N-CHANNEL ENHANCEMENT MODE POWER MOSFET

TF060N03M

● General Description

The TF060N03M 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

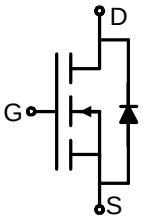
Low Thermal resistance

●Application

Synchronous Rectification for AC-DC/DC-DC converter

Power Tools

● Product Summary

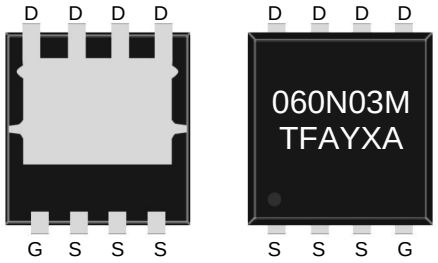


V_{DS}=30V I_D=55A

$R_{DSON(4.5V\ typ)}$=5.5mΩ

$R_{DSON(2.5V\ typ)}$=9.8mΩ

RoHS compliant



PDFNWB3.3x3.3-8L

●Package Marking and Ordering Information:

Part NO.	TF060N03M
Marking1	060N03M
Marking2	TF:tuofeng; Y:year code; XX: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℃	55	A
	$I_{D@}$TC=75℃	40	A
	$I_{D@}$TC=100℃	35	A
Pulsed Drain Current ①	I_{DM}	150	A
Total Power Dissipation	P_D@TC=25℃	25	W
Total Power Dissipation	P_D@TA=25℃	2.0	W
Operating Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃
Single Pulse Avalanche Energy	E_{AS}	85	mJ

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	5.5	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	60	° 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	1.5	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	-	5.5	7.0	mΩ
		V_{GS}=4.5V, I_D=20A	-	9.8	11	mΩ
Forward Transconductance	g_{FS}	V_{DS} =25V, I_D=20A	-	20	-	S
Source-drain voltage	V_{SD}	Is=20A	-	0.84	1.20	V

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	Ciss	f = 1MHz V_{DS}=15V V_{GS} = 0V	-	1400	-	pF
Output capacitance	Coss		-	205	-	
Reverse transfer capacitance	Crss		-	177	-	

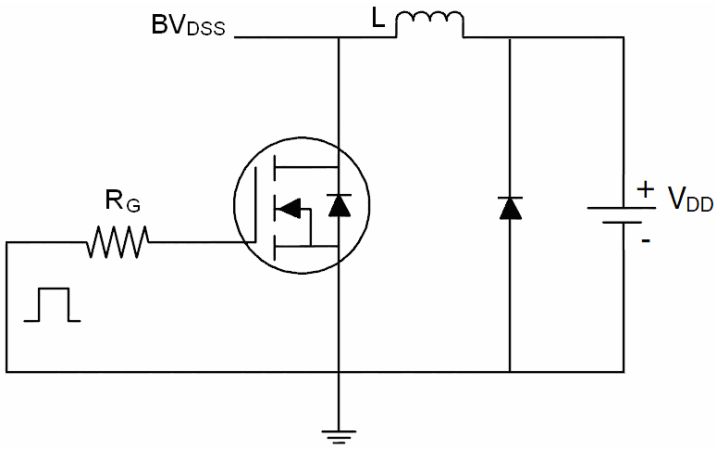
●Gate Charge characteristics(T_a = 25℃)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Qg	V_{DD} = 15V I_D = 20A V_{GS} = 10V	-	32.3	-	nC
Gate - Source charge	Qgs		-	4.9	-	
Gate - Drain charge	Qgd		-	6.9	-	

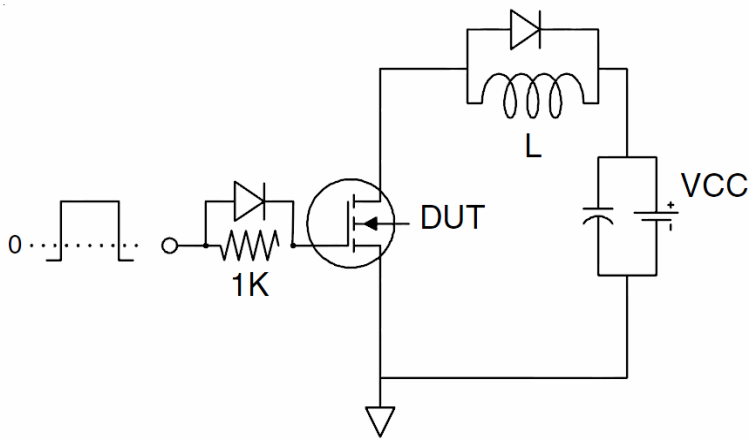
Note: ① Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2% ;

Test Circuit

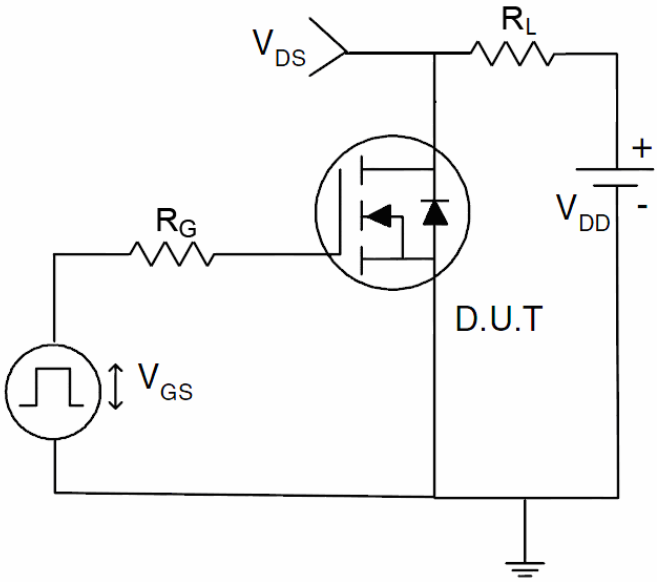
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics

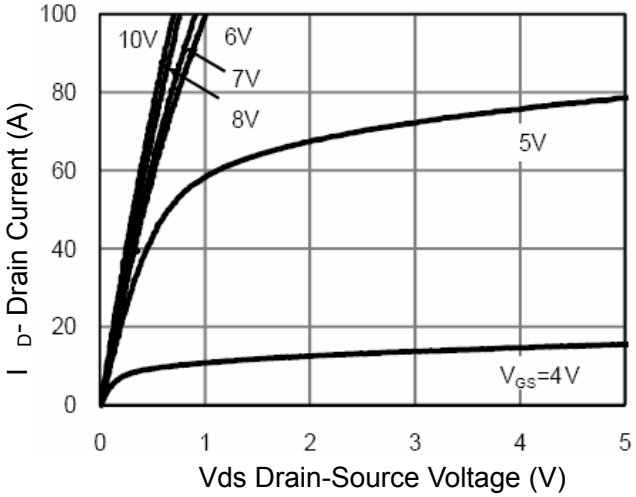


Figure 1 Output Characteristics

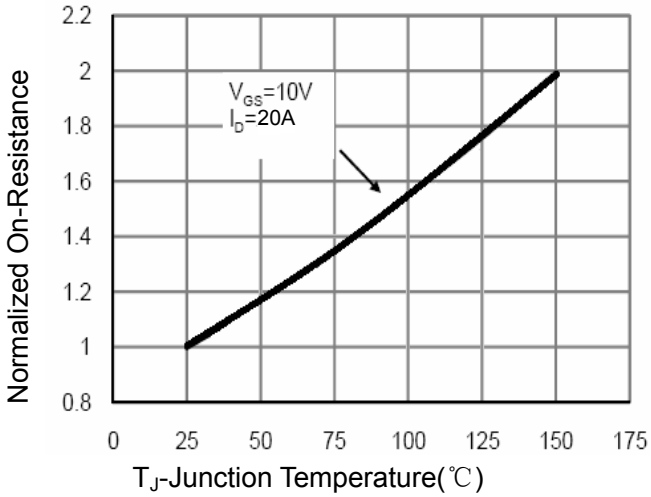


Figure 4 Rdson-JunctionTemperature

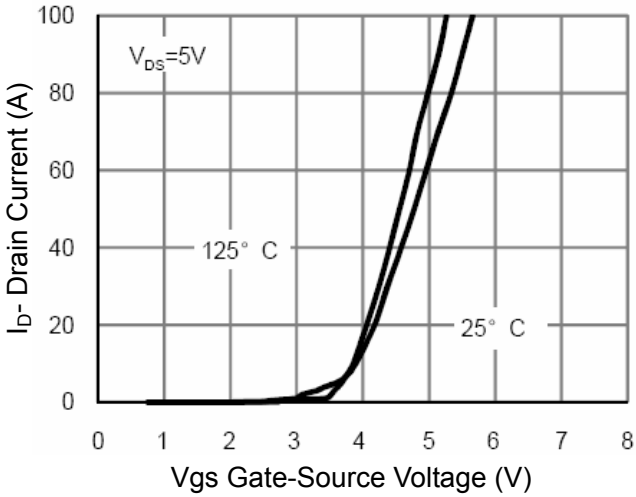


Figure 2 Transfer Characteristics

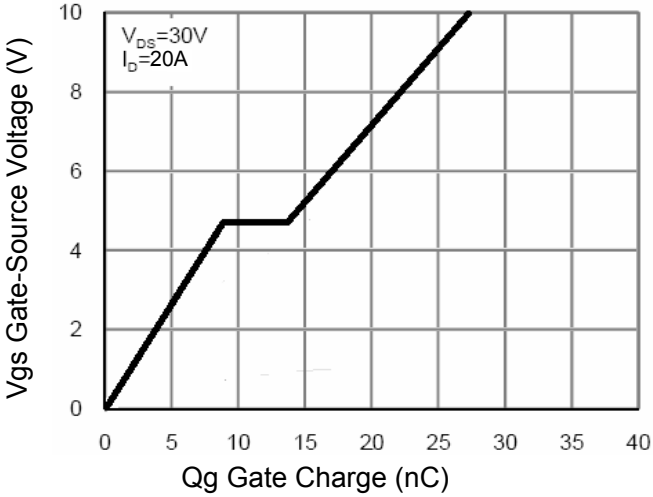


Figure 5 Gate Charge

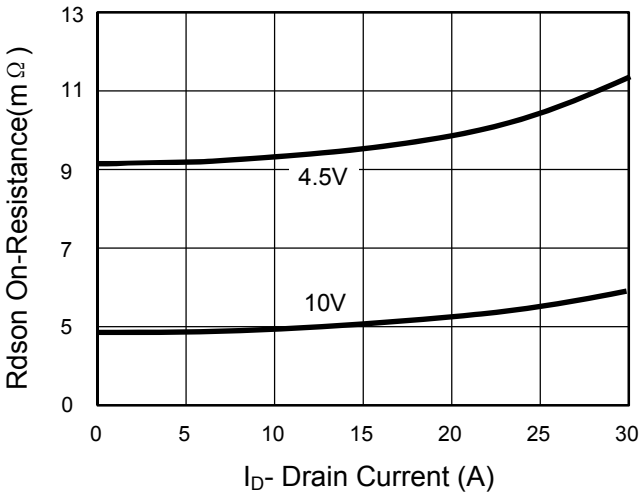


Figure 3 Rdson- Drain Current

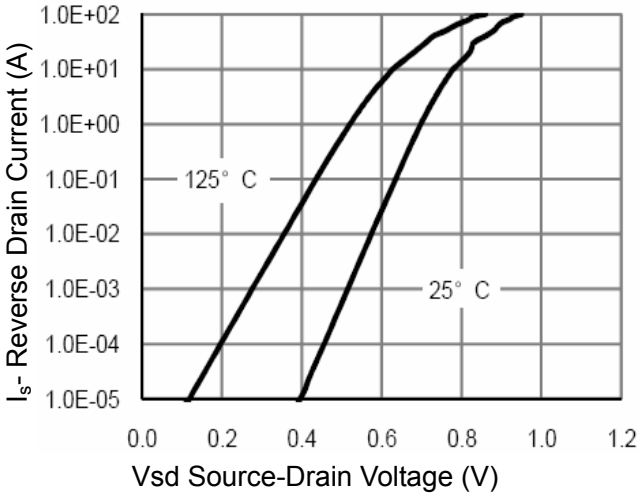


Figure 6 Source- Drain Diode Forward

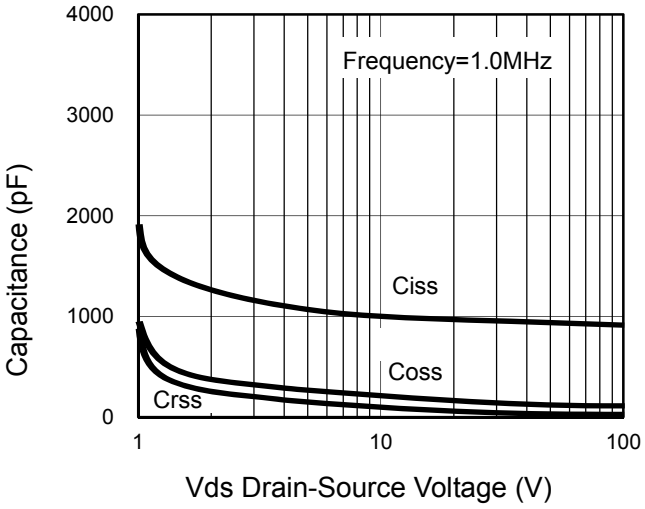


Figure 7 Capacitance vs Vds

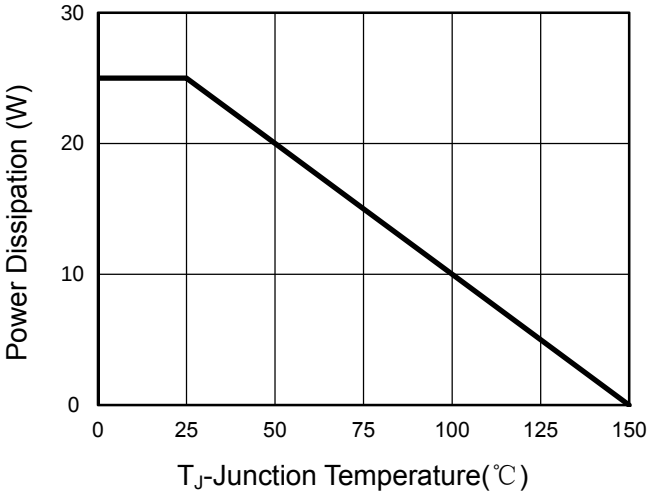


Figure 9 Power De-rating

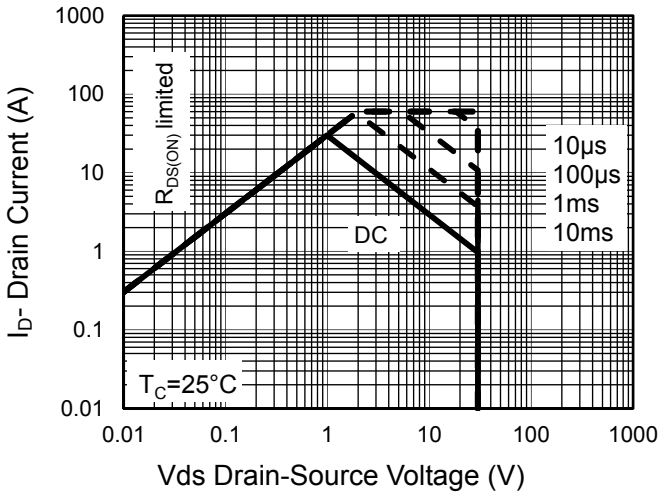


Figure 8 Safe Operation Area

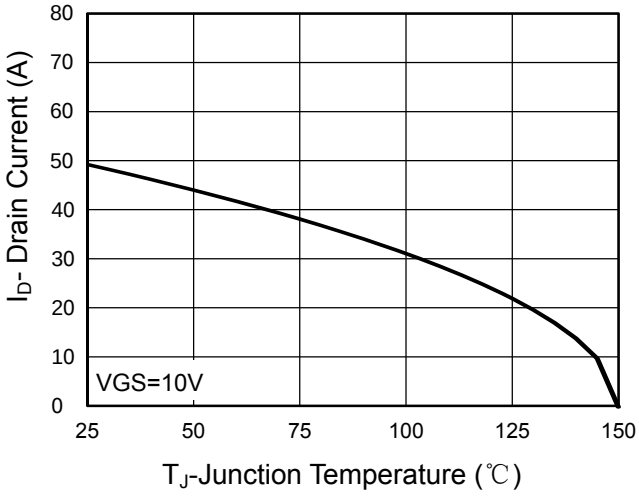


Figure 10 Current De-rating

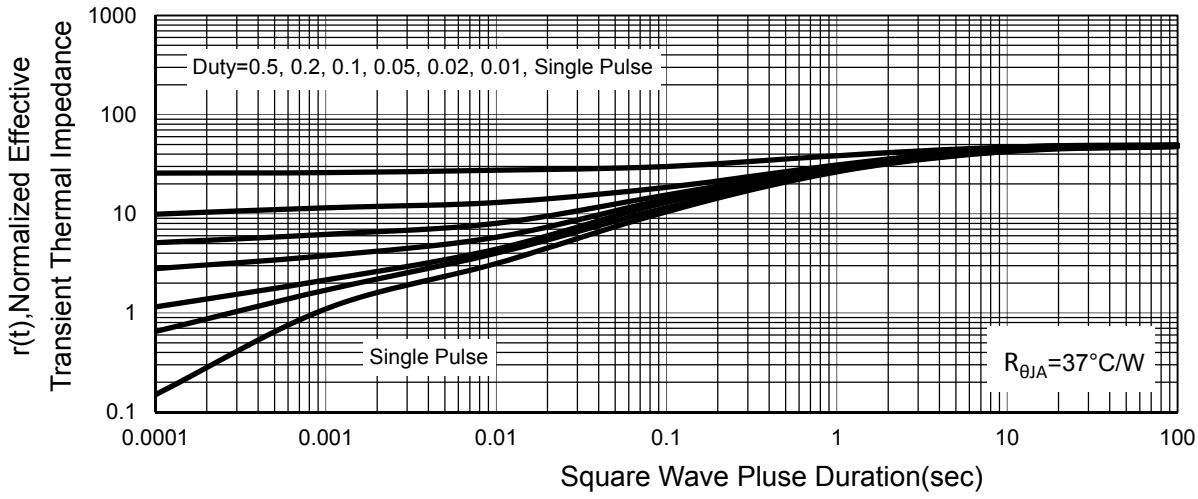
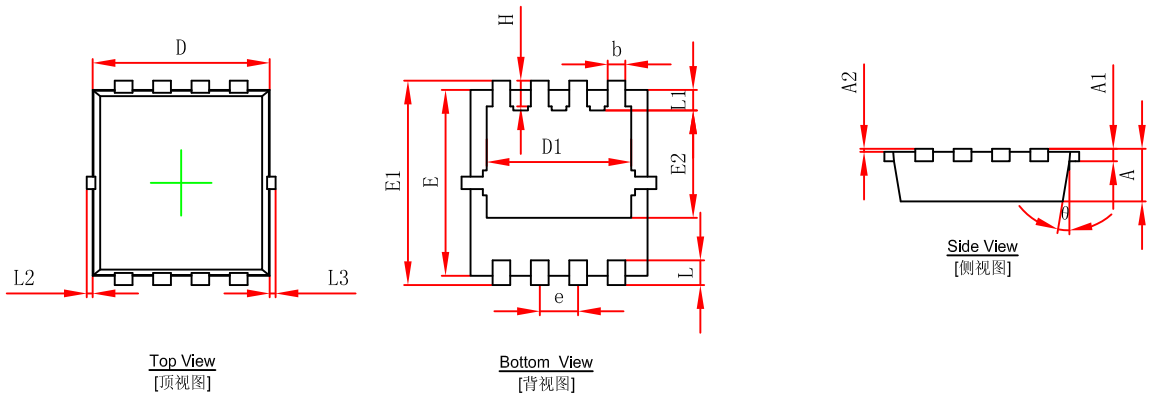


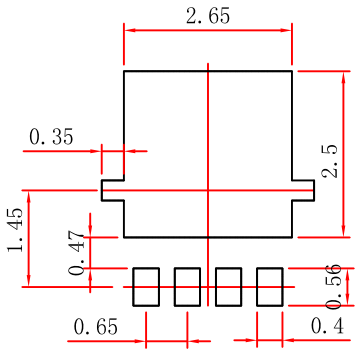
Figure 11 Normalized Maximum Transient Thermal Impedance

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.