P -CHANNEL ENHANCEMENT MODE POWER MOSFET

TF120P06K

● General Description

The TF120P06K combines advanced trench MOSFET technology with a low resistance package to provide extremely low R_{DSON} .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

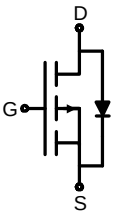
MB/VGA Vcore

SMPS 2nd Synchronous Rectifier

POL application

BLDC Motor driver

● Product Summary



V_{DS} =-60V I_D=-80A

$R_{DSON(-10V\ typ)}$ =11.5mΩ

$R_{DSON(-4.5V\ typ)}$ =14.0mΩ

RoHS compliant

TO-251

TO-252

●Ordering Information:

Part NO.	TF120P06K
Marking 1	120P06K:TF120P06K
Marking 2	TF:tuofeng; YY:year code; XX:Week; AA:device code;
MOQ	TO-251:50/PCS TO-252:2500/PCS

●Absolute Maximum Ratings (T_C =25℃)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	$I_{D@}T_C$=25℃	-80	A
	$I_{D@}T_C$=75℃	-56	A
	$I_{D\ @}T_C$=100℃	-48	A
Pulsed Drain Current ①	I_{DM}	-300	A
Total Power Dissipation	$P_D@T_C$=25℃	115	W
Total Power Dissipation	$P_D@T_A$=25℃	2.0	W
Operating Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃

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

Single Pulse Avalanche Energy	E_{AS}	480	mJ
Avalanche Current	I_{AS} I_{AR}	-25	A

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	5.0	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	55	° C/W
Soldering temperature, wave soldering 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	-60			V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS}, I_D =250uA	-1.1	-1.8	-2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-60V, 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		11.5	15.0	mΩ
		V_{GS}=-4.5V, I_D=-20A		14.0	18.0	mΩ
Forward Transconductance	g_{FS}	V_{DS} =-20V, I_D=-20A		32		S
Source-drain voltage	V_{SD}	Is=-20A			1.20	V

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	Ciss	Vds=-20V,Vgs=0V f = 1MHz	-	8700	-	pF
Output capacitance	Coss		-	290	-	
Reverse transfer capacitance	Crss		-	210	-	

●Gate Charge characteristics(T_a = 25℃)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Risistance	R_g	f = 1MHz		2.1		Ω
Total gate charge	Qg	V_{DD} = -30V	-	140	-	nC
Gate - Source charge	Qgs	I_D = -20A	-	19.0	-	
Gate - Drain charge	Qgd	V_{GS} = -10V	-	28.0	-	
Turn-ON Delay time	$t_{D(on)}$	V_{GS}=-10V ,V_{DS}=-30V R_G =1.0Ω, I=-20A		26		ns
Turn-ON Rise time	t_r			21		ns
Turn-Off Delay time	$t_{D(off)}$			138		ns
Turn-Off Fall time	t_f			30		ns

Typical Performance Characteristics

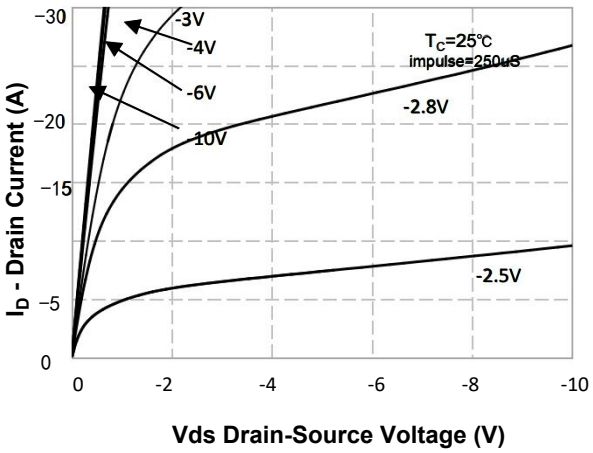


Figure 1. On-Region Characteristics

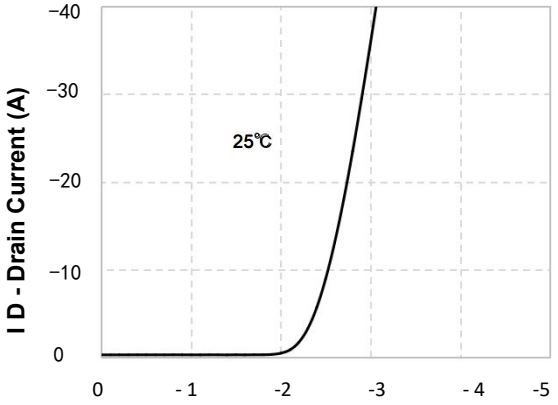


Figure 2. Transfer Characteristics

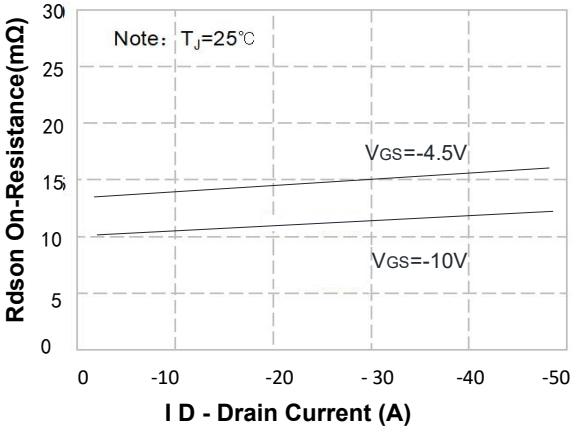


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

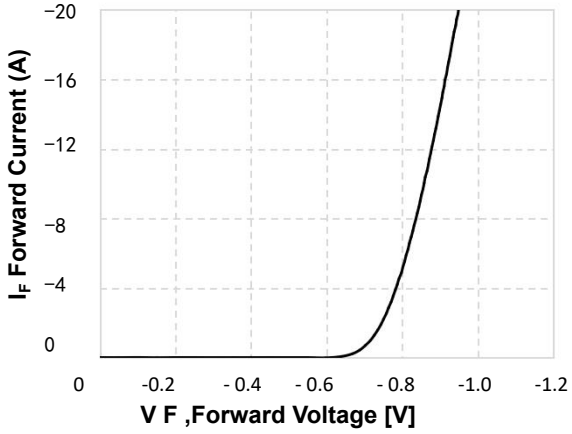


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

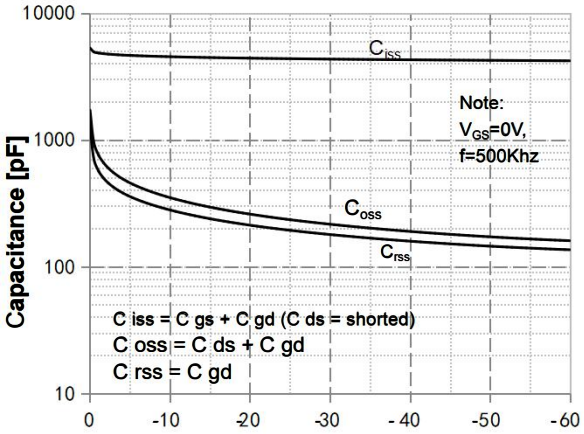


Figure 5. Capacitance Characteristics

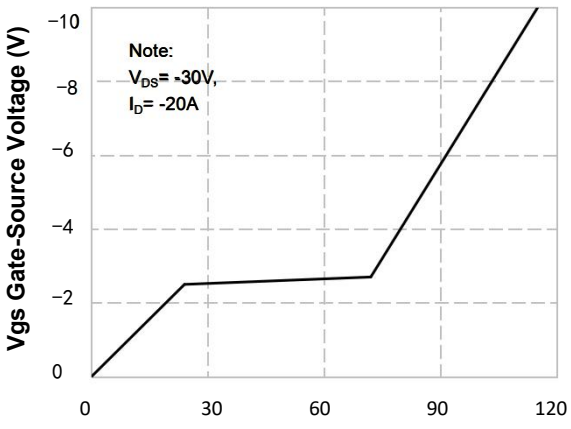


Figure 6. Gate Charge Characteristics

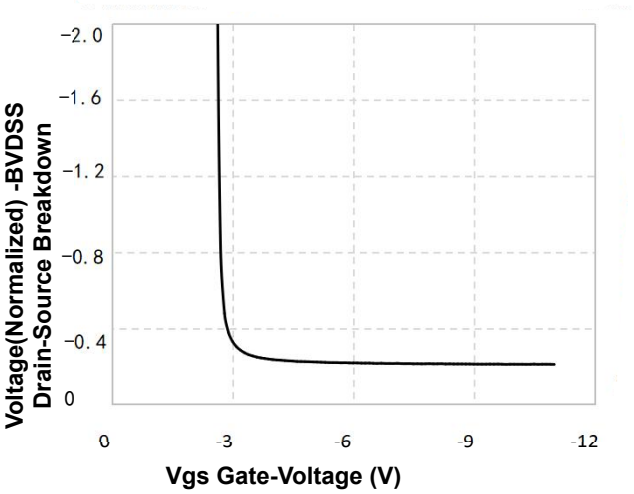


Figure 7. Breakdown Voltage Variation vs Gate-Voltage

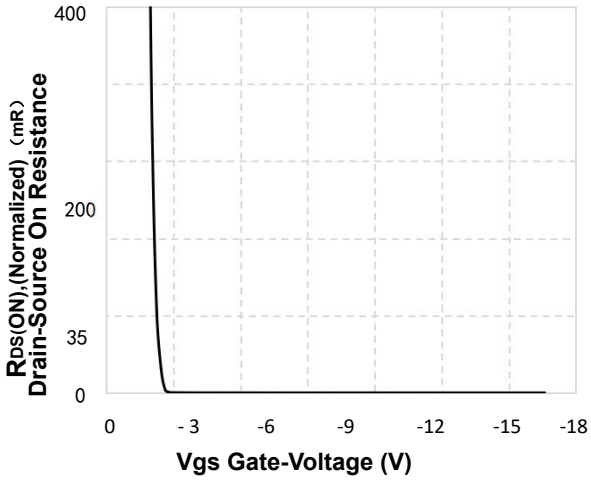


Figure 8. On-Resistance Variation vs Gate Voltage

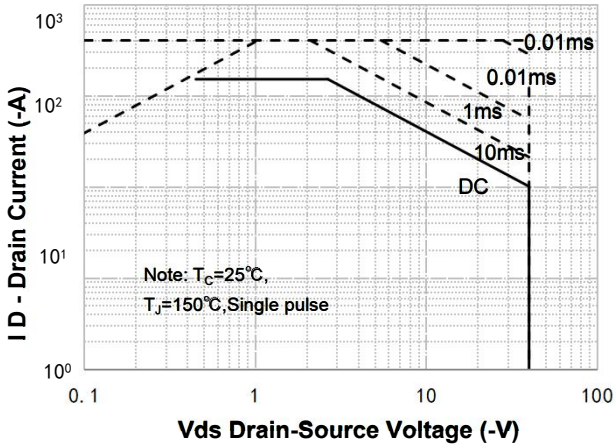


Figure 9. Maximum Safe Operating Area

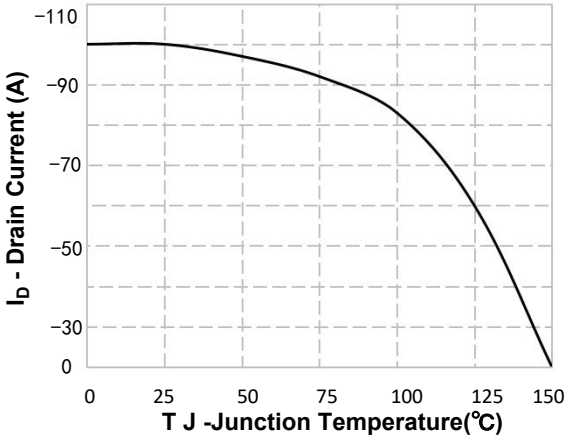


Figure 10. Maximum PContinuous Drain Currentvs Case Temperature

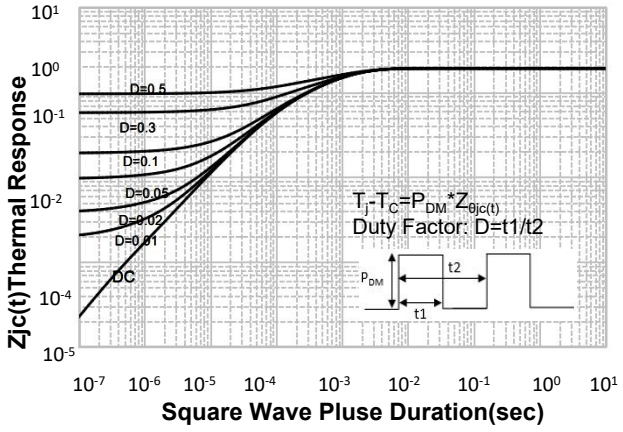
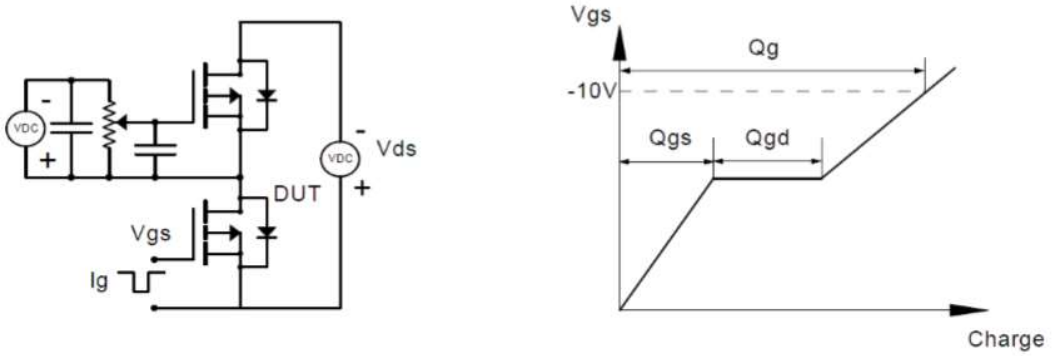


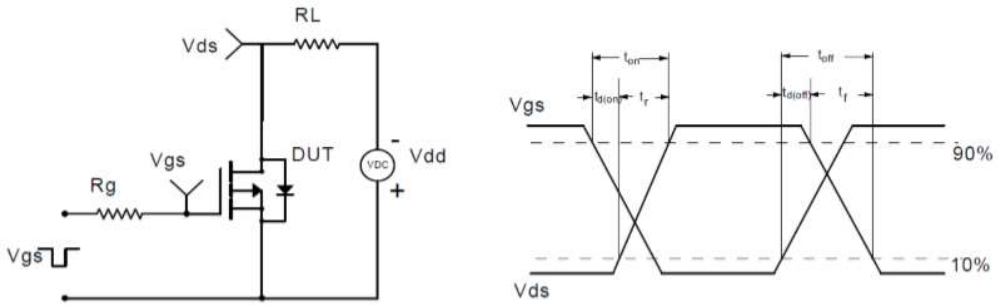
Figure 11. Transient Thermal Response Curve

Test Circuit

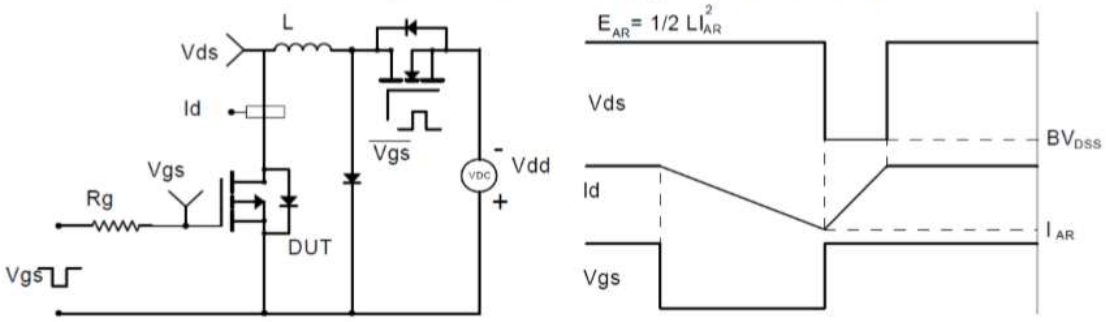
Gate Charge Test Circuit & Waveform



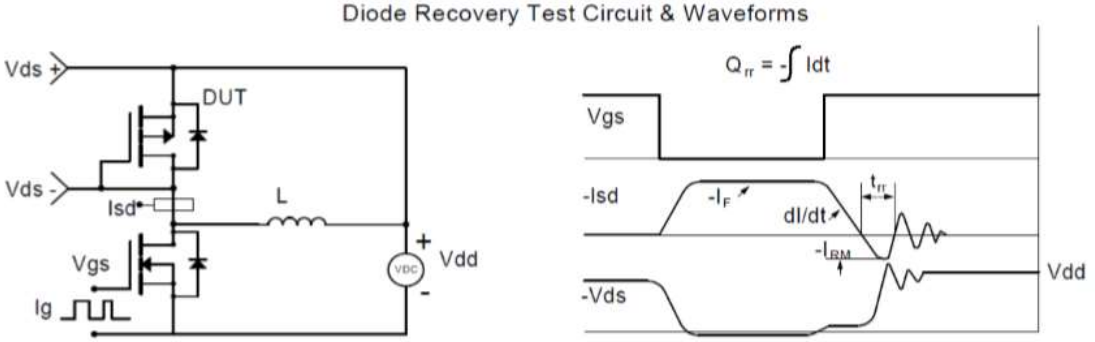
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

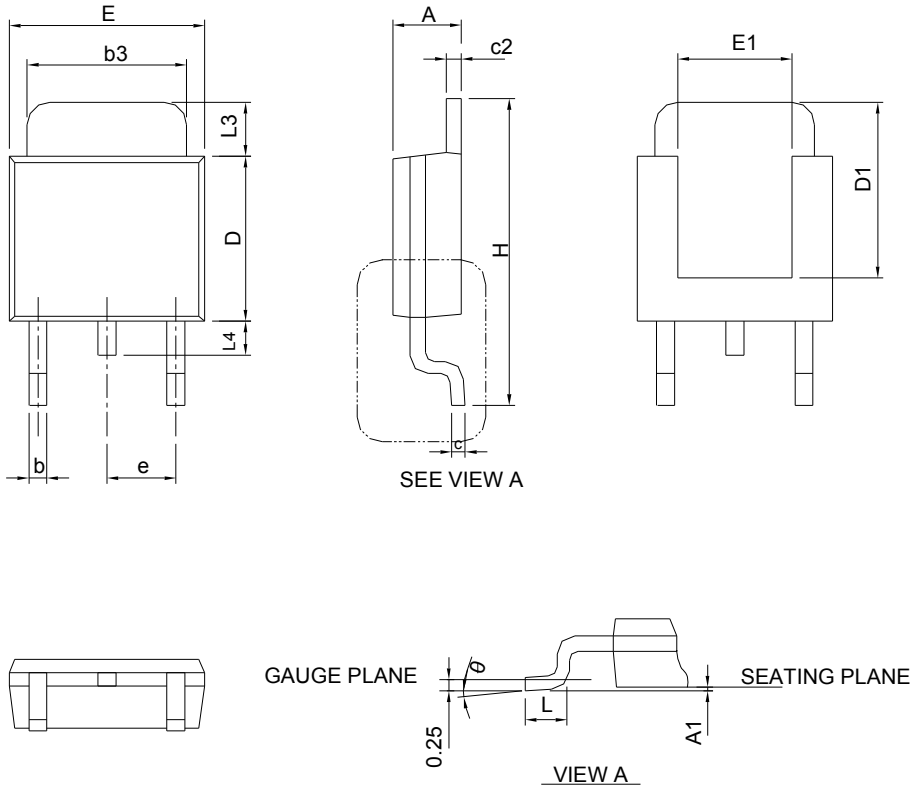


Diode Recovery Test Circuit & Waveforms



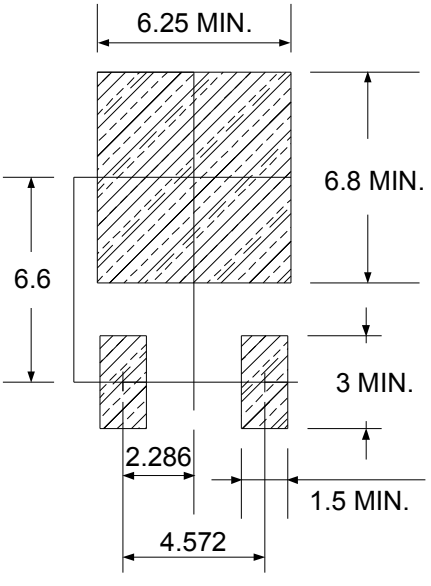
Package Information

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