



Shenzhen Tuofeng Semiconductor Technology Co., Ltd

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

SGT MOS、低内阻、低结电容开关损耗小

TF020N025NGC

• General Description

The TF020N025NGC combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

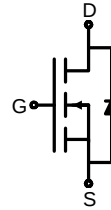
• Features

Advance high cell density Trench technology
Low $R_{DS(ON)}$ to minimize conductive loss
Low Gate Charge for fast switching
Low Thermal resistance

• Application

MB/VGA Vcore
SMPS 2nd Synchronous Rectifier
POL application
BLDC Motor driver

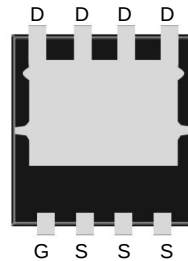
• Product Summary



$$V_{DS} = 25V \quad I_D = 110A$$

$$R_{DS(ON)}(4.5V \text{ typ}) = 1.8m\Omega$$

$$R_{DS(ON)}(2.5V \text{ typ}) = 3.5m\Omega$$



PDFNWB5x6-8L-Clip

• Ordering Information:

Part NO.	TF020N025NGC
Marking 1	020N025GC : TF020N025NGC
Marking 2	TF:tuofeng; AA:device code; Y:year code; X:Week
MOQ	5000

• Absolute Maximum Ratings ($T_C = 25^\circ C$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	25	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	$I_D @ T_C = 25^\circ C$	110	A
	$I_D @ T_C = 75^\circ C$	70	A
	$I_D @ T_C = 100^\circ C$	60	A
Pulsed Drain Current ①	I_{DM}	200	A
Total Power Dissipation	$P_D @ T_C = 25^\circ C$	65	W
Total Power Dissipation	$P_D @ T_A = 25^\circ C$	1.0	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ C$
Storage Temperature	T_{STG}	-55 to 150	$^\circ C$

Note: ① Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;



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Single Pulse Avalanche Energy	E _{AS}	75			mJ	
Avalanche Current	I _{AS} I _{AR}	25			A	
●Thermal resistance						
Parameter	Symbol	Min.	Typ.	Max.	Unit	
Thermal resistance, junction - case	R _{thJC}	-	-	2.2	° C/W	
Thermal resistance, junction - ambient	R _{thJA}	-	-	55	° C/W	
Soldering temperature, wave soldering for 8s	T _{sold}	-	-	265	° C	
●Electronic Characteristics(T _a = 25°C)						
Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	25			V
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250uA	0.5	1.1	1.5	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =25V, V _{GS} =0V			1.0	uA
Gate- Source Leakage Current	I _{GSS}	V _{GS} =±12V ,V _{DS} =0V			±100	nA
Static Drain-source On Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =20A		1.8	2.5	mΩ
		V _{GS} =2.5V, I _D =20A		3.5	4.5	mΩ
Forward Transconductance	g _{FS}	V _{DS} =25V, I _D =20A		10		S
Source-drain voltage	V _{SD}	I _S =20A			1.20	V
●Electronic Characteristics(T _a = 25°C)						
Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C _{iss}	V _{ds} =15V,V _{gs} =0V f = 1MHz	-	3611	-	pF
Output capacitance	C _{oss}		-	1856	-	
Reverse transfer capacitance	C _{rss}		-	73	-	
●Gate Charge characteristics(T _a = 25°C)						
Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Resistance	R _g	f = 1MHz		1.5		Ω
Total gate charge	Q _g	V _{DD} = 15V I _D = 20A V _{GS} = 4.5V	-	28.18	-	nC
Gate - Source charge	Q _{gs}		-	5.6	-	
Gate - Drain charge	Q _{gd}		-	6.6	-	
Turn-ON Delay time	t _{D(on)}	V _{GS} =4.5V ,V _{DS} =15V R _G =3.0Ω, I=20A		12.8		ns
Turn-ON Rise time	t _r			4.00		ns
Turn-Off Delay time	t _{D(off)}			32.0		ns
Turn-Off Fall time	t _f			8.00		ns

Figure 1 Output Characteristics

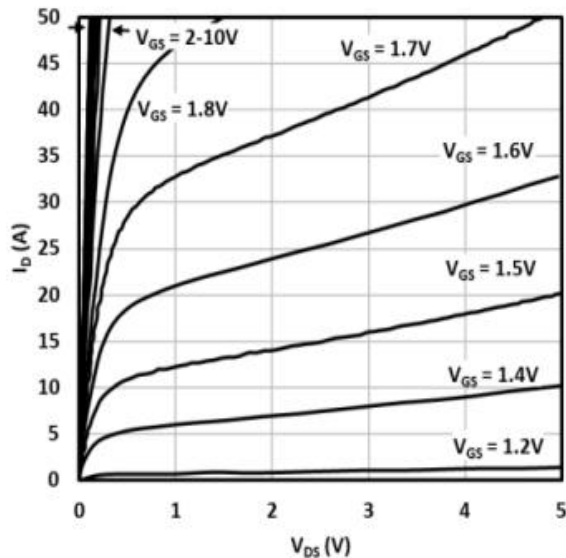


Figure 2 Transfer Characteristics

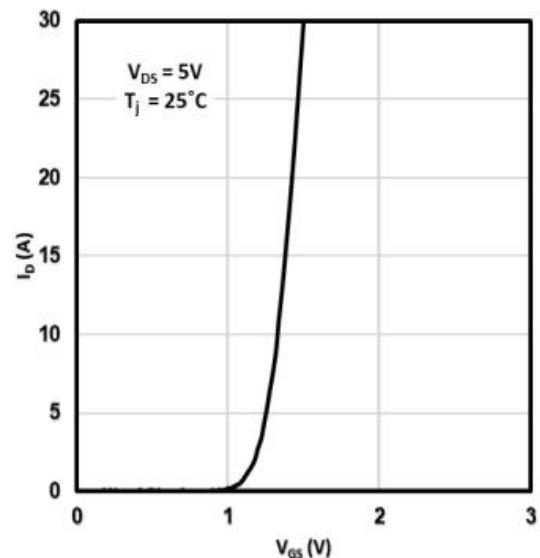


Figure 3 On-resistance vs.gate voltage

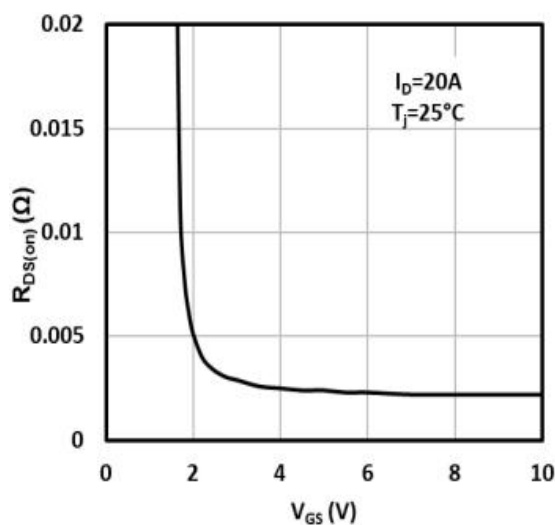


Figure 4 On-resistance vs.drain current

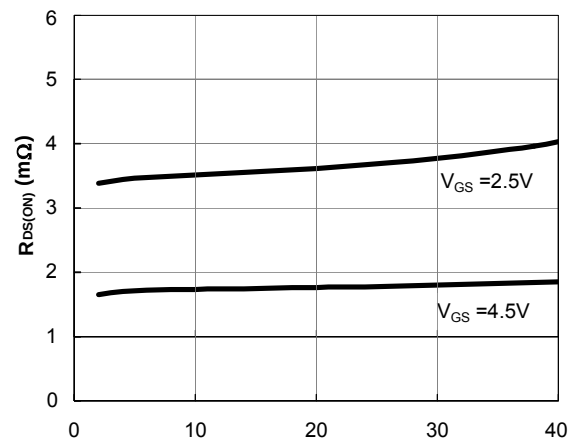


Figure 5 Source-to-drain diode forward characteristics

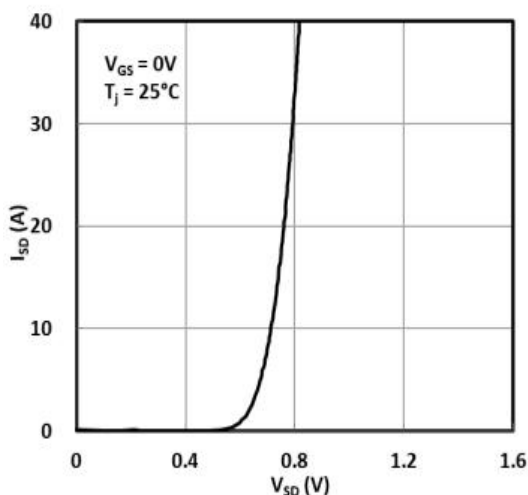


Figure 6 Capacitance vs drain-to-source Voltage

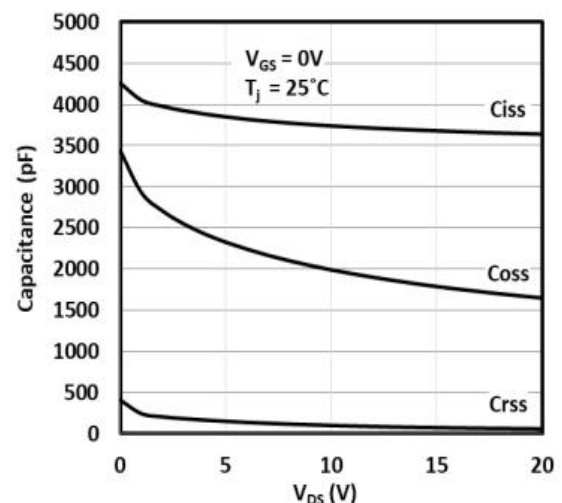


Figure 7 Gate-to-source voltage vs.gate charge

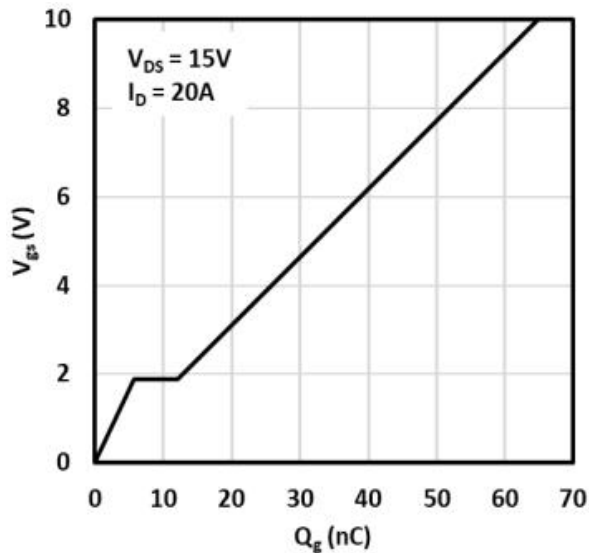


Figure 8 Maximum drain current vs.case temperature

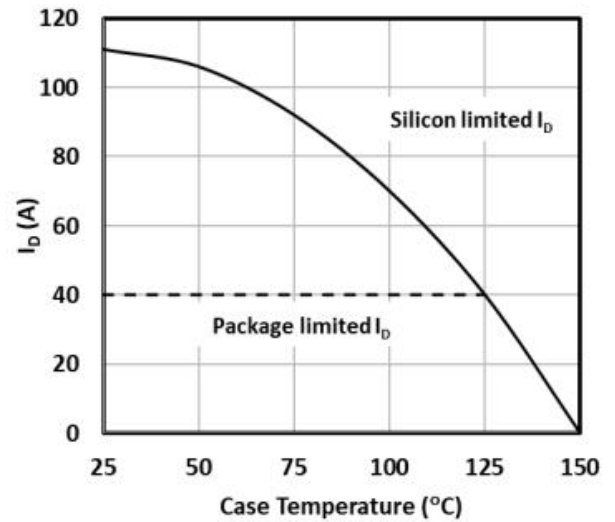
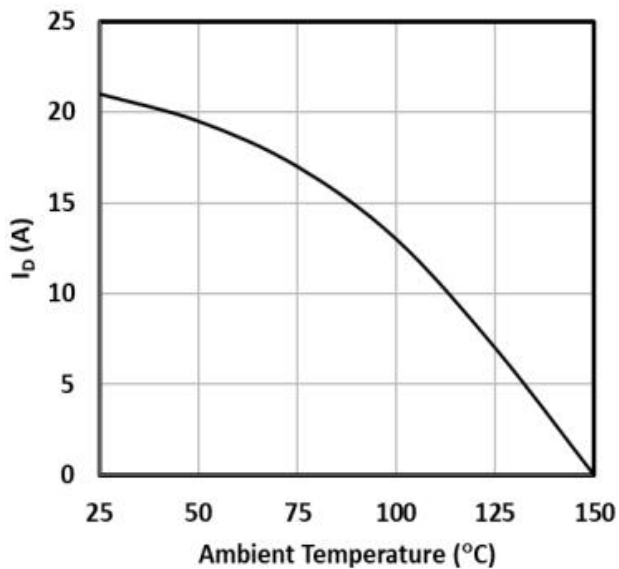
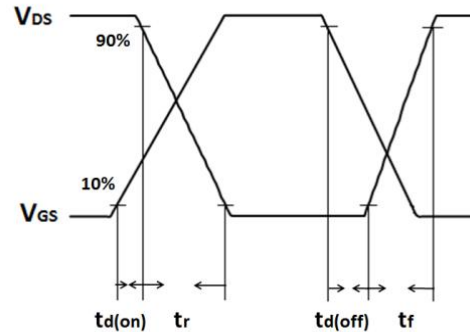
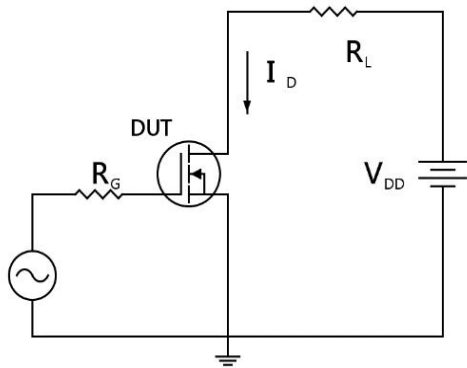


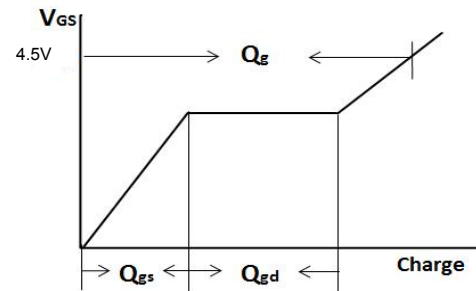
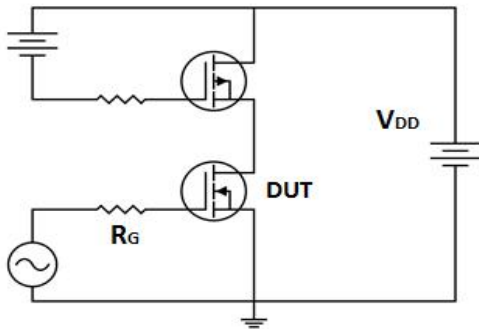
Figure 9 Maximum drain current vs. ambient temperature



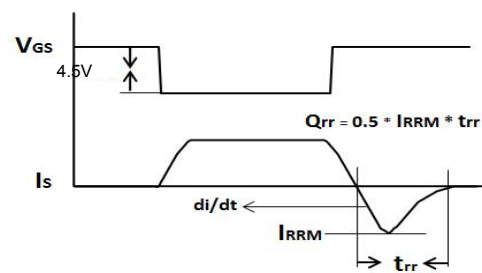
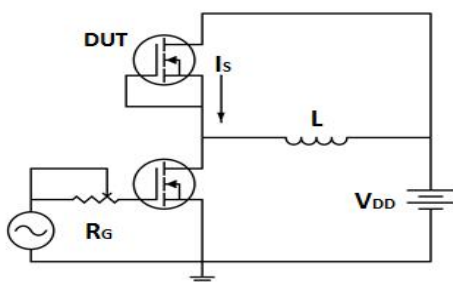
Resistive switching time test circuit & waveforms



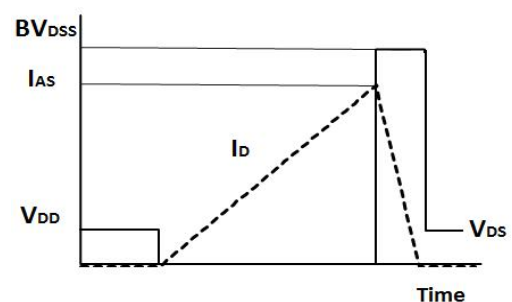
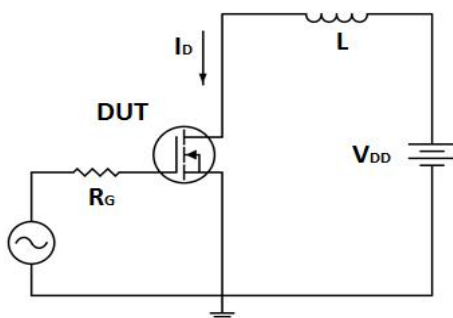
Gate charge test circuit & waveforms



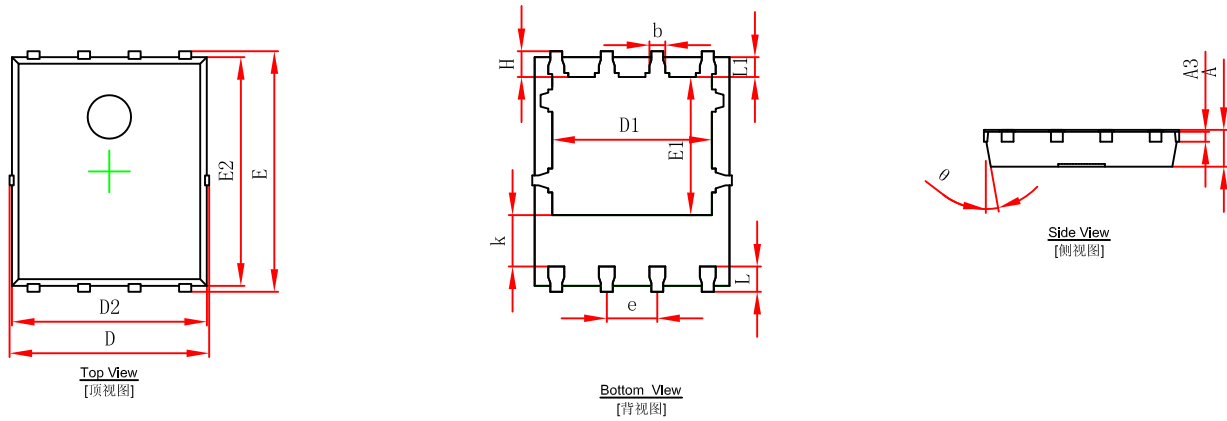
Peak diode recovery dv/dt circuit & waveforms



Unclamped inductive switching test circuit & waveforms

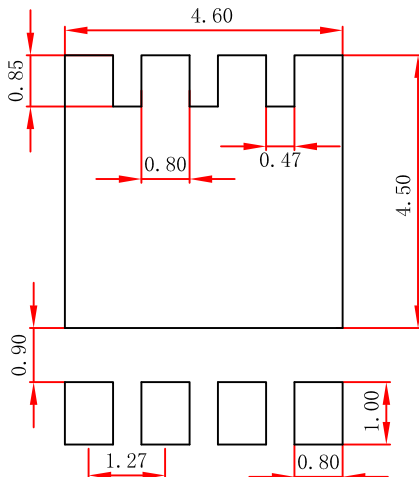


PDFNWB5x6-8L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°

PDFNWB5x6-8L Suggested Pad Layout



- Note:
1. Controlling dimension: in millimeters.
 2. General tolerance: $\pm 0.05\text{mm}$.
 3. The pad layout is for reference purposes only.