

• General Description

The TF170P06K 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.

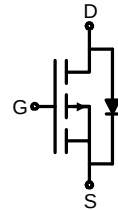
• Features

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

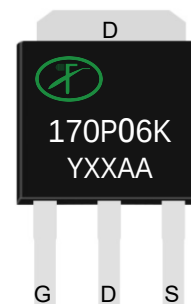
• Product Summary



$$V_{DS} = -60V \quad I_D = -70A$$

$$R_{DS(ON)}(-10V \text{ typ}) = 17.0m\Omega$$

$$R_{DS(ON)}(-4.5V \text{ typ}) = 19.0m\Omega$$



TO-251



TO-252

• Ordering Information:

Part NO.	TF170P06K
Marking 1	170P06K:TF170P06K
Marking 2	Logo:tuofeng; Y:year code; XX:Week; AA:device code;
MOQ	TO-251:50/PCS TO-252:2500/PCS

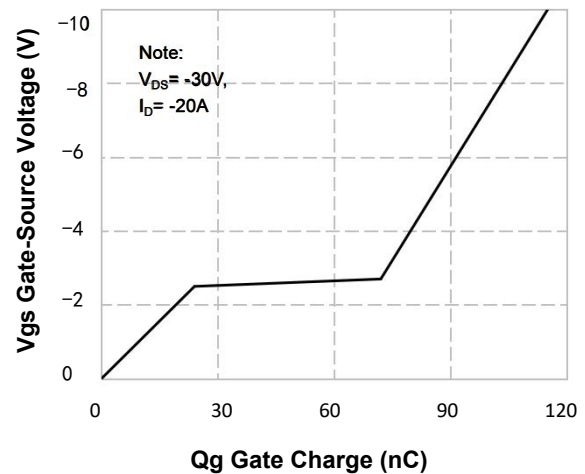
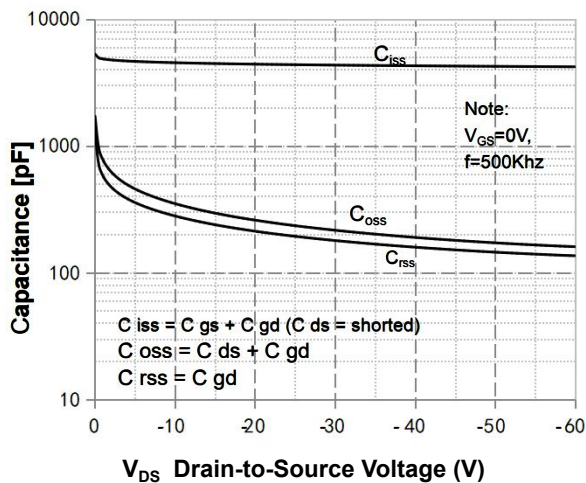
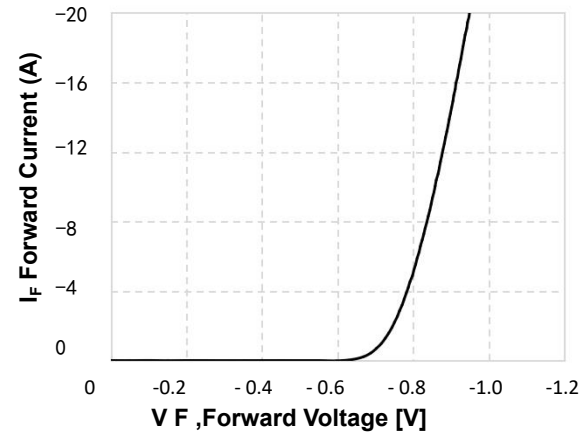
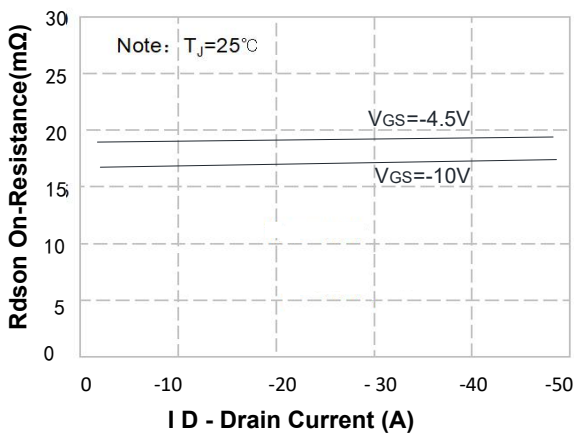
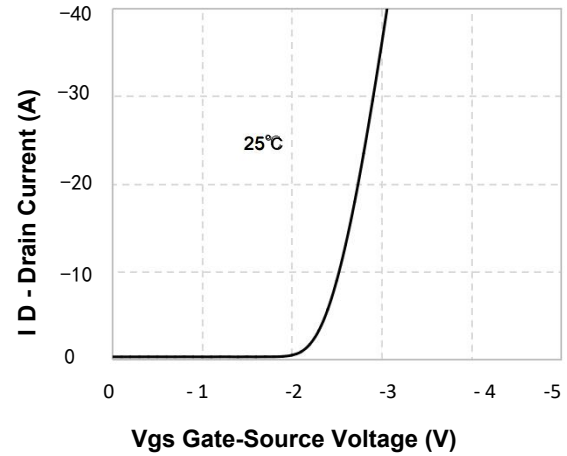
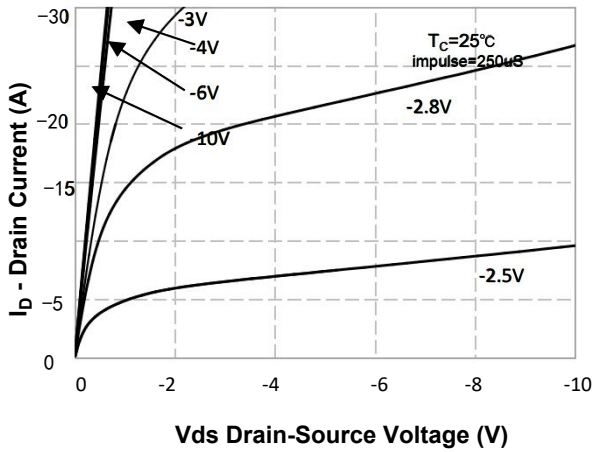
• Absolute Maximum Ratings ($T_C = 25^\circ C$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D @ T_C = 25^\circ C$	-70	A
	$I_D @ T_C = 75^\circ C$	-50	A
	$I_D @ T_C = 100^\circ C$	-42	A
Pulsed Drain Current ①	I_{DM}	-210	A
Total Power Dissipation	$P_D @ T_C = 25^\circ C$	60	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	$^\circ C$

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

Single Pulse Avalanche Energy	E _{AS}	160			mJ	
Avalanche Current	I _{AS} I _{AR}	-25			A	
●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, 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	-1.5	-2.1	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		17.0	20.0	mΩ
		V _{GS} =-4.5V, I _D =-20A		19.0	24.0	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-20V, I _D =-20A		12		S
Source-drain voltage	V _{SD}	I _S =-20A			1.20	V
●Electronic Characteristics						
Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C _{iss}	V _{ds} =-20V,V _{gs} =0V f = 1MHz	-	4400	-	pF
Output capacitance	C _{oss}		-	259	-	
Reverse transfer capacitance	C _{rss}		-	212	-	
●Gate Charge characteristics(T _a = 25°C)						
Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Resistance	R _g	f = 1MHz		2.4		Ω
Total gate charge	Q _g	V _{DD} = -3 0V I _D = -20A V _{GS} = -10V	-	115	-	nC
Gate - Source charge	Q _{gs}		-	27.4	-	
Gate - Drain charge	Q _{gd}		-	50	-	
Turn-ON Delay time	t _{D(on)}	V _{GS} =-10V ,V _{DS} =-30V R _G =1.0Ω, I=-20A		24		ns
Turn-ON Rise time	t _r			18		ns
Turn-Off Delay time	t _{D(off)}			56		ns
Turn-Off Fall time	t _f			30		ns

Typical Performance Characteristics



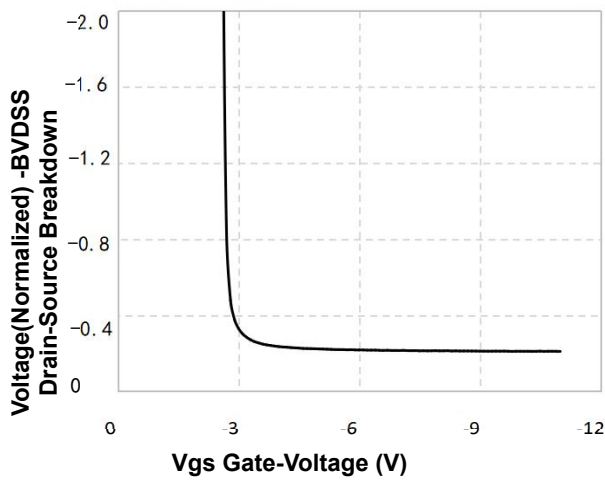


Figure 7. Breakdown Voltage Variation vs Gate-Voltage

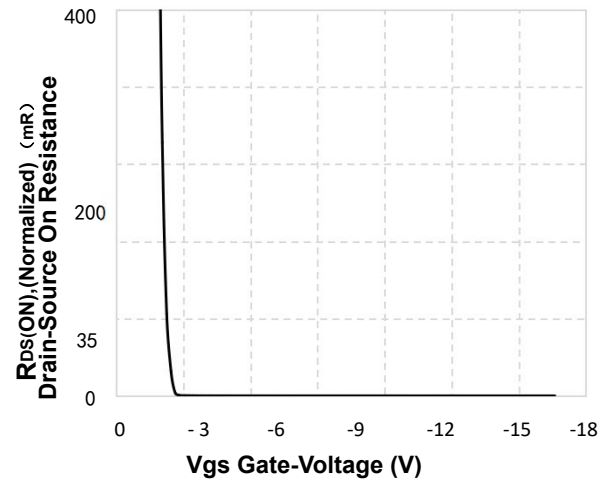


Figure 8. On-Resistance Variation vs Gate Voltage

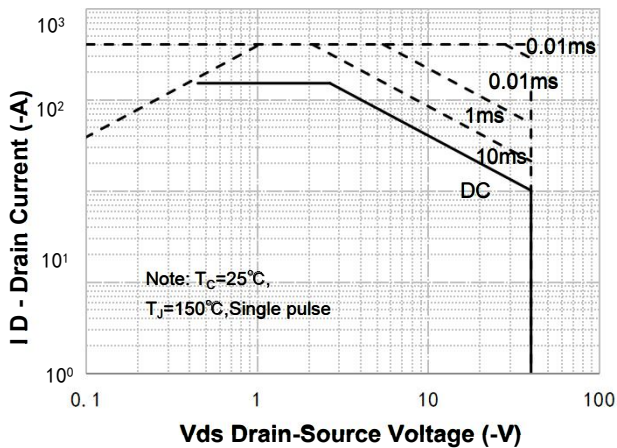


Figure 9. Maximum Safe Operating Area

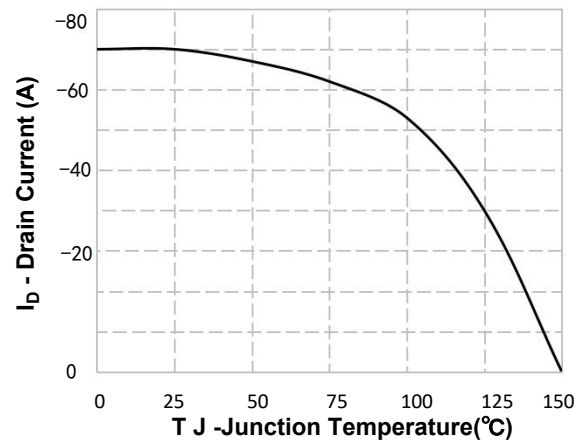


Figure 10. Maximum Continuous Drain Current vs Case Temperature

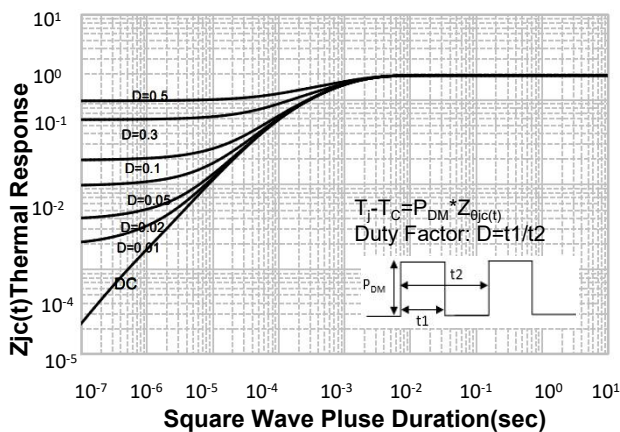
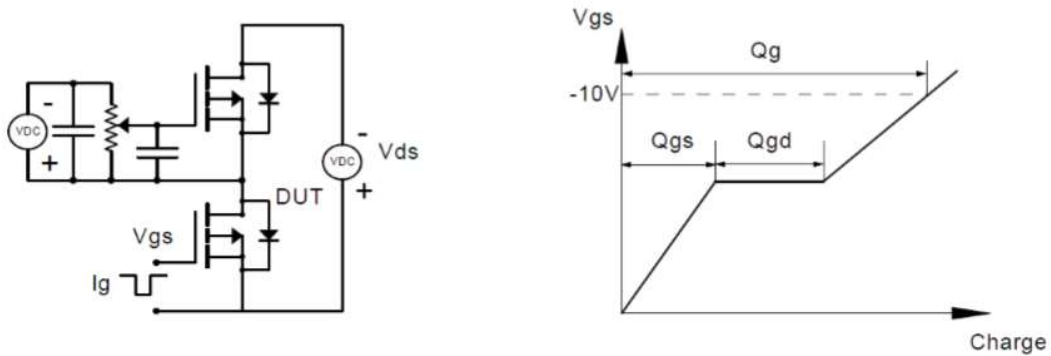


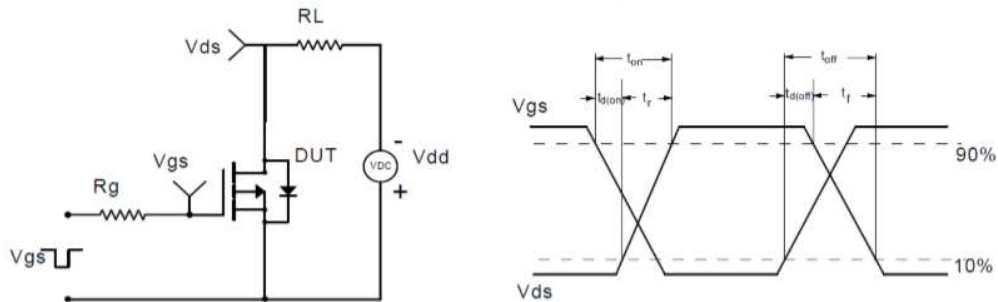
Figure 11. Transient Thermal Response Curve

Test Circuit

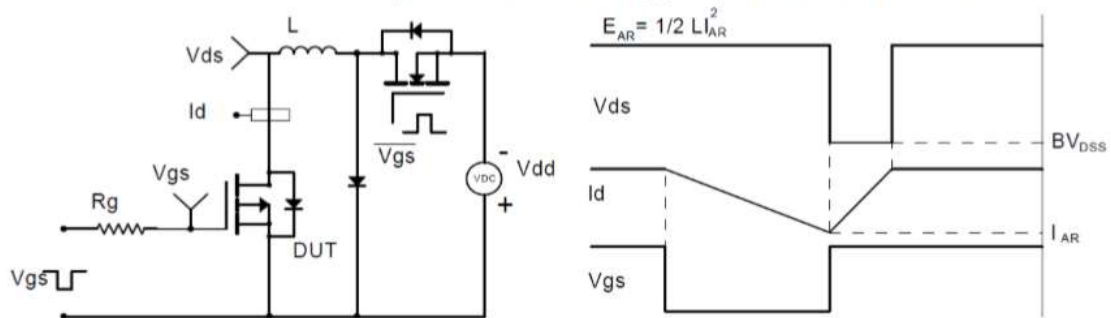
Gate Charge Test Circuit & Waveform



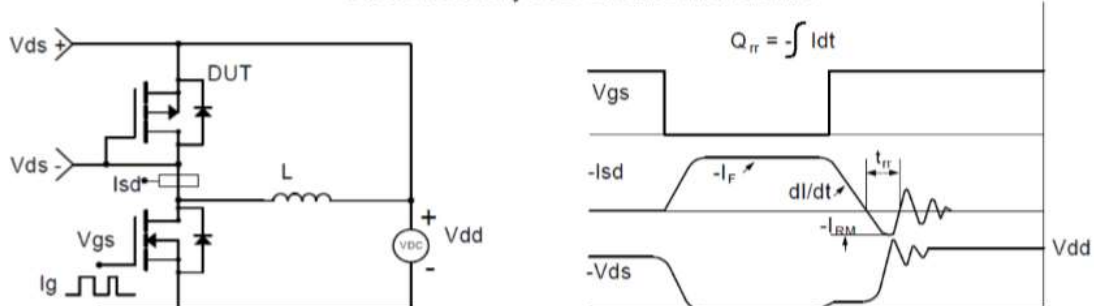
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

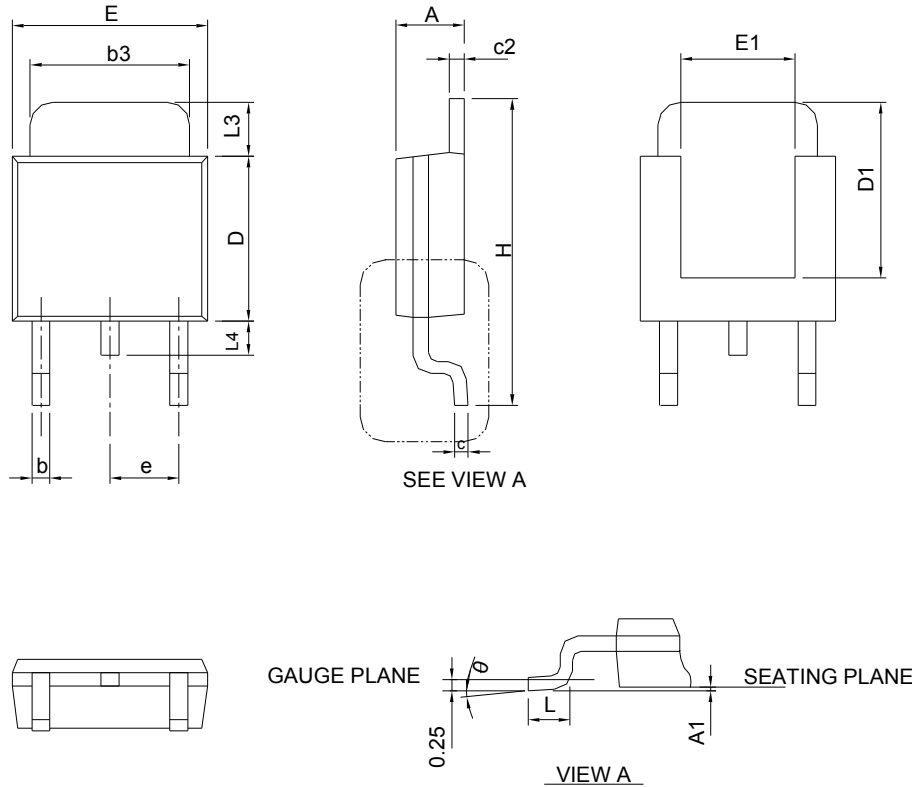


Diode Recovery Test Circuit & Waveforms



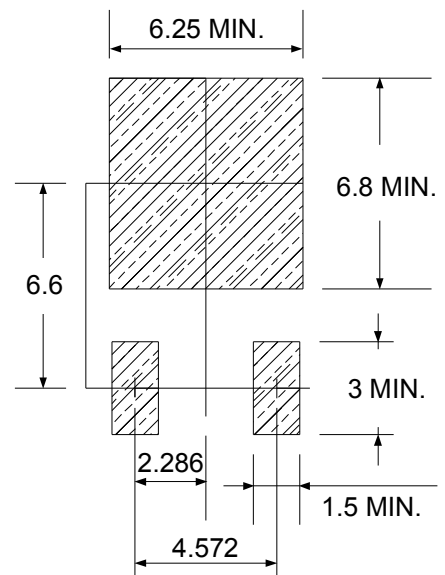
Package Information

TO-252



DIMENSIONS	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