

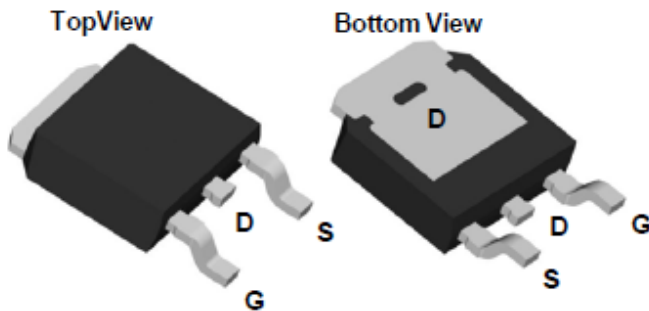
Features

The TW50P03D is the high cell density trench P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications

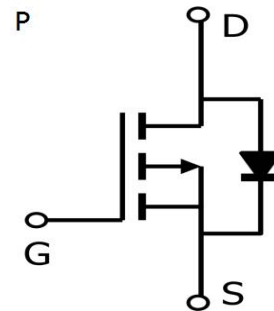
The TW50P03D meet the RoHS and GreeProduct requirement 100% EAS guaranteed with full function reliability approved.

Product Summary

BVDSS	RDSON	ID
-30V	14.5mΩ	-50A



TO-252



Maximum Ratings(Ta 25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	VDS	-30	V
Gate-Source Voltage	VGS	±25	
Continuous Drain Current, VGS@ -10V ¹	ID@TC=25°C	-50	A
Continuous Drain Current, VGS@ -10V ¹	ID@TC =100°C	-32	
Continuous Drain Current, VGS@ -10V ¹	ID@TA=25°C	-9.6	
Continuous Drain Current, VGS@ -10V ¹	ID@TA=70°C	-32	
Pulsed Drain Current ²	IDM	-120	
Single Pulse Avalanche Energy	EAS	408	mJ
Avalanche Current	IAS	-50	A
Total Power Dissipation	PD@TC=25°C	45	W
Total Power Dissipation	PD@TA=25°C	2.0	
Storage Temperature Range	TSTG	-55 to 150	°C
Operating Junction Temperature Range	TJ	-55 to 150	

Thermal Data

Parameter	Symbol	Max.	Unit
Thermal Resistance Junction-ambient	RθJA	62	°C/W
Thermal Resistance Junction-ambient (t ≤10s)	RθJA	25	
Thermal Resistance Junction-Case	RθJC	2.8	

Electrical Characteristics(TJ=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	BVDSS	VGS = 0V, ID = -250μA	-30			V
Gate Threshold Voltage	VGS(th)	VDS =VGS, ID = -250μA	-1.0		-2.5	V
Gate-Body leakage Current	IGSS	VDS =0V, VGS = ±25V			±100	nA
Zero Gate Voltage Drain Current	IDSS	VDS=-24V , VGS=0V , TJ=25℃			-1	μA
Static Drain-Source On-Resistance	RDS(on)	VGS = -10V, ID = -30A		10	14.5	mΩ
		VGS = -4.5V, ID = -15A		13	16	mΩ
Dynamic Parameters						
Input Capacitance	Ciss	VDS=-15V , VGS=0V , f=1MHz		3448		pF
Output Capacitance	Coss			508		pF
Reverse Transfer Capacitance	Crss			421		pF
Total Gate Charge	Qg	VDS=-15V , VGS=-4.5V , ID=-15A		22		nC
Gate Source Charge	Qgs			8.7		nC
Gate Drain Charge	Qgd			7.2		nC
Switching Parameters						
Turn-On DelayTime	td(on)	VDD=-15V , VGS=-10V , RG=3.3Ω ID=-15A		8		ns
Turn-On Rise Time	tr			73.7		ns
Turn-Off DelayTime	td(off)			61.8		ns
Turn-Off Fall Time	tf			24.4		ns
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current ^{1,4}	IS	VG=VD=0V , Force Current			-50	A
Pulsed Source Current ^{2,4}	ISM				-180	
Diode Forward Voltage ²	VSD	VGS=0V , IS=-1A , TJ=25℃			-1	V
Body Diode Reverse Recovery Time	trr	IF=-15A , dI/dt=100A/μs , TJ=25℃		19		ns
Body Diode Reverse Recovery Charge	Qrr			9		nC

Note :

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 5 sec.
3. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

Typical Electrical and Thermal Characteristics

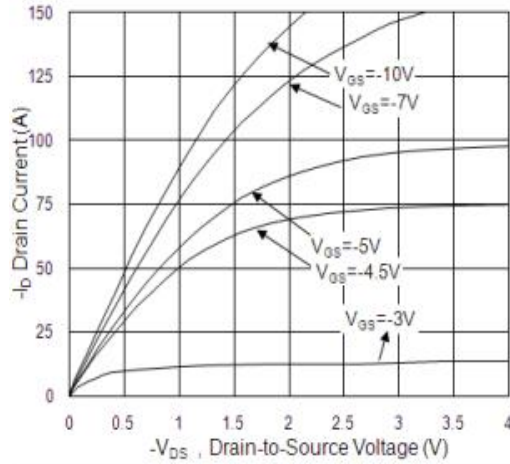


Fig.1 Typical Output Characteristics

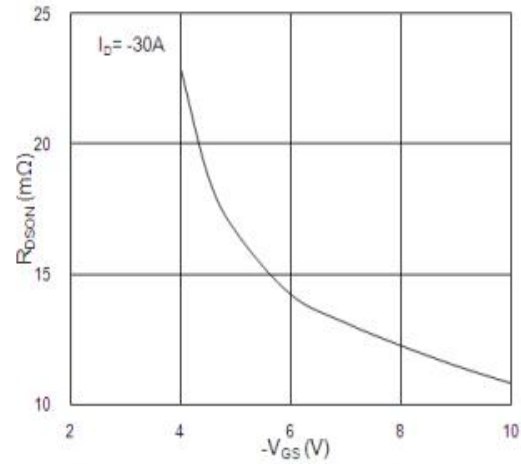


Fig.2 On-Resistance vs. G-S Voltage

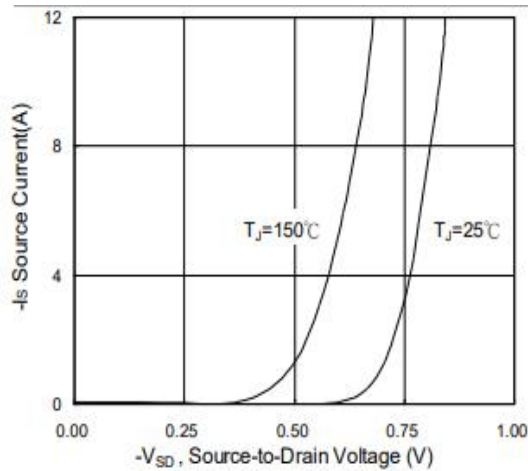


Fig.3 Forward Characteristics of Reverse

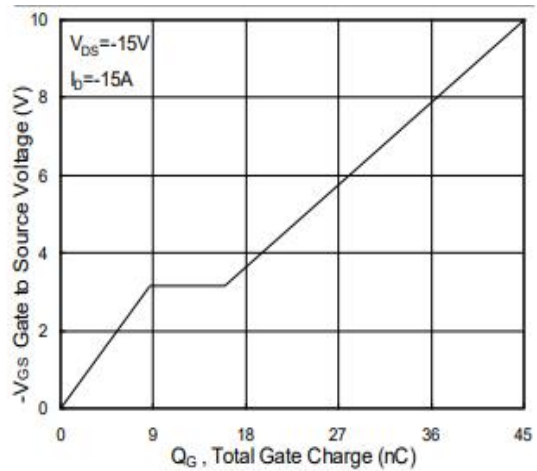


Fig.4 Gate-charge Characteristics

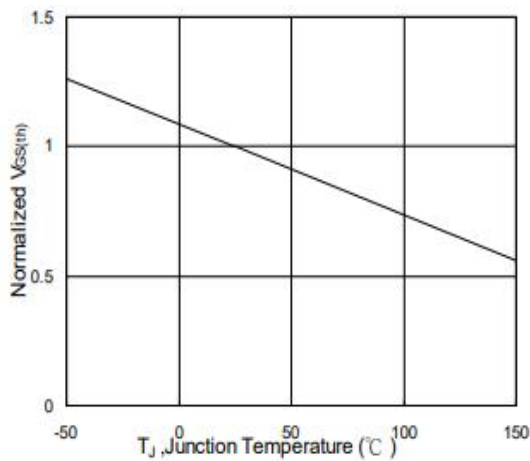


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

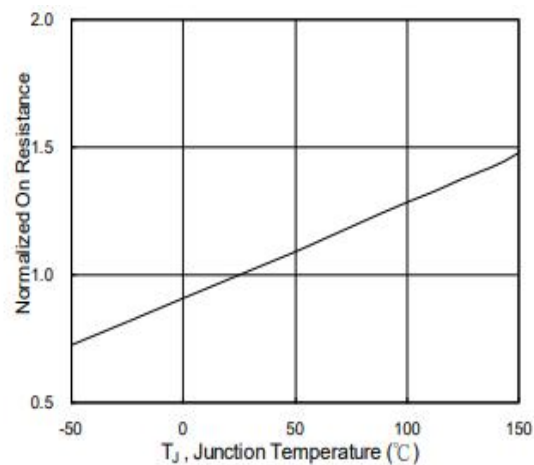


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Typical Electrical and Thermal Characteristics

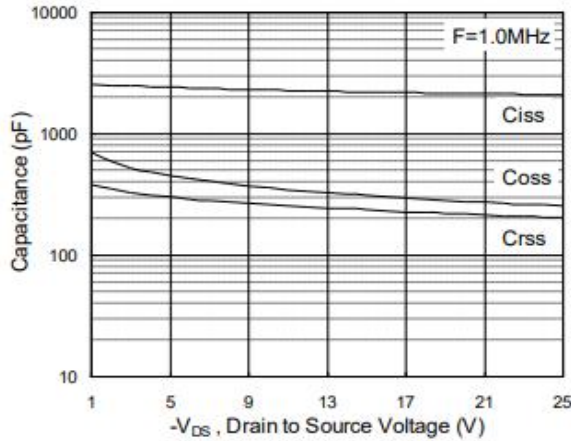


Fig.7 Capacitance

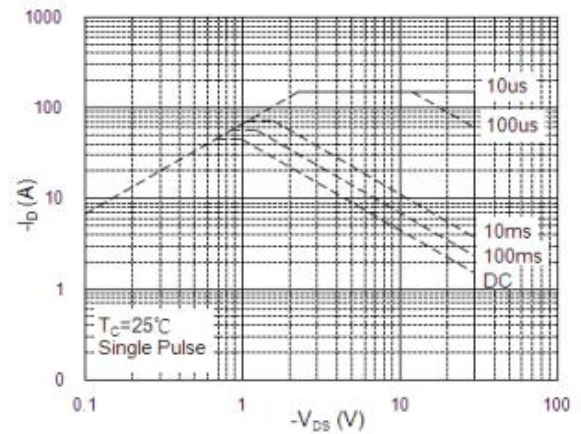


Fig.8 Safe Operating Area

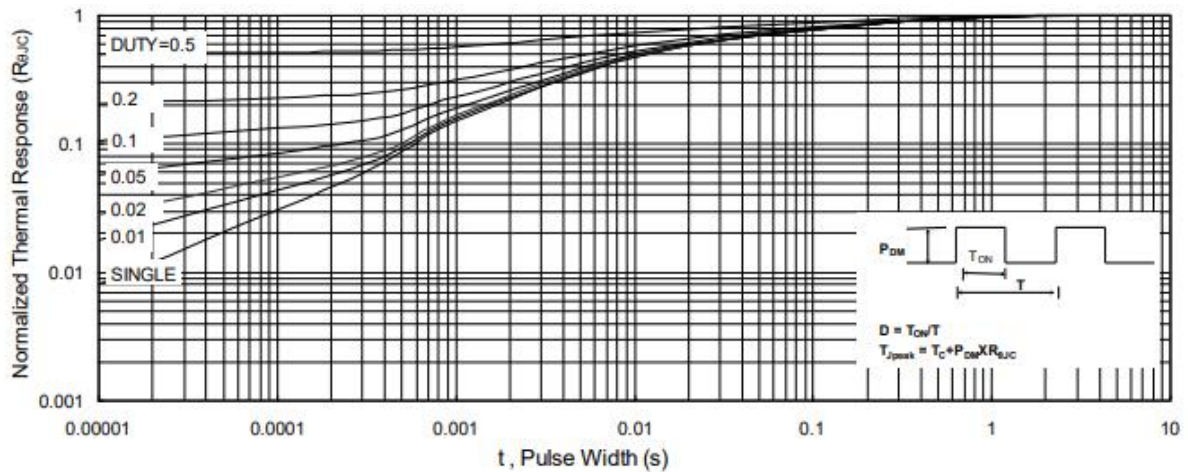


Fig.9 Normalized Maximum Transient Thermal Impedance

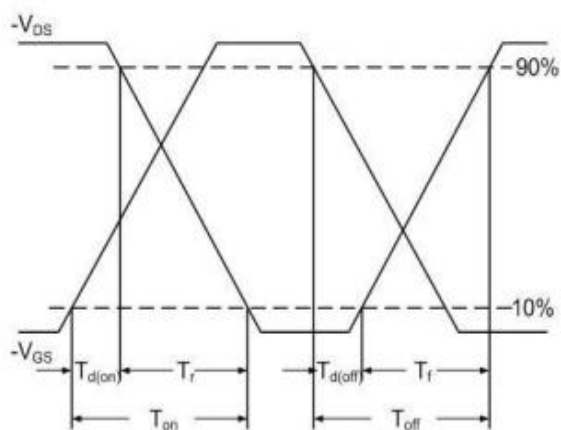


Fig.10 Switching Time Waveform

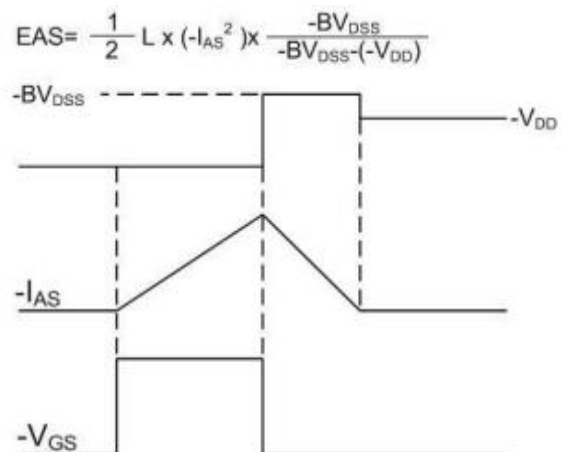
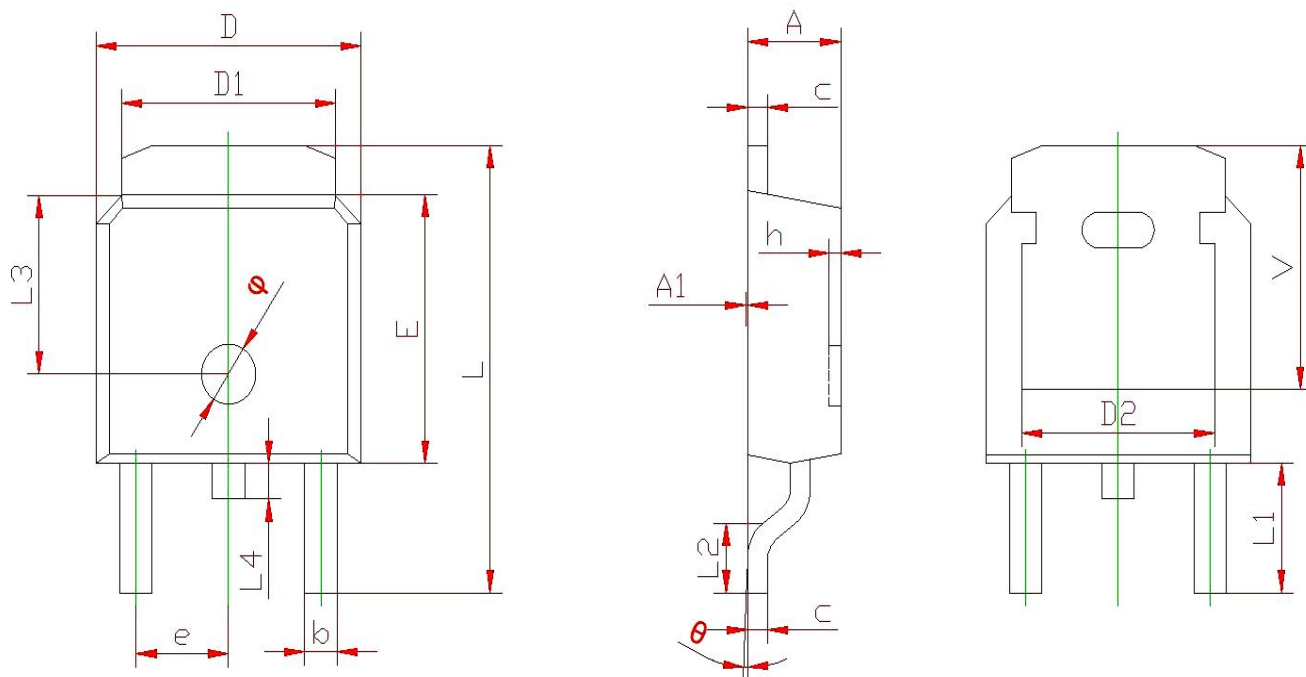


Fig.11 Unclamped Inductive Switching Waveform

TO-252 Package Outline Dimesions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.800 REF		0.189 REF	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF		0.114 REF	
L2	1.400	1.700	0.055	0.067
L3	4.000 REF		0.157 REF	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.5000 REF		0.217 REF	