

General Description

The TF020P02N combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

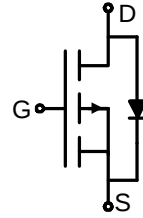
Features

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

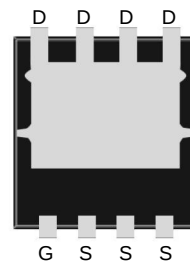
Product Summary



$$V_{DS} = -20V \quad I_D = -120A$$

$$R_{DS(ON)}(-4.5V \text{ typ}) = 2.0m\Omega$$

$$R_{DS(ON)}(-2.5V \text{ typ}) = 2.7m\Omega$$



PDFNWB5x6-8L

Ordering Information:

Part NO.	TF020P02N
Marking1	020P02N
Marking2	TF:tuofeng; Y:year code; X:Week; AA:device code;
Basic ordering unit (pcs)	5000

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	$I_{D@T_C=25^\circ C}$	-120	A
	$I_{D@T_C=75^\circ C}$	-84	A
	$I_{D@T_C=100^\circ C}$	-72	A
Pulsed Drain Current ^①	I_{DM}	-480	A
Total Power Dissipation ^②	$P_D@T_C=25^\circ C$	75	W
Total Power Dissipation	$P_D@T_A=25^\circ C$	2.0	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ C$
Storage Temperature	T_{STG}	-55 to 150	$^\circ C$

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case ^②	R _{thJC}	-	-	2.0	° C/W
Thermal resistance, junction - ambient	R _{thJA}	-	-	46	° C/W
Soldering temperature, wavesoldering for 8s	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	-20			V
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = -250uA	-0.50	-0.65	-1.00	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = -20V, 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		2.0	2.7	mΩ
		V _{GS} = -2.5V, I _D = -20A		2.7	3.8	mΩ
Forward Transconductance	g _{FS}	V _{DS} = -10V, I _D = -20A		58		S
Source-drain voltage	V _{SD}	I _S = -20A		0.75	1.00	V

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C _{iss}	f = 1MHz V _{DD} = -10V V _{GS} = 0V	-	15000	-	pF
Output capacitance	C _{oss}		-	1600	-	
Reverse transfer capacitance	C _{rss}		-	1068	-	

•Gate Charge characteristics(T_a = 25°C)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q _g	V _{DD} = -10V I _D = -20A V _{GS} = -4.5V	-	100	-	nC
Gate - Source charge	Q _{gs}		-	21.0	-	
Gate - Drain charge	Q _{gd}		-	32.0	-	
Turn-On Delay Time	t _{d(on)}	V _{GS} = -4.5V V _{DD} = -10V R _L = 0.5Ω R _{GEN} = 3.0Ω	-	20.0	-	nS
Turn-On Rise Time	t _r		-	50.0	-	
Turn-Off Delay Time	t _{d(off)}		-	100	-	
Turn-Off Fall Time	t _f		-	40.0	-	

Note:

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

Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;

Typical Performance Characteristics

Figure1: Output Characteristics

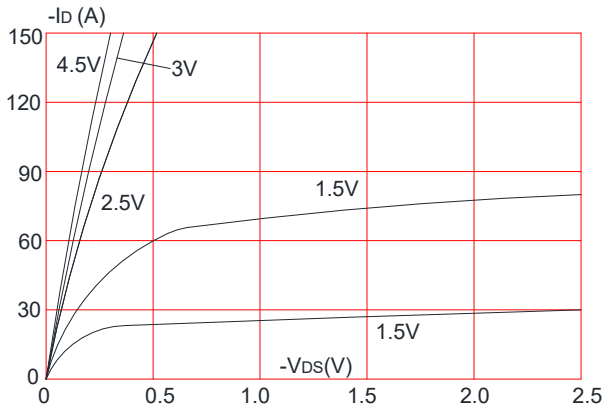


Figure 2: Typical Transfer Characteristics

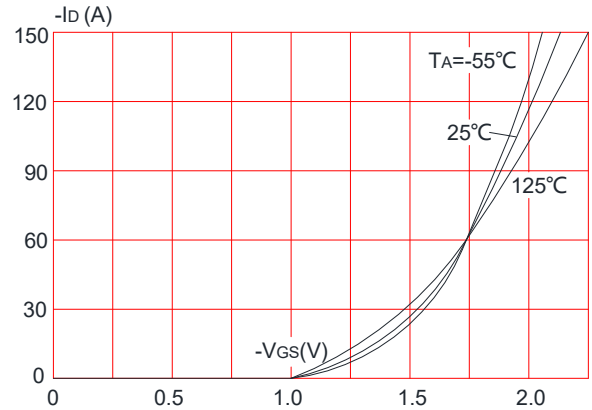


Figure 3: On-resistance vs. Drain Current

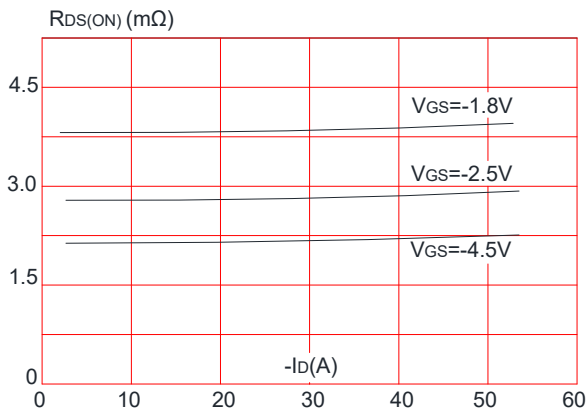


Figure 4: Body Diode Characteristics

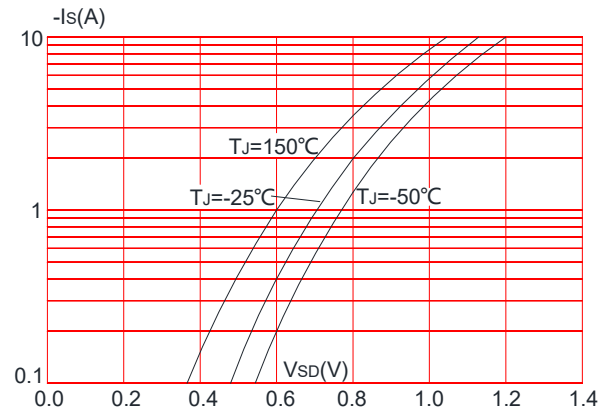


Figure 5: Gate Charge Characteristics

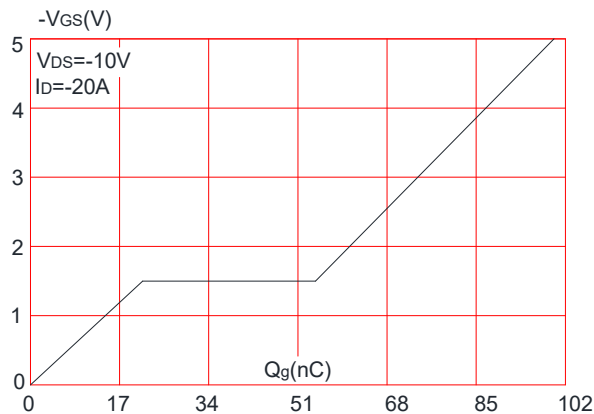


Figure 6: Capacitance Characteristics

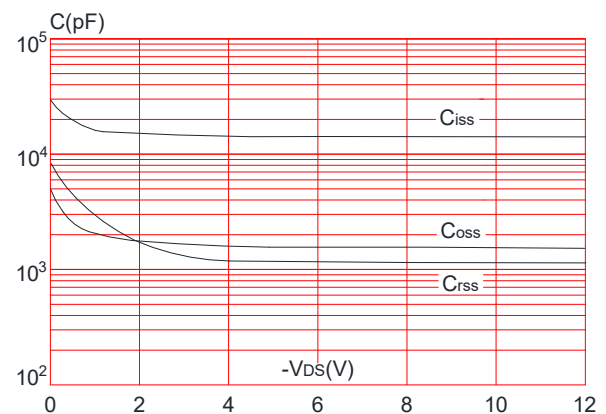


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

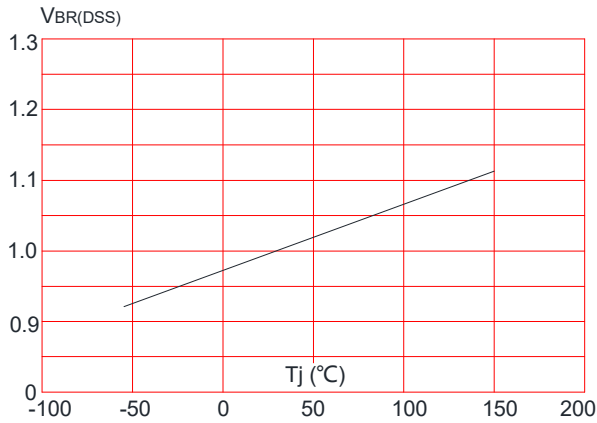


Figure 8: Normalized on Resistance vs. Junction Temperature

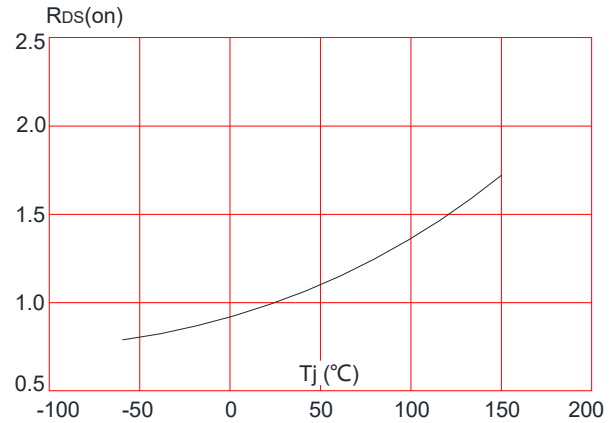


Figure 9: Maximum Safe Operating Area

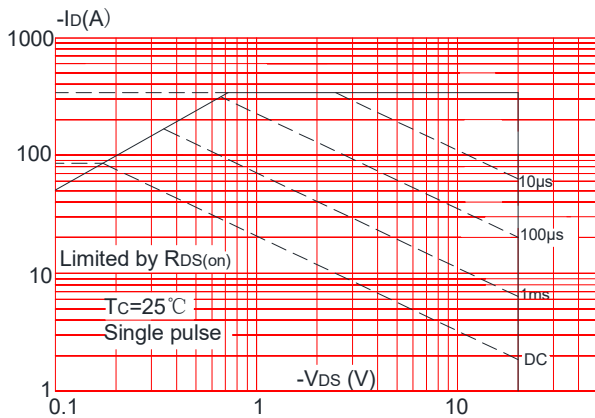


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

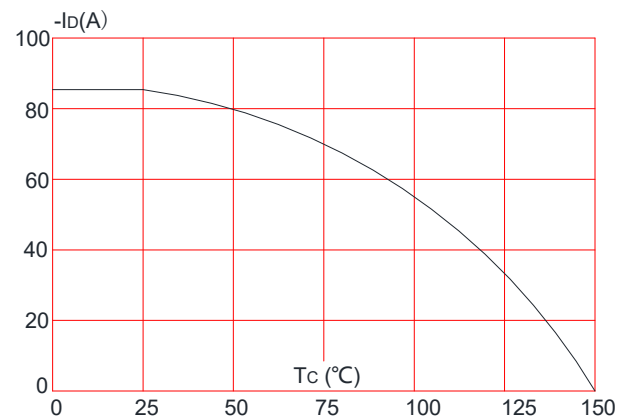
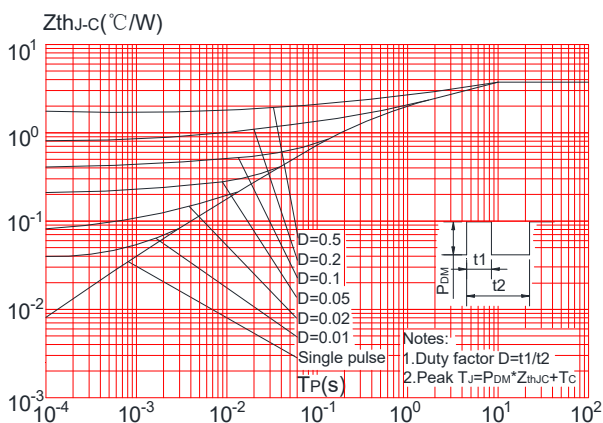
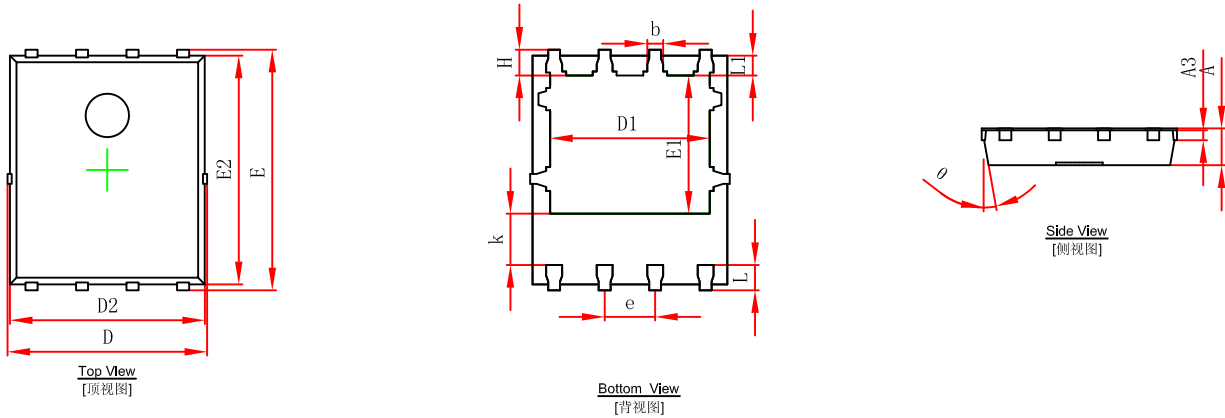


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

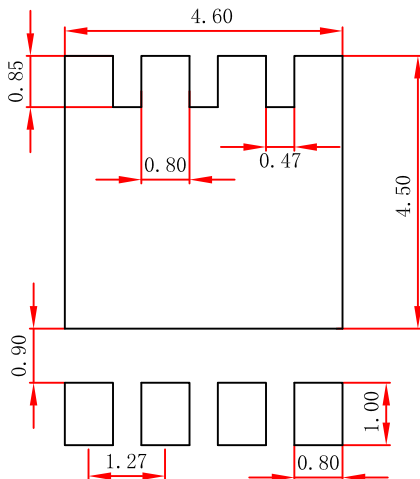


PDFNWB5x6-8L Package Outline Dimensions



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.