

● **General Description**

The TF030P02K combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

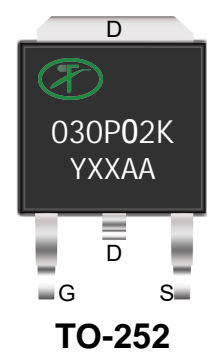
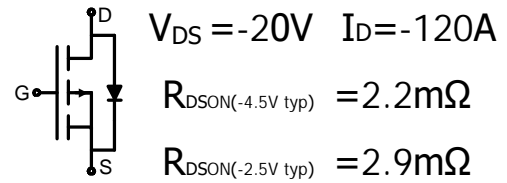
● **Features**

- 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**



● **Ordering Information:**

Part NO.	TF030P02K
Marking1	030P02K:TF030P02K
Marking2	Logo:tuofeng; Y:year code; XX:Week; AA:device code;
Basic ordering unit (pcs)	2500

● **Absolute Maximum Ratings (T_c =25°C)**

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°C}	-120	A
	I _{D@TC=75°C}	-86	A
	I _{D@TC=100°C}	-72	A
Pulsed Drain Current ^①	I _{DM}	-350	A
Total Power Dissipation ^②	P _D	50	W
Total Power Dissipation(TA=25°C)	P _{D@TA=25°C}	2.0	W
Operating Junction Temperature	T _J	-55 to 150	°C
Storage Temperature	T _{STG}	-55 to 150	°C
Single Pulse Avalanche Energy@L=0.5mH	E _{AS}	150	mJ
Avalanche Current@L=0.5mH	I _{AS}	-24.8	A



Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D = -250\mu A$	-20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -20V, V_{GS}=0V,$	-	-	-1	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS} = \pm 12V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D = -250\mu A$	-0.4	-	-1.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note2	$V_{GS} = -4.5V, I_D = -30A$	-	2.2	2.7	m Ω
		$V_{GS} = -2.5V, I_D = -20A$	-	2.9	3.8	
		$V_{GS} = -1.8V, I_D = -15A$	-	3.9	5.7	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = -10V, V_{GS}=0V,$ $f=1.0MHz$	-	15	-	nF
C_{oss}	Output Capacitance		-	1600	-	pF
C_{rss}	Reverse Transfer Capacitance		-	1068	-	pF
Q_g	Total Gate Charge	$V_{DS} = -10V, I_D = -20A,$ $V_{GS} = -4.5V$	-	100	-	nC
Q_{gs}	Gate-Source Charge		-	21	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	32	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = -10V, R_L=0.5\Omega,$ $V_{GS} = -4.5V, R_{GEN}=3\Omega$	-	20	-	ns
t_r	Turn-on Rise Time		-	50	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	100	-	ns
t_f	Turn-off Fall Time		-	40	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-85	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-350	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S = -30A$	-	-0.8	-1.2	V

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
 2. EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=-10V, V_G=-10V, R_G=25\Omega, L=0.5mH, I_{AS}=-24.8A$
 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Performance Characteristics

Figure 1: Output Characteristics

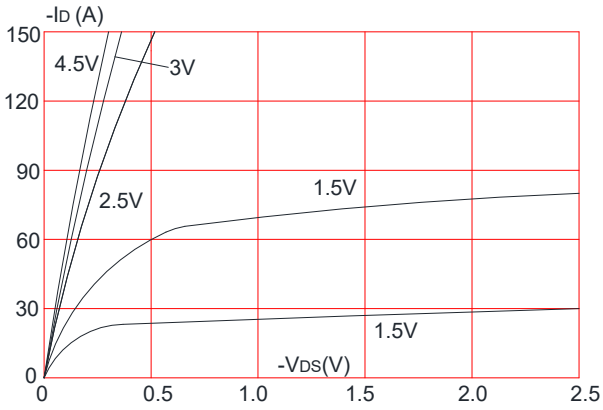


Figure 2: Typical Transfer Characteristics

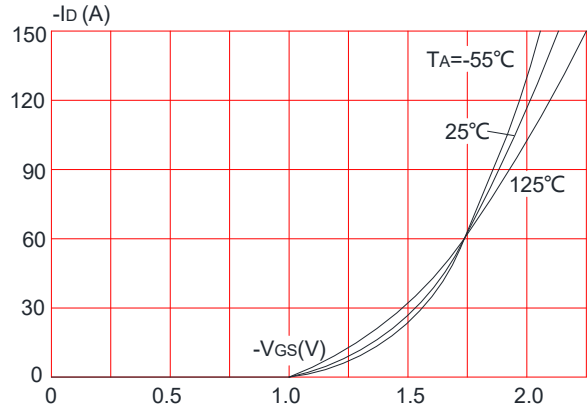


Figure 3: On-resistance vs. Drain Current

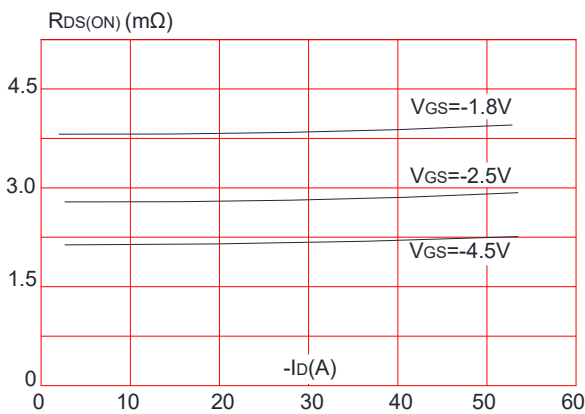


Figure 4: Body Diode Characteristics

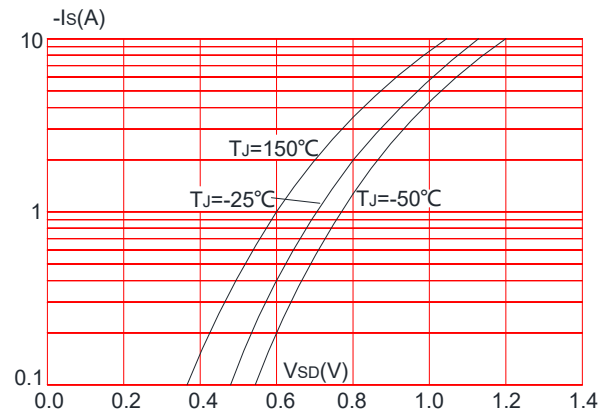


Figure 5: Gate Charge Characteristics

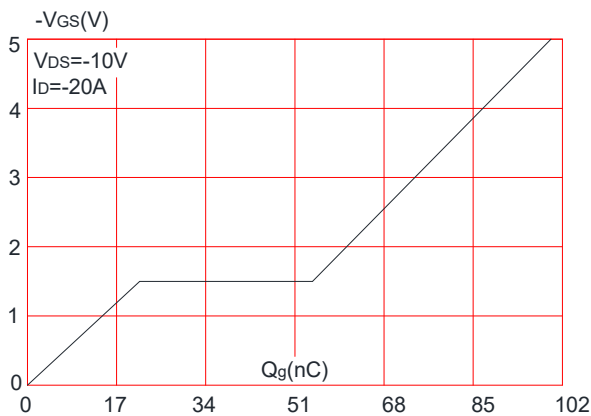


Figure 6: Capacitance Characteristics

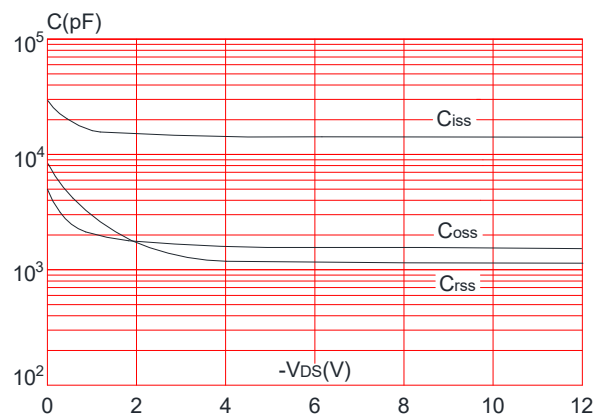


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

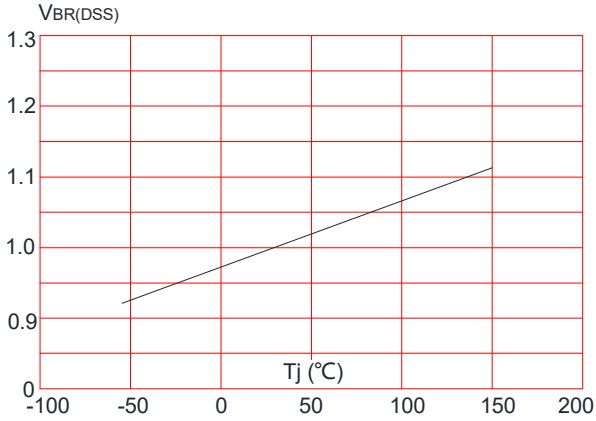


Figure 8: Normalized on Resistance vs. Junction Temperature

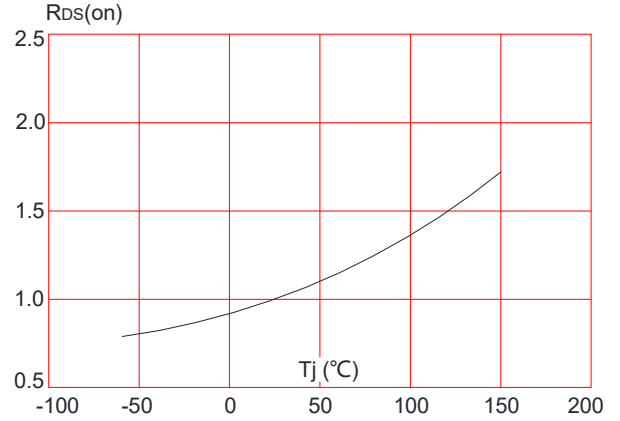


Figure 9: Maximum Safe Operating Area

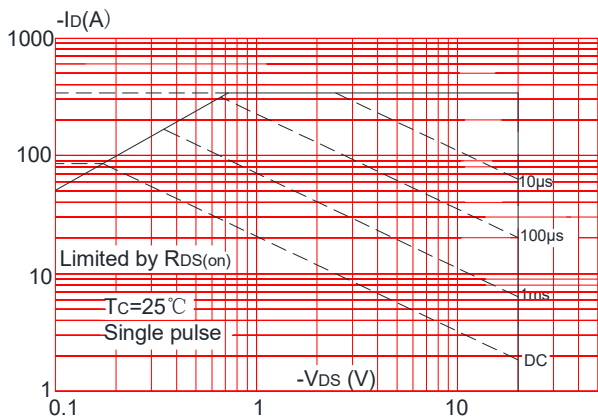


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

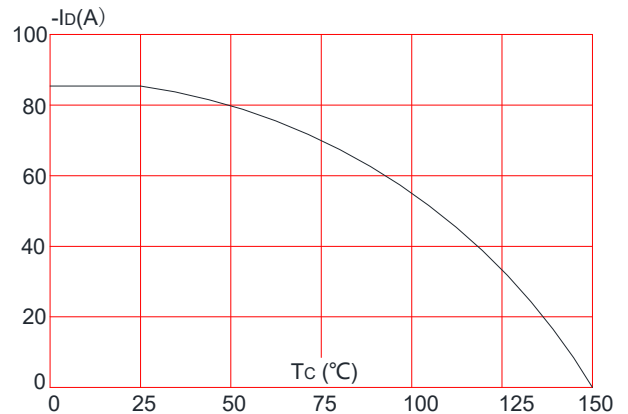
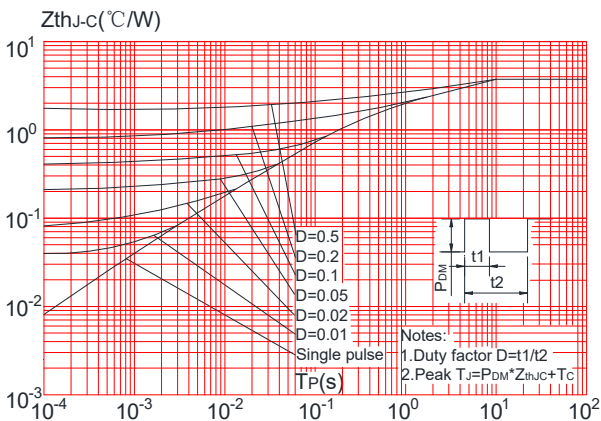
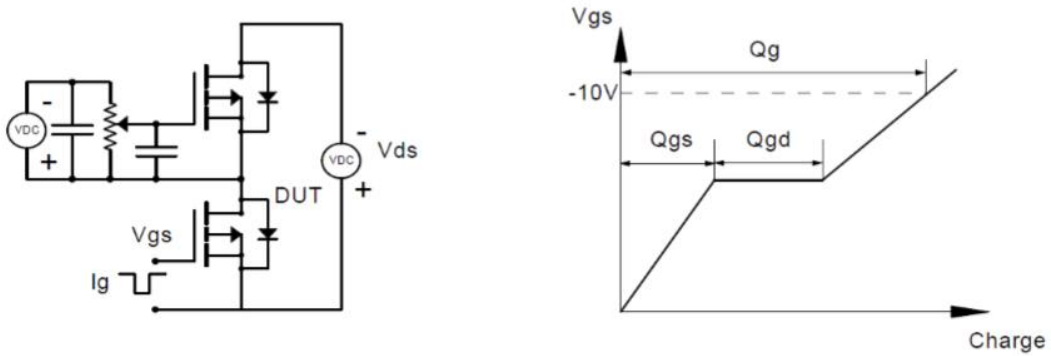


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

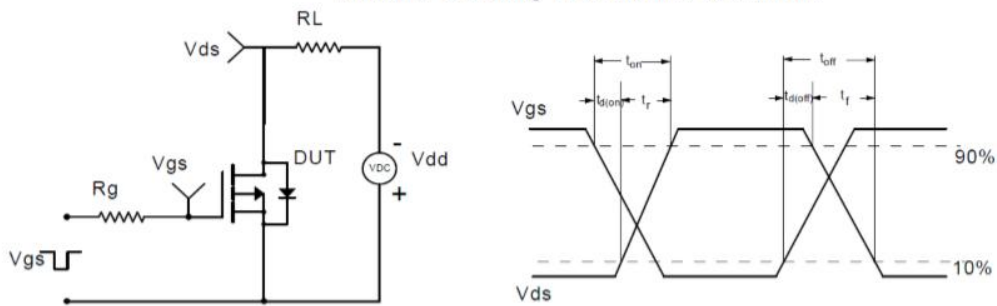


Test Circuit

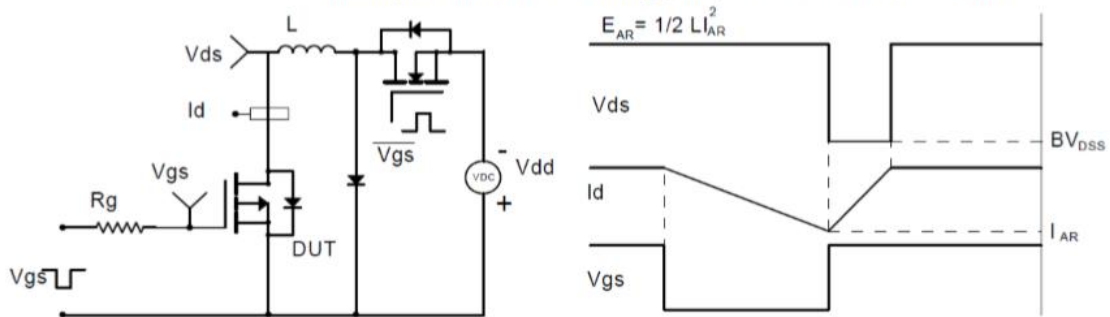
Gate Charge Test Circuit & Waveform



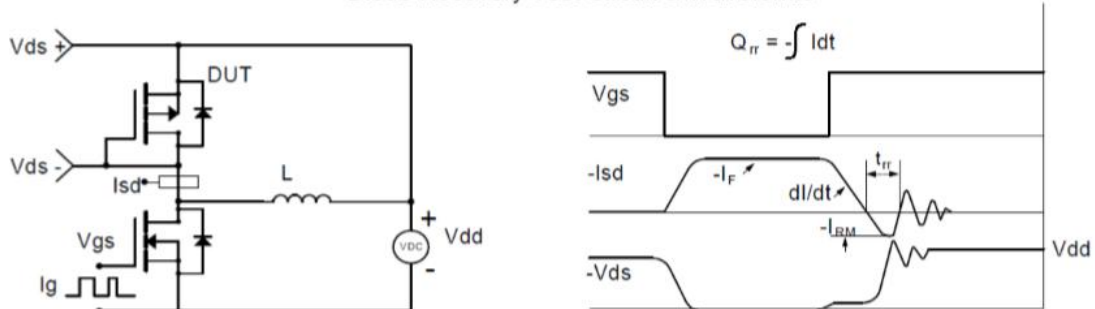
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

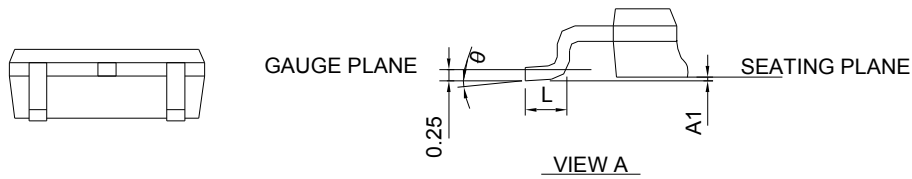
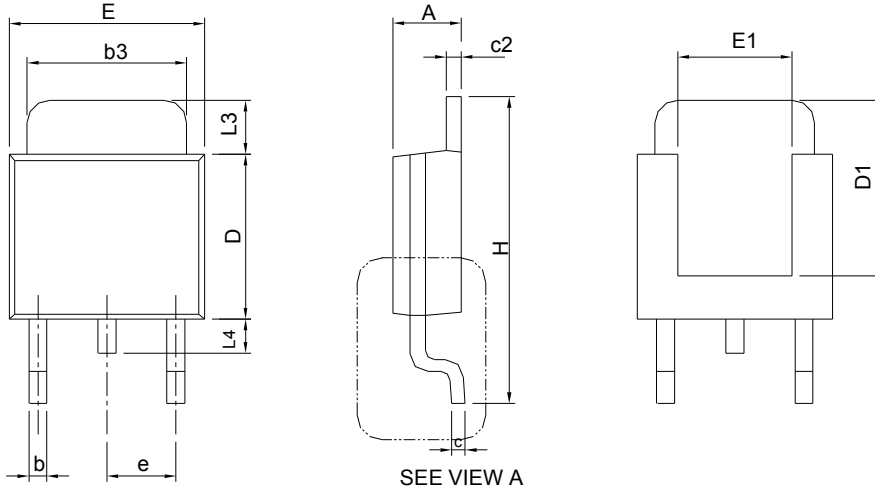


Diode Recovery Test Circuit & Waveforms



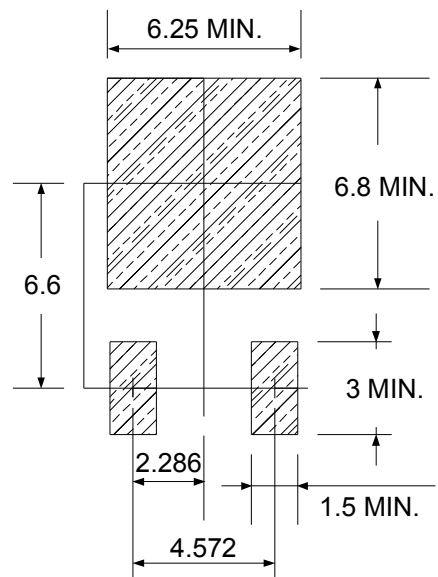
Package Information

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