

• General Description

The TF100P04K 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.

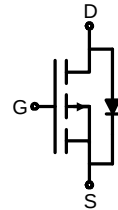
• Features

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

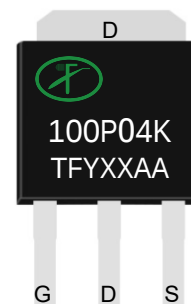
• Product Summary



$$V_{DS} = -40V \quad I_D = -40A$$

$$R_{DS(ON)}(-10V \text{ typ}) = 10.0m\Omega$$

$$R_{DS(ON)}(-4.5V \text{ typ}) = 15.0m\Omega$$



TO-251



TO-252

• Ordering Information:

Part NO.	TF100P04K
Marking 1	100P04K:TF100P04K
Marking 2	TF: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}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D @ T_C = 25^\circ C$	-40	A
	$I_D @ T_C = 75^\circ C$	-28	A
	$I_D @ T_C = 100^\circ C$	-24	A
Pulsed Drain Current ①	I_{DM}	-120	A
Total Power Dissipation	$P_D @ T_C = 25^\circ C$	45	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}	140			mJ	
Avalanche Current	I _{AS} I _{AR}	-24			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	-40			V
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250uA	-1.1	-1.7	-2.5	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-40V, 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		10.0	13.0	mΩ
		V _{GS} =-4.5V, I _D =-10A		15.0	22.0	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-20V, I _D =-20A		18		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} =-15V,V _{gs} =0V f = 1MHz	-	3800	-	pF
Output capacitance	C _{oss}		-	329	-	
Reverse transfer capacitance	C _{rss}		-	289	-	
●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} = - 20V I _D = -20A V _{GS} = -10V	-	68	-	nC
Gate - Source charge	Q _{gs}		-	10	-	
Gate - Drain charge	Q _{gd}		-	14	-	
Turn-ON Delay time	t _{D(on)}	V _{GS} =-10V ,V _{DS} =-20V R _G =2.4Ω, I=-20A		10		ns
Turn-ON Rise time	t _r			82		ns
Turn-Off Delay time	t _{D(off)}			93		ns
Turn-Off Fall time	t _f			74		ns

Typical Performance Characteristics

Figure 1: Output Characteristics

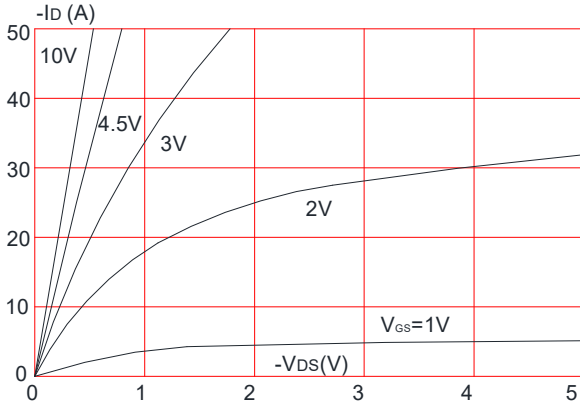


Figure 2: Typical Transfer Characteristics

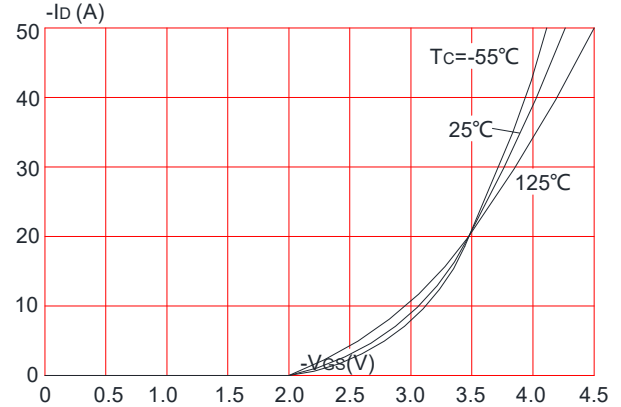


Figure 3: On-resistance vs. Drain Current

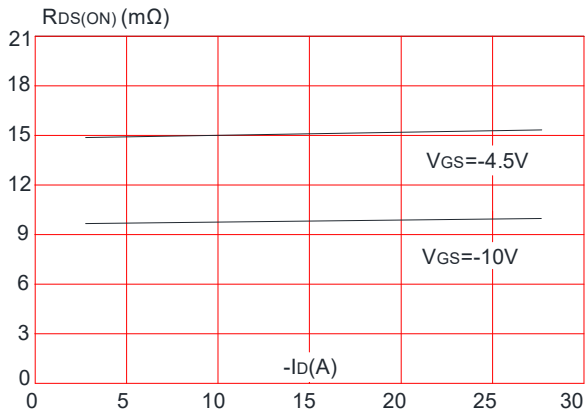


Figure 4: Body Diode Characteristics

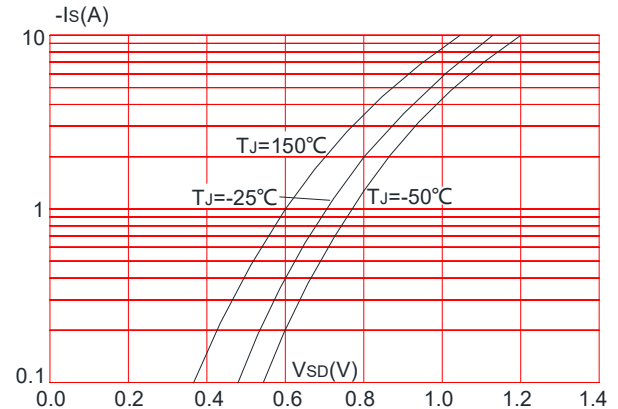


Figure 5: Gate Charge Characteristics

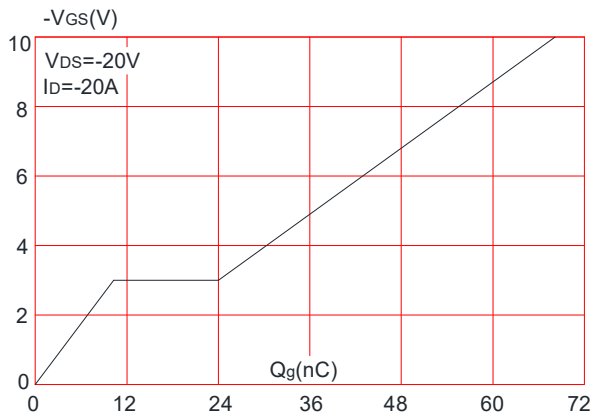


Figure 6: Capacitance Characteristics

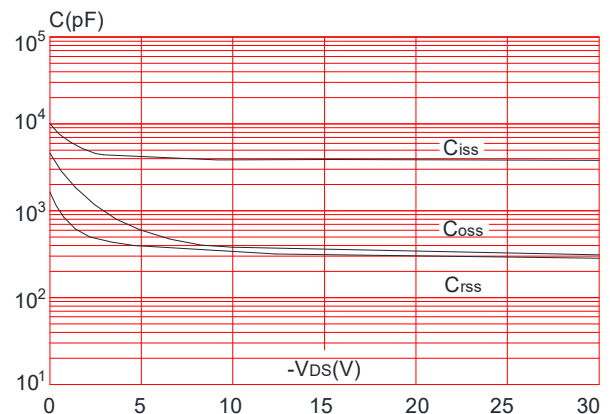


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

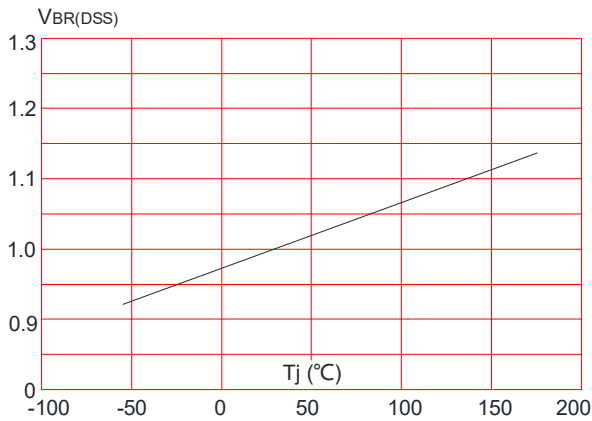


Figure 8: Normalized on Resistance vs. Junction Temperature

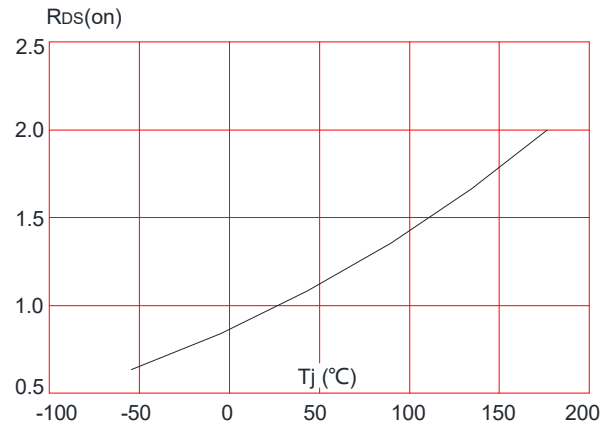


Figure 9: Maximum Safe Operating Area

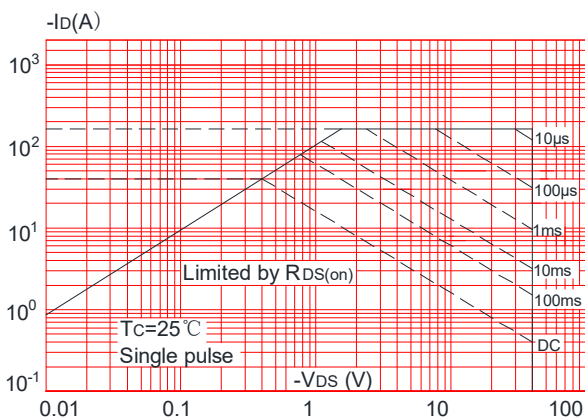


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

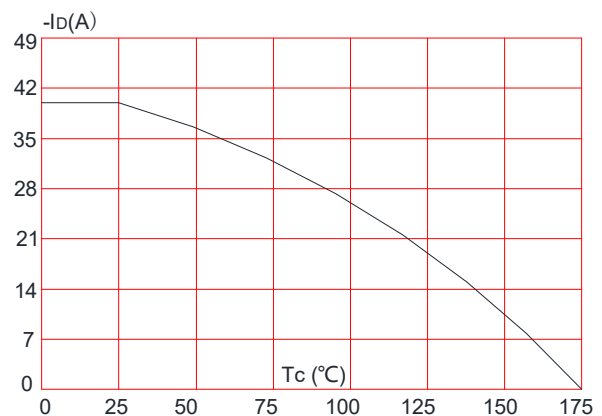
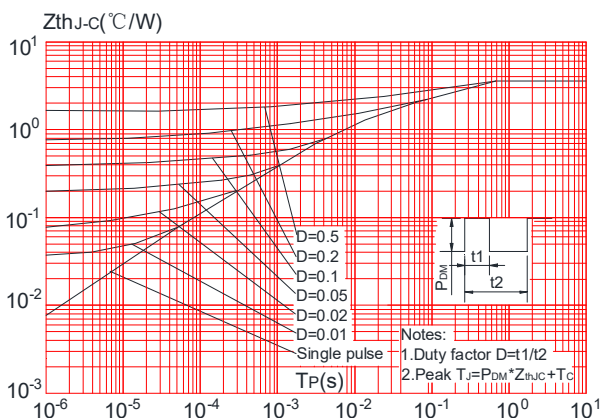
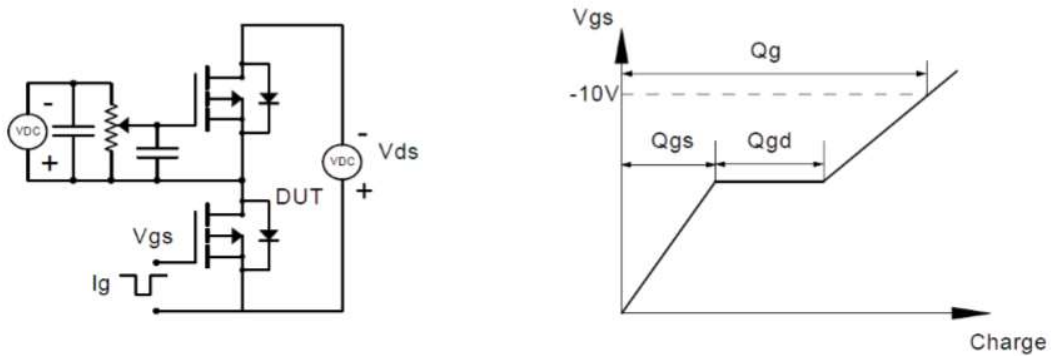


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

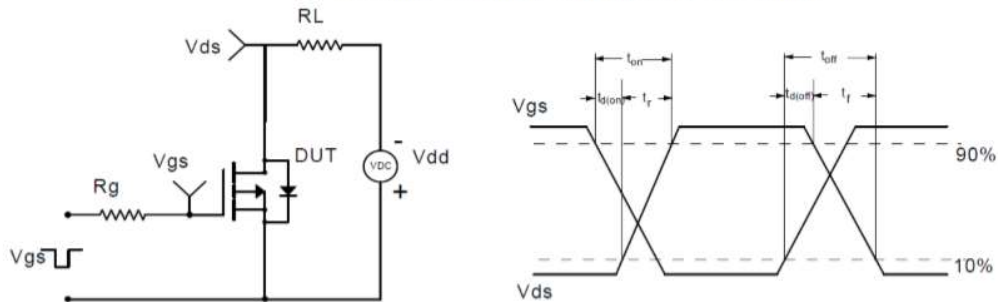


Test Circuit

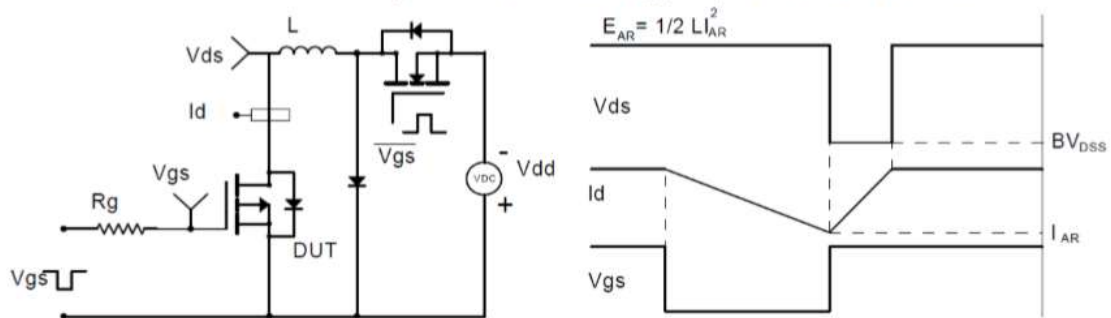
Gate Charge Test Circuit & Waveform



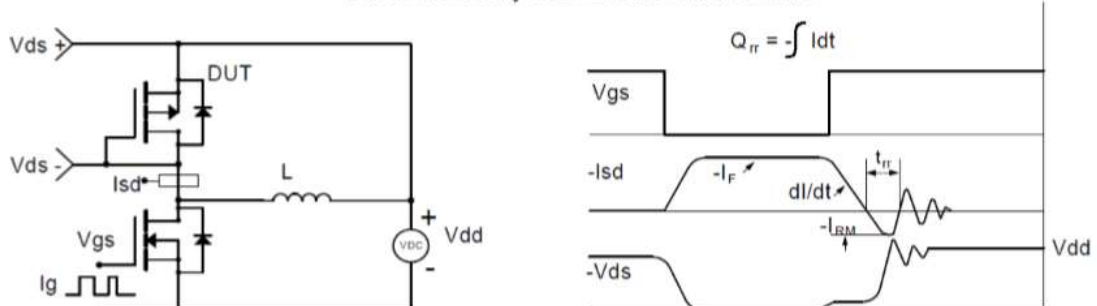
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

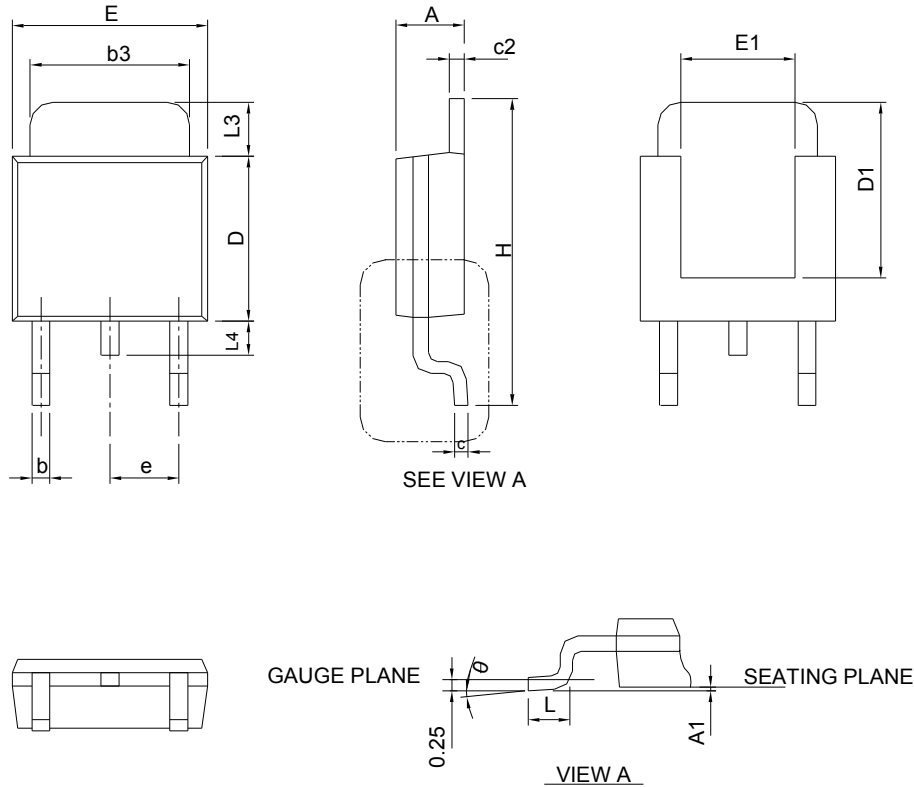


Diode Recovery Test Circuit & Waveforms



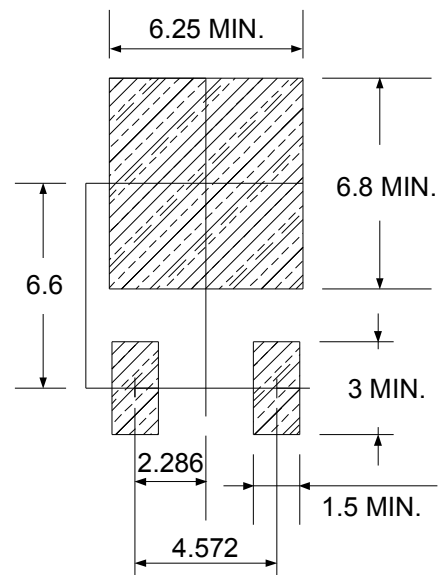
Package Information

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