P -CHANNEL ENHANCEMENT MODE POWER MOSFET

TF20P02

● General Description

The TF20P02 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

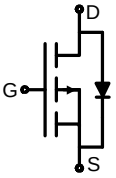
●Application

Load Switches

DC/DC

BLDC Motor driver

● Product Summary



V_{DS} =-20V I_D=-20A

$R_{DSON(-4.5V\ typ)}$ =15.0mΩ

$R_{DSON(-2.5V\ typ)}$ =19.5mΩ

RoHS compliant



TO-251



TO-252

●Ordering Information:

Part NO.	TF20P02
Marking1	20N02:TF20P02
Marking2	TF:tuofeng; Y:year code; XX:Week; AA:device code;
Basic ordering unit (pcs)	2500

●Absolute Maximum Ratings (T_C =25℃)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current	$I_{D@}$TC=25℃	-20	A
	$I_{D@}$TC=75℃	-14	A
	I_{D} @TC=100℃	-12	A
Pulsed Drain Current ①	I_{DM}	-50	A
Total Power Dissipation②	P_D	10	W
Total Power Dissipation(TA=25℃)	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@L=0.1mH	E_{AS}	40	mJ
Avalanche Current@L=0.1mH	I_{AS}	-20	A

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case②	R_{thJC}	-	-	3.5	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	62.5	° C/W
Soldering temperature, wave soldering for 10s	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	-0.45	-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=-8A		15.0	18.0	mΩ
		V_{GS}=-2.5V, I_D=-4A		19.5	23.0	mΩ
Forward Transconductance	g_{FS}	V_{DS} =-10V, I_D=-3.0A		10		s
Source-drain voltage	V_{SD}	Is=-5.5A		0.85	1.28	V

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	Ciss	V_{GS}=0V, V_{DS}=-10V f = 1MHz	-	1478	-	pF
Output capacitance	Coss		-	127.9	-	
Reverse transfer capacitance	Crss		-	136.5	-	

●Gate Charge characteristics(T_a = 25℃)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Qg	V_{DD} =-10V I_D = -8A V_{GS} = -4.5V	-	18.7	-	nC
Gate - Source charge	Qgs		-	2.64	-	
Gate - Drain charge	Qgd		-	4.50	-	

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

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

Fig.1 Gate-Charge Characteristics

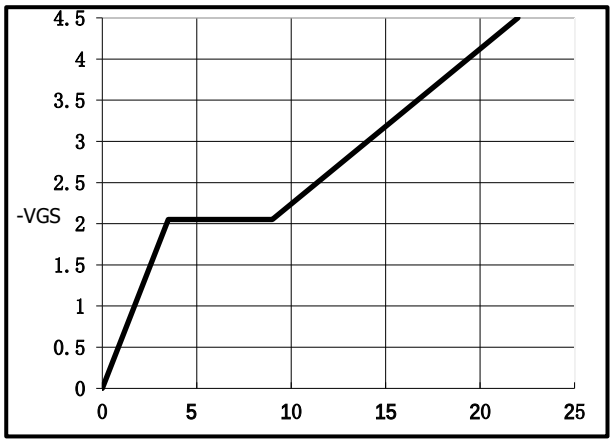


Fig.2 Capacitance Characteristics

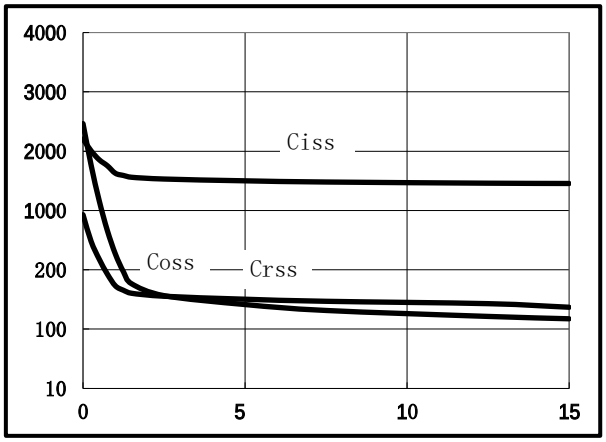


Fig.2 Power Dissipation

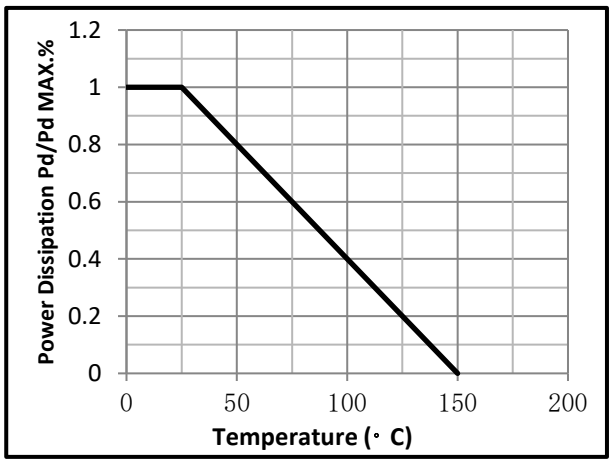


Fig.3 Typical output Characteristics

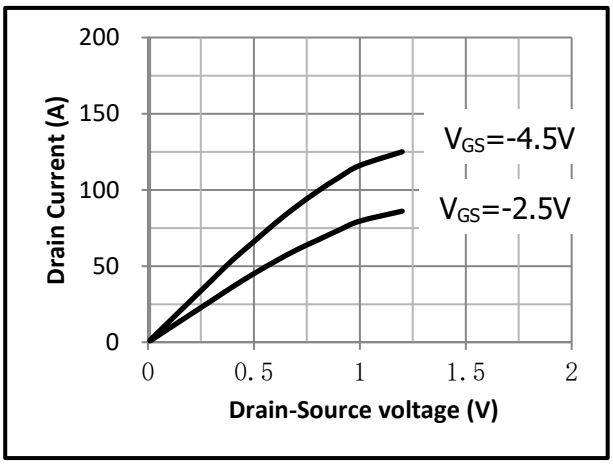


Fig.4 Threshold Voltage V.S Junction Temperature

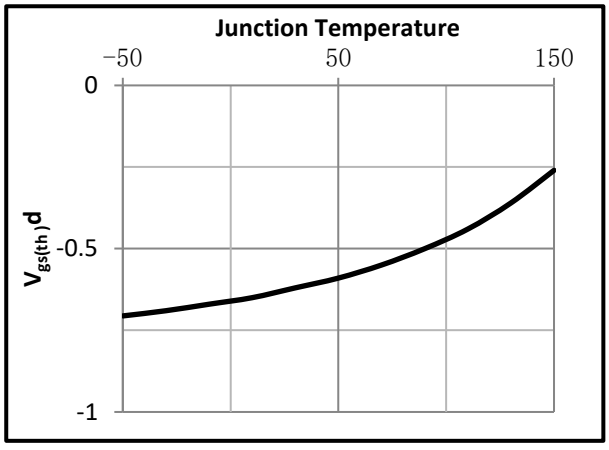


Fig.5 Resistance V.S Drain Current

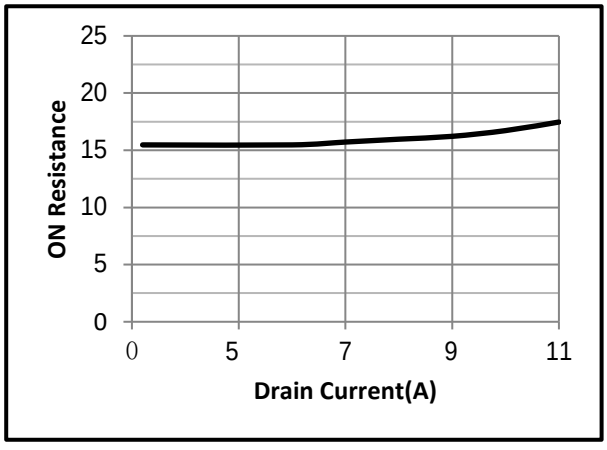


Fig.6 On-Resistance VS Gate Source Voltage

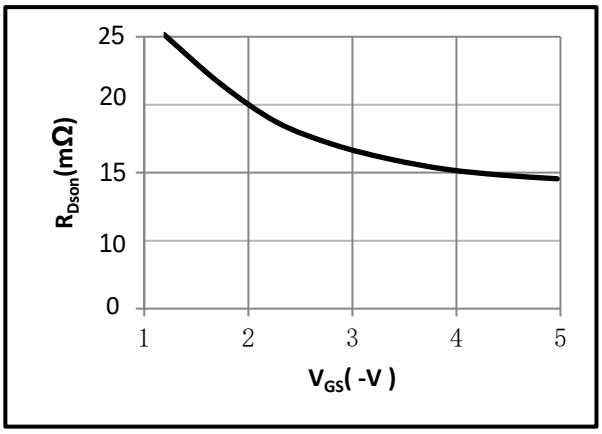


Fig.7 On-Resistance V.S Junction Temperature

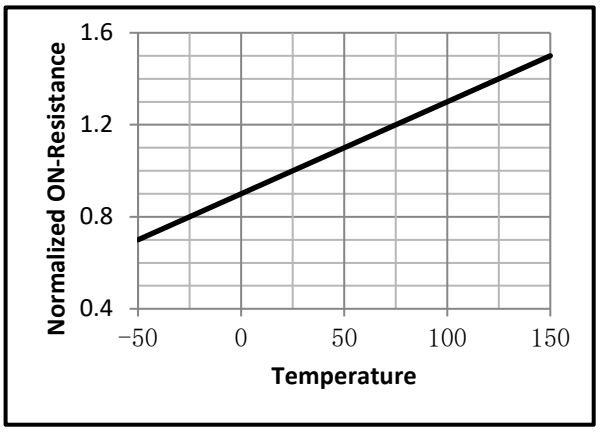


Fig.8 Switching Time Measurement Circuit

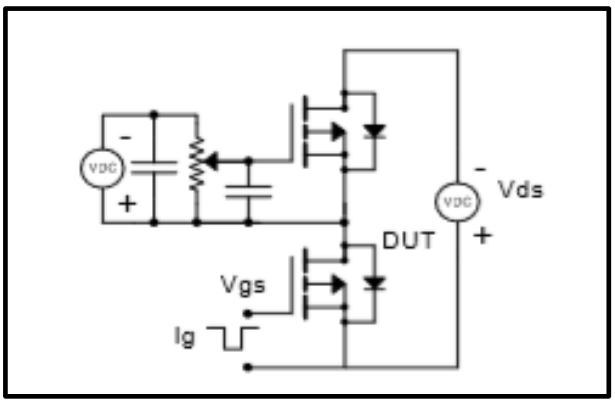


Fig.9 Gate Charge Waveform

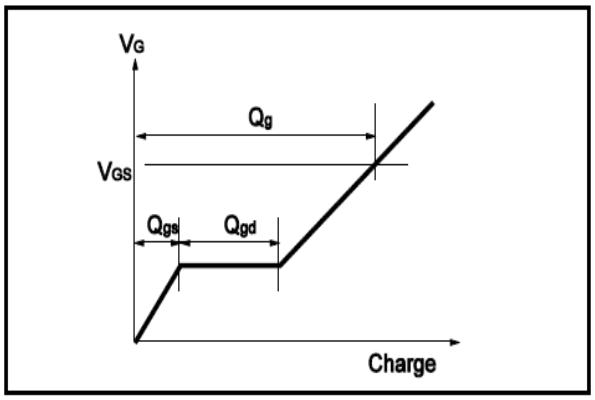


Fig.10 Switching Time Measurement Circuit

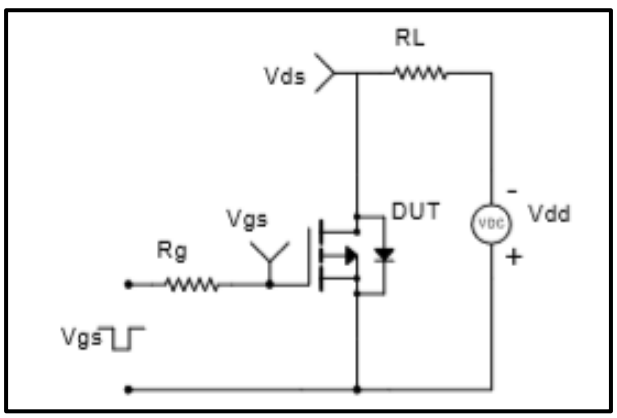
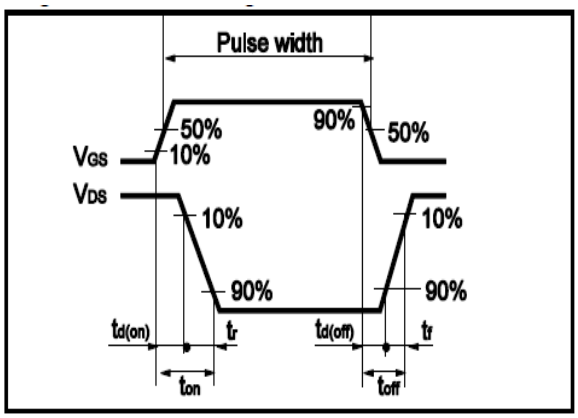
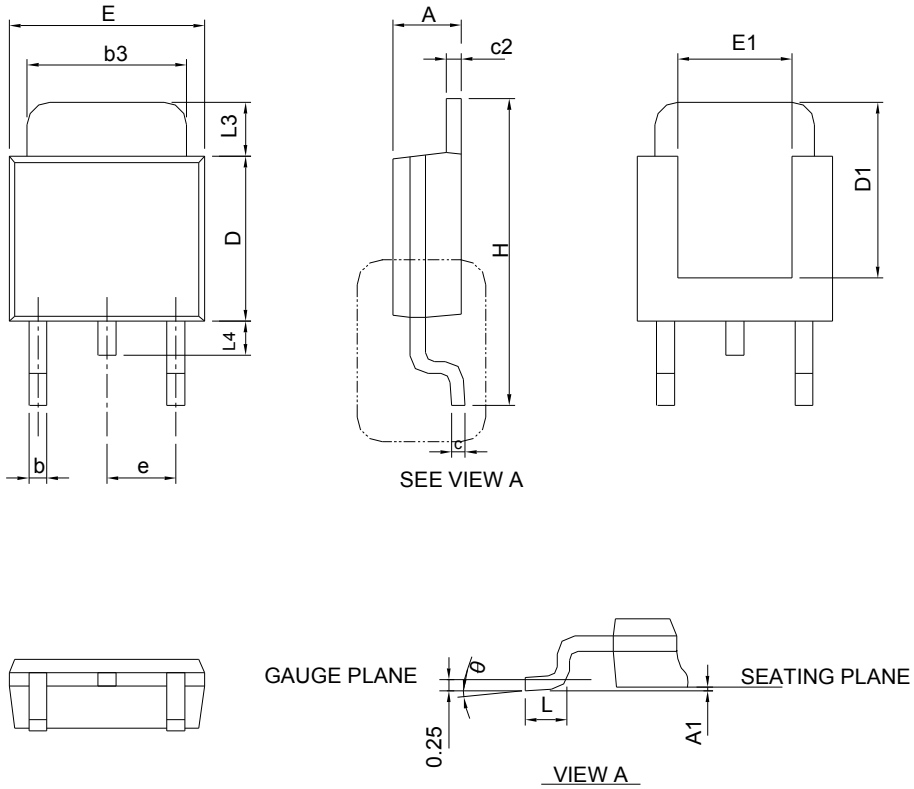


Fig.11 Gate Charge Waveform



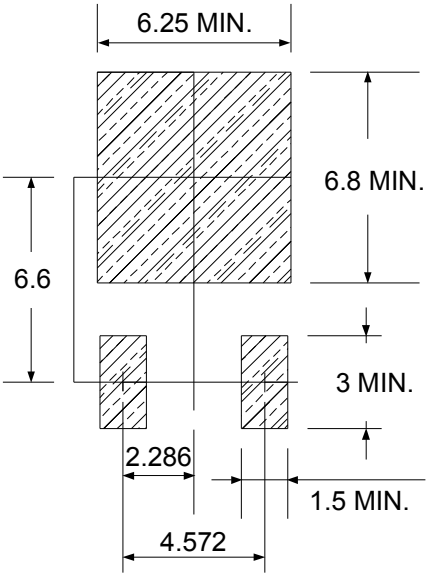
Package Information

TO-252



SYMBOL	TO-252			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1		0.13		0.005
b	0.50	0.89	0.020	0.035
b3	4.95	5.46	0.195	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	2.29 BSC		0.090 BSC	
H	9.40	10.41	0.370	0.410
L	0.90	1.78	0.035	0.070
L3	0.89	2.03	0.035	0.080
L4		1.02		0.040
θ	0°	8°	0°	8°

RECOMMENDED LAND PATTERN



UNIT: mm