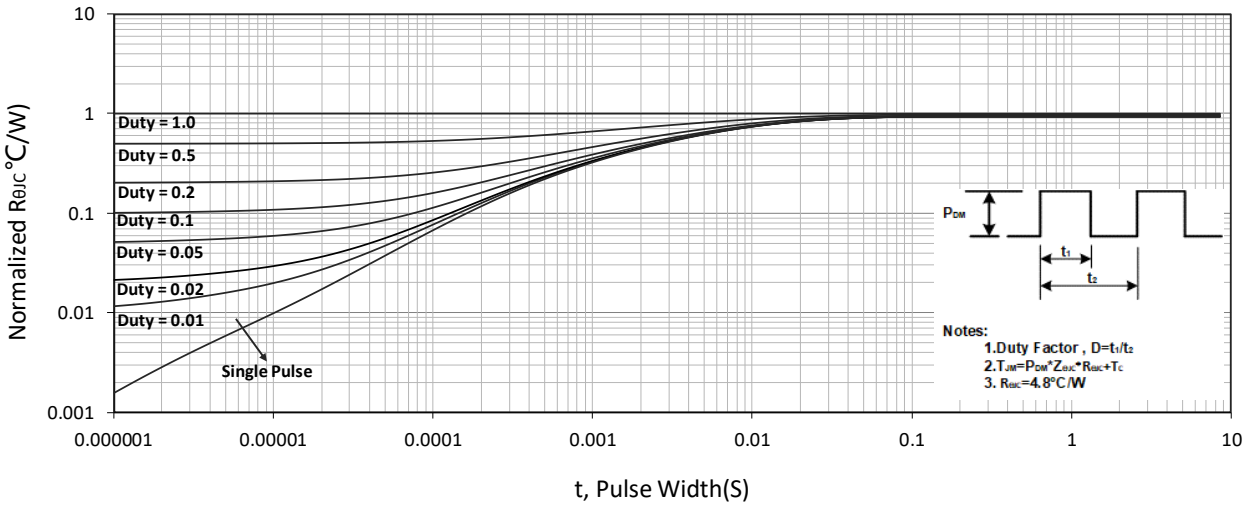
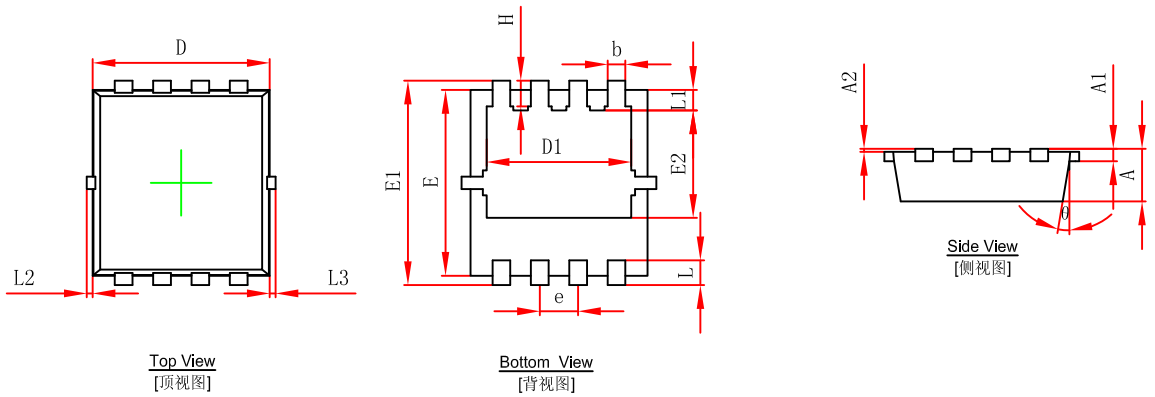


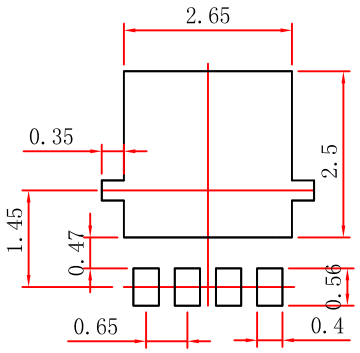
Figure 11. Normalized Maximum Transient Thermal Impedance

PDFNWB3.3x3.3-8L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°

PDFNWB3.3x3.3-8L Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:±0.05mm.
3.The pad layout is for reference purposes only.