

● **General Description**

The TFD190P03M combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. Two P Channel MOSFET inside for dual DIE implication.

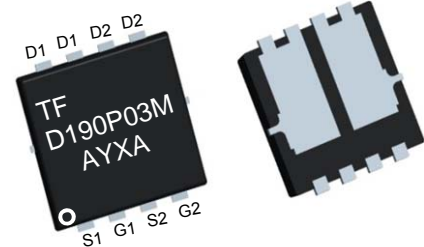
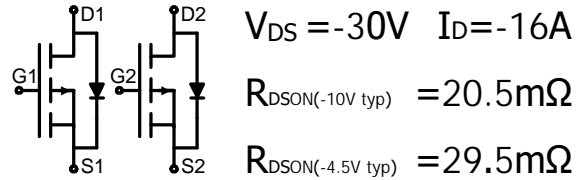
● **Features**

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Dual DIE in one package

● **Application**

- Power Management in Notebook Computer
- BLDC Motor driver

● **Product Summary**



PDFN3333-8

● **Ordering Information:**

Part NO.	TFD190P03M
Marking1	D190P03M:TFD190P03M
Marking2	TF:tuofeng; Y:year code; X:Week; AA:device code;
Basic ordering unit (pcs)	5000

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D @ T_C = 25^\circ C$	-16	A
	$I_D @ T_C = 75^\circ C$	-11.2	A
	$I_D @ T_C = 100^\circ C$	-9.6	A
Pulsed Drain Current ^①	I_{DM}	-45	A
Total Power Dissipation	$P_D @ T_C = 25^\circ C$	30	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	$^\circ C$
Single Pulse Avalanche Energy	E_{AS}	45	mJ



●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	3.5	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	55	° C/W
Soldering temperature, wavesoldering for 8s	T_{sold}	-	-	260	° C

Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = -250\mu A$	-30			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = -250\mu A$	-1.0	-1.4	-2.0	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = -30V, V_{GS} = 0V$			-1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS} = -10V, I_D = -8A$		20.5	23.5	m Ω
		$V_{GS} = -4.5V, I_D = -5A$		29.5	35.0	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = -10V, I_D = -5A$		10		s
Source-drain voltage	V_{SD}	$I_S = -8A$			1.20	V

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	$V_{DD} = -15V$ $V_{GS} = 0V$ $f = 1MHz$	-	905	-	pF
Output capacitance	C_{oss}		-	90	-	
Reverse transfer capacitance	C_{rss}		-	95	-	

●Gate Charge characteristics($T_a = 25^\circ C$)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	$V_{DD} = -15V$	-	22.45	-	nC
Gate - Source charge	Q_{gs}	$I_D = -7A$	-	3.25	-	
Gate - Drain charge	Q_{gd}	$V_{GS} = -10V$	-	3.69	-	

● **Characteristics curve**

Fig.1 Power Dissipation Derating Curve

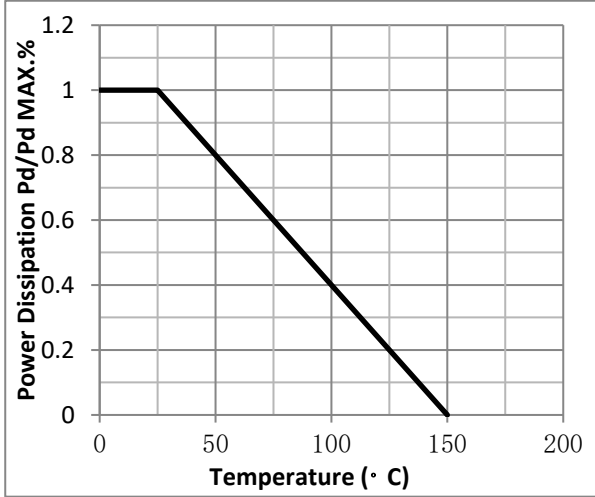


Fig.2 Typical output Characteristics

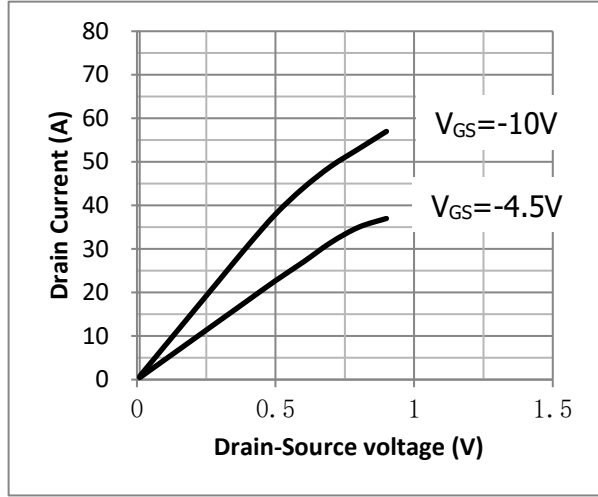


Fig.3 Threshold Voltage V.S Junction Temperature

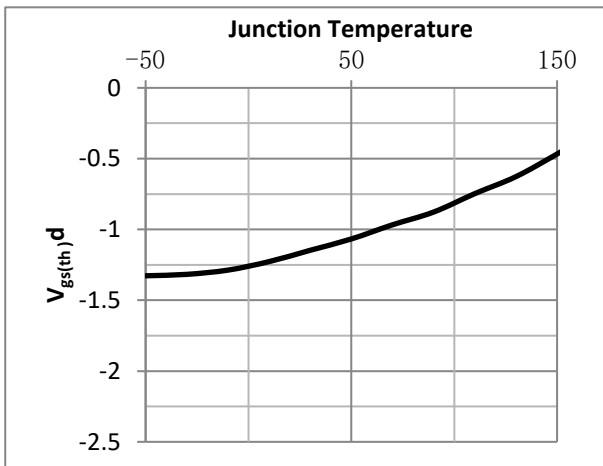


Fig.4 Resistance V.S Drain Current

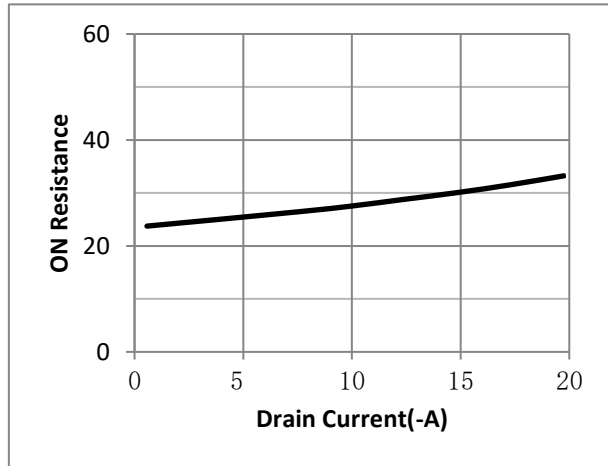


Fig.5 On-Resistance VS Gate Source Voltage

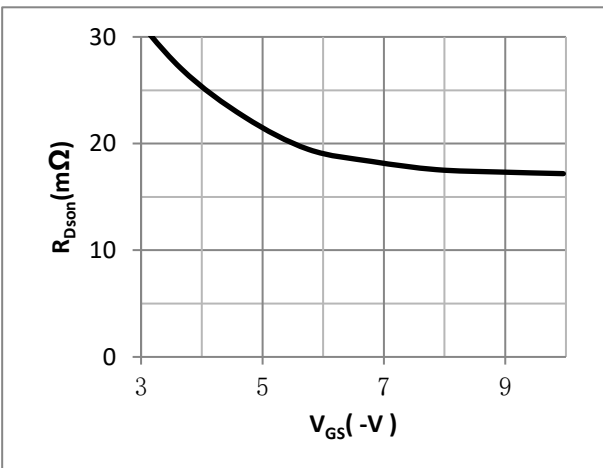
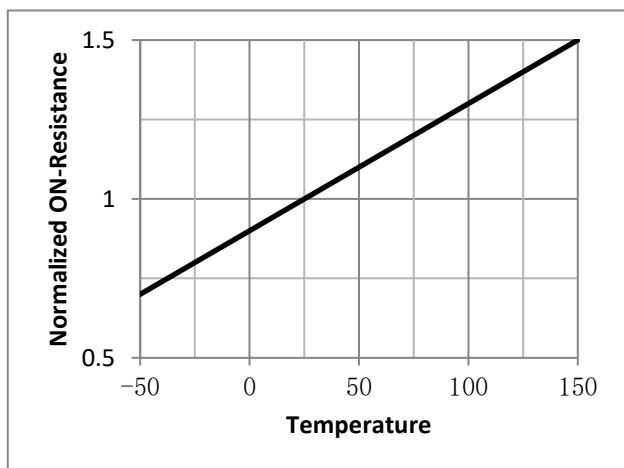


Fig.6 On-Resistance V.S Junction Temperature



● **Test Circuit**

Fig.1 Switching Time Measurement Circuit

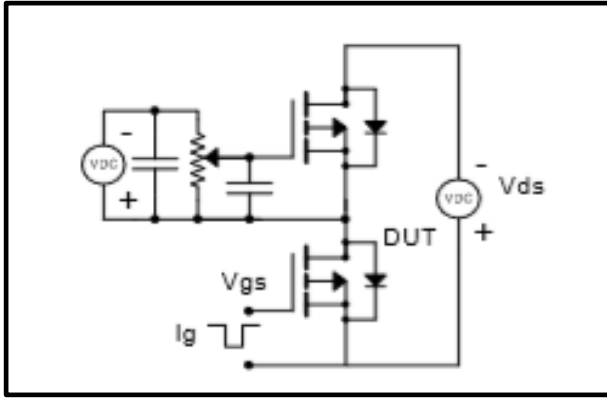


Fig.2 Gate Charge Waveform

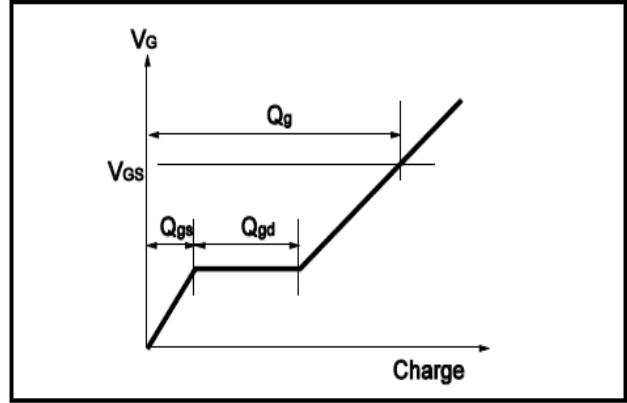


Fig.3 Switching Time Measurement Circuit

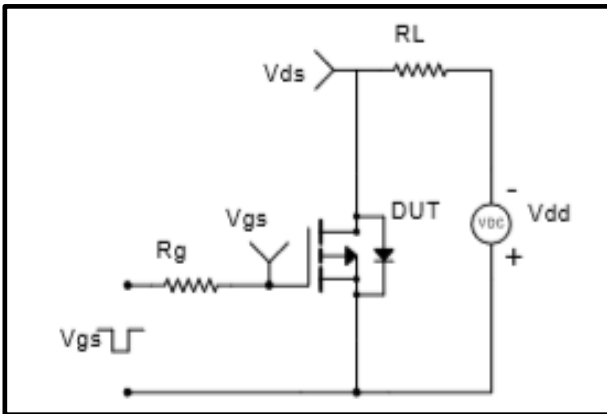


Fig.4 Gate Charge Waveform

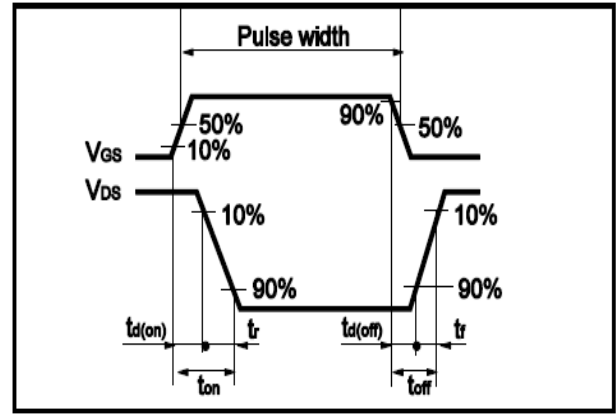


Fig.5 Avalanche Measurement Circuit

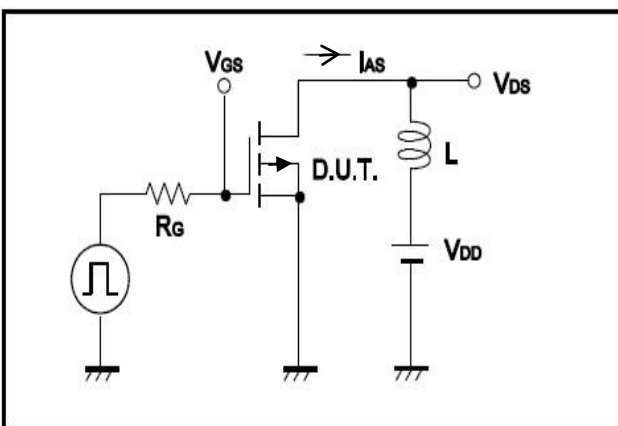
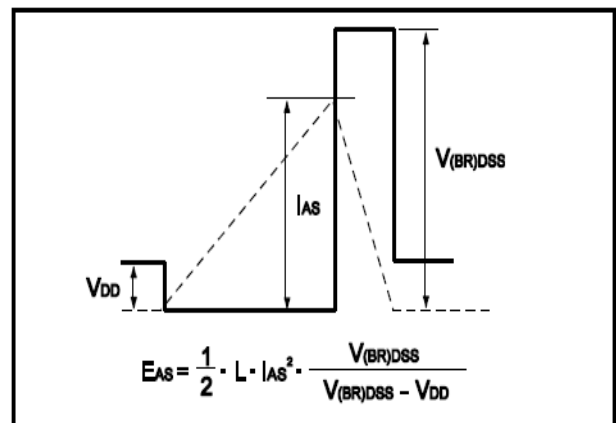
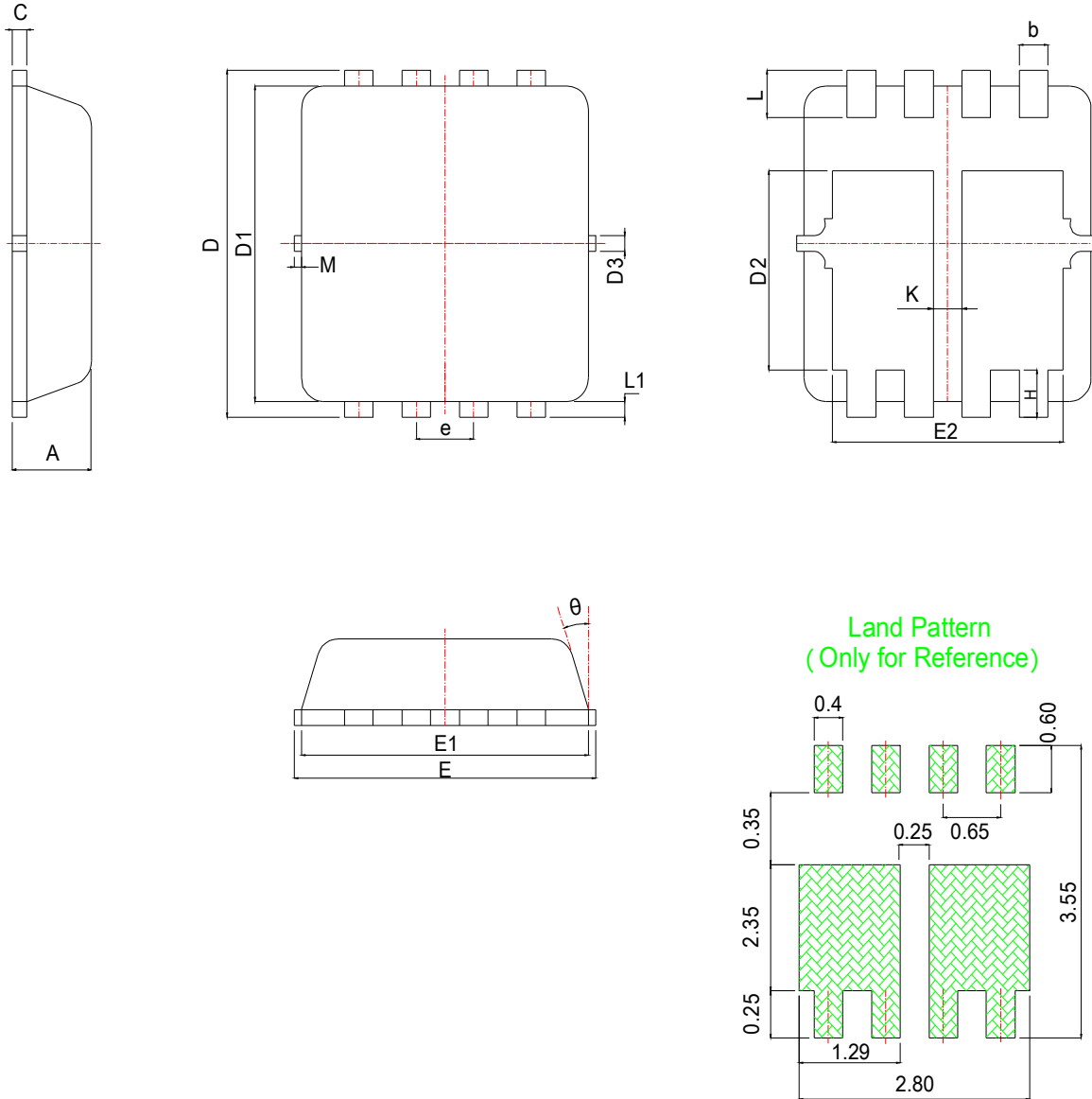


Fig.6 Avalanche Waveform



• **PDFN3333-8L**



SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031	E1	3.00	3.15	3.20	0.118	0.122	0.126
b	0.25	0.30	0.35	0.010	0.012	0.014	E2	2.39	2.49	2.59	0.094	0.098	0.102
c	0.10	0.15	0.25	0.004	0.007	0.010	e	0.65BSC			0.026BSC		
D	3.25	3.35	3.45	0.128	0.132	0.136	H	0.30	0.40	0.50	0.012	0.016	0.020
D1	3.00	3.10	3.20	0.118	0.122	0.126	L	0.30	0.40	0.50	0.012	0.016	0.020
D2	1.78	1.88	1.98	0.070	0.074	0.078	L1	*	0.13	*	*	0.005	*
D3	*	0.13	*	*	0.005	*	theta	*	10°	12°	*	10°	12°
E	3.20	3.30	3.40	0.126	0.130	0.134	M	*	*	0.15	*	*	0.006
K	0.30	*	*	0.012	*	*							