P -CHANNEL ENHANCEMENT MODE POWER MOSFET

TF030P03K

● General Description

The TF030P03K 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

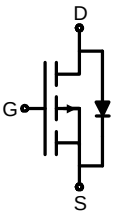
MB/VGA Vcore

SMPS 2nd Synchronous Rectifier

POL application

BLDC Motor driver

● Product Summary



V_{DS} =-30V I_D=-90A

$R_{DSON(-10V\ typ)}$ =3.8mΩ

$R_{DSON(-4.5V\ typ)}$ =5.1mΩ

RoHS compliant

TO-251

TO-252

●Ordering Information:

Part NO.	TF030P03K
Marking 1	030P03K:TF030P03K
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}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	$I_{D@}T_C$=25℃	-90	A
	$I_{D@}T_C$=75℃	-63	A
	$I_{D\ @}T_C$=100℃	-54	A
Pulsed Drain Current ①	I_{DM}	-350	A
Total Power Dissipation	$P_D@T_C$=25℃	70	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}	200	mJ
Avalanche Current	I_{AS} I_{AR}	-20	A

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	2.0	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	45	° 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	-30			V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS}, I_D =250uA	-1.0	-1.6	-2.3	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-30V, 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=-30A		3.8	5.0	mΩ
		V_{GS}=-4.5V, I_D=-20A		5.1	6.5	mΩ
Forward Transconductance	g_{FS}	V_{DS} =-15V, I_D=-30A		80		S
Source-drain voltage	V_{SD}	Is=-20A			1.20	V

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	Ciss	Vds=-15V,Vgs=0V f = 1MHz	-	4900	-	pF
Output capacitance	Coss		-	655.0	-	
Reverse transfer capacitance	Crss		-	520.0	-	

●Gate Charge characteristics(T_a = 25℃)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Risistance	R_g	f = 1MHz		4.5		Ω
Total gate charge	Qg	V_{DD} = - 15V	-	93.3	-	nC
Gate - Source charge	Qgs	I_D = -30A	-	6.3	-	
Gate - Drain charge	Qgd	V_{GS} = -10V	-	15.6	-	
Turn-ON Delay time	$t_{D(on)}$	V_{GS}=-10V ,V_{DS}=-15V R_G =3.0Ω, I=-30A		18.0		ns
Turn-ON Rise time	t_r			11.8		ns
Turn-Off Delay time	$t_{D(off)}$			101		ns
Turn-Off Fall time	t_f			23		ns

Typical Characteristics

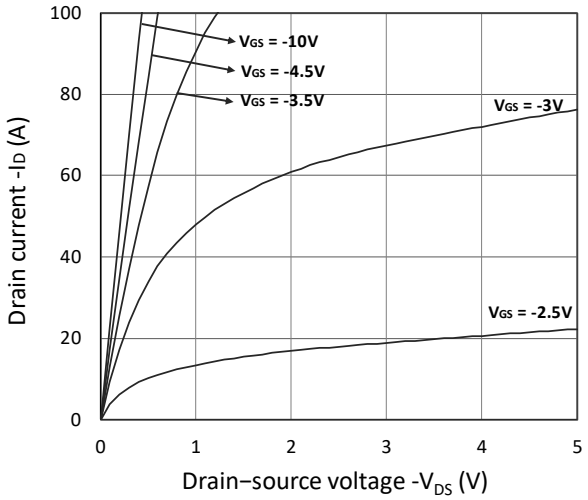


Figure 1. Output Characteristics

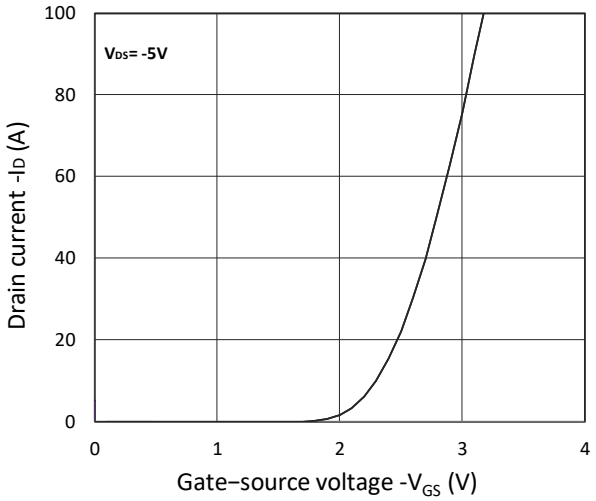


Figure 2. Transfer Characteristics

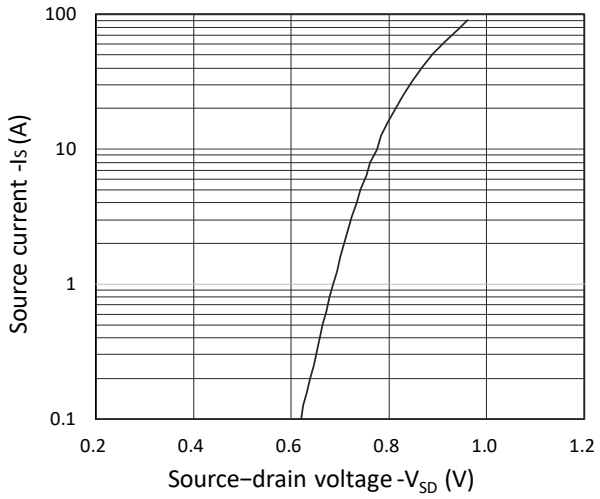


Figure 3. Forward Characteristics of Reverse

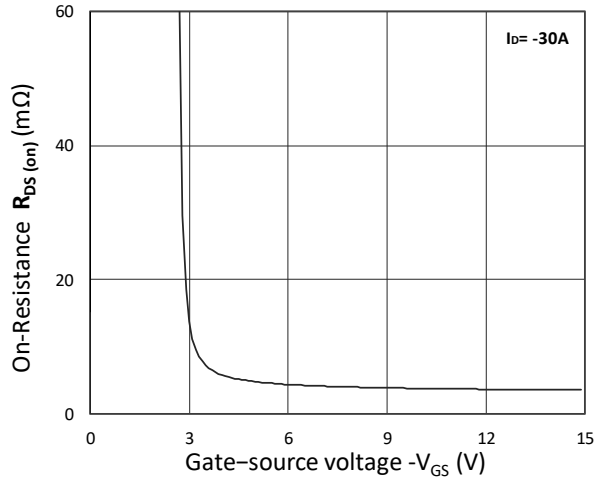


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

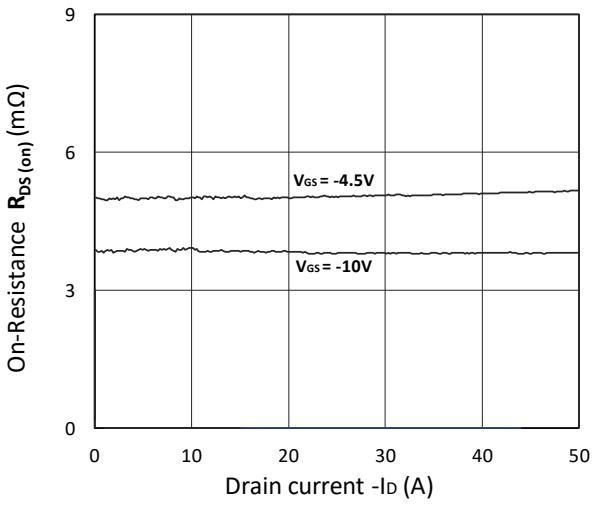


Figure 5. $R_{DS(ON)}$ vs. I_D

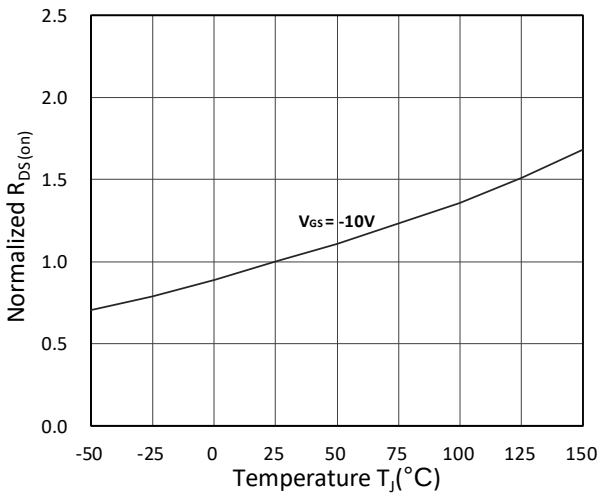


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

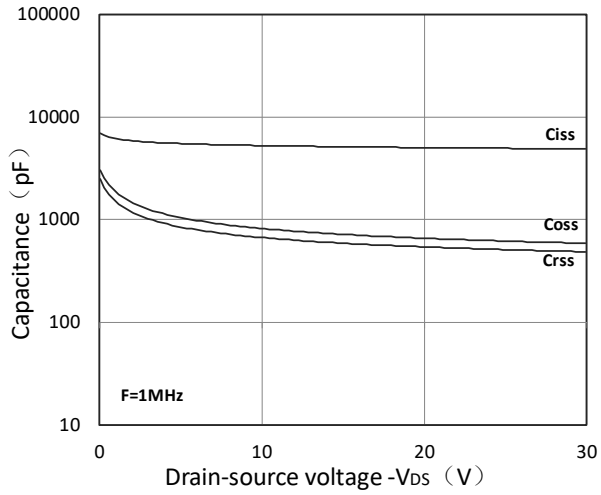


Figure 7. Capacitance Characteristics

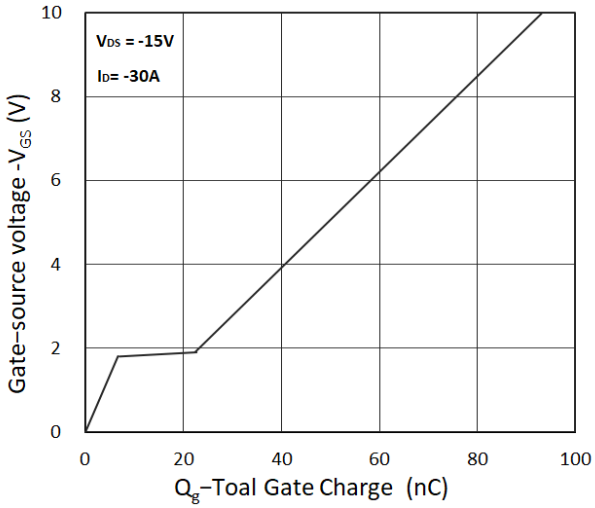


Figure 8. Gate Charge Characteristics

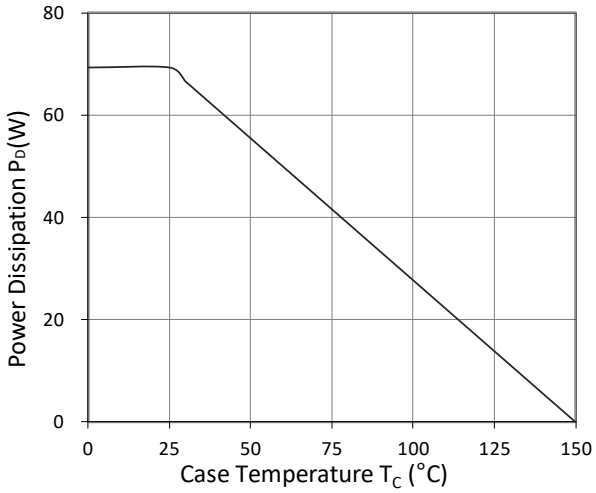


Figure 9. Power Dissipation

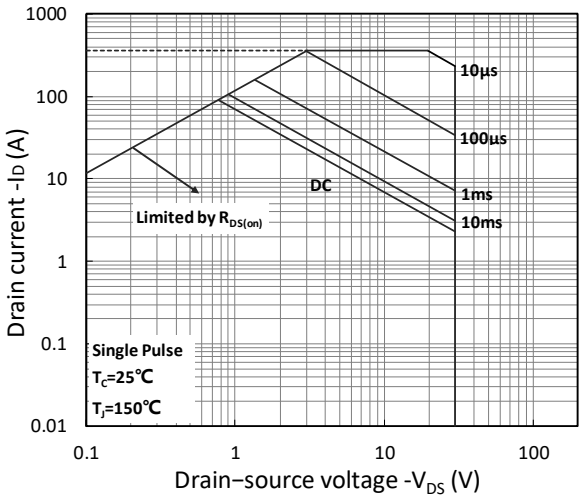


Figure10. Safe Operating Area

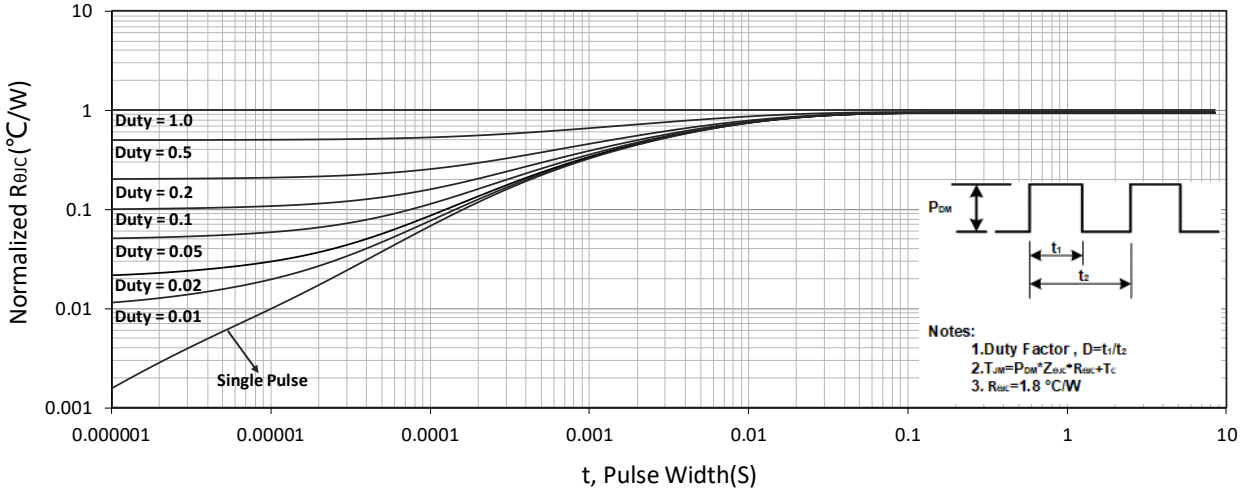
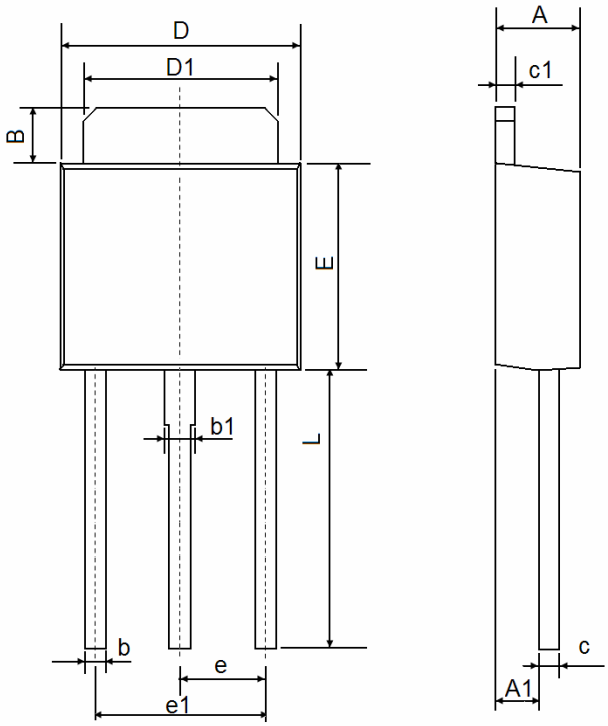


Figure 11. Normalized Maximum Transient Thermal Impedance

Package Information

TO-251



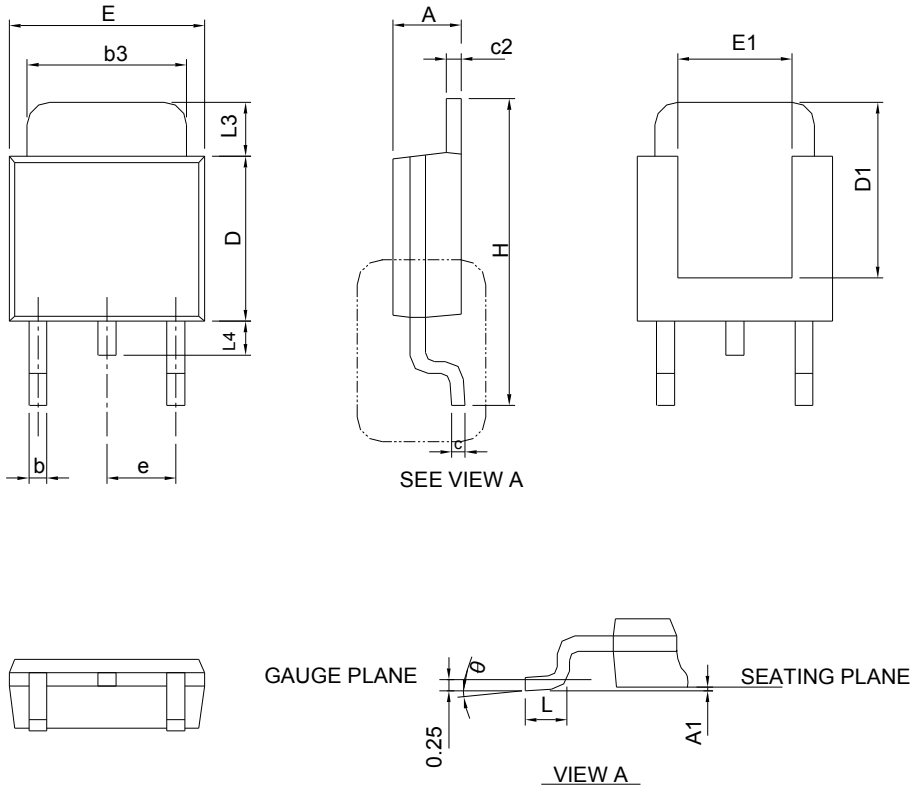
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	1.050	1.350	0.042	0.054
B	0.700	1.000	0.028	0.040
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	6.000	0.213	0.237
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	4.900	9.400	0.194	0.372

Notes

1. All dimensions are in millimeters.
2. Tolerance ±0.10mm (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exac

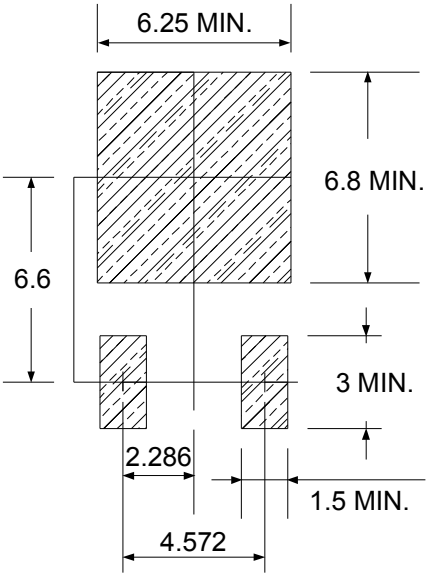
Package Information

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