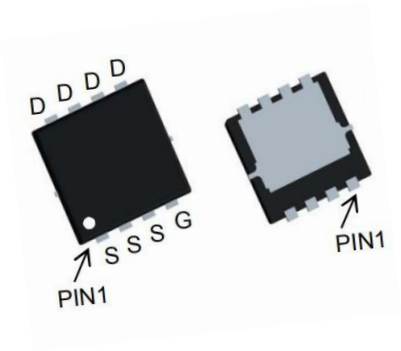
Features

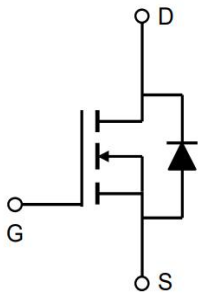
The TW20N03CC isthehighcelldensitytrenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The TW20N03CC meet the RoHS and Green Product requirement,100%EAS guaranteedwithfull function reliability approved.

Product Summary

V_{DS}	30V
I_D	20A
$R_{DS(ON)}$ (at V_{GS} =10V)	< 20mΩ
$R_{DS(ON)}$ (at V_{GS} =4.5V)	< 29mΩ



PDFN3X3



Maximum Ratings(Ta=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current, VGS @ 10V1	ID@TC =25℃	20	A
Continuous Drain Current, VGS @ 10V1	ID@TC=100℃	8	
Pulsed Drain Current ①	I_{DM}	38	
Single Pulse Avalanche Energy3	EAS	28	mj
Avalanche Current	IAS	13.8	A
Power Dissipation ②	P_D	5.5	W
Storage Temperature	T_{STG}	-55~+175	℃
Operating Junction	T_J	-55~+175	℃

Thermal Data

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction-Cas	RθJC		36	℃/W

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS = 0V, ID = 250μA	30			V
Zero Gate Voltage Drain Current	I_{DSS}	VDS=30V, VGS =0V			1	μA
Gate-Body leakage Current	I_{GSS}	VDS =0V, VGS = ±20V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	VDS =VGS, ID = 250μA	1.0	1.5	2.5	V
Static Drain-Source On-Resistance	RDS(on)	VGS = 10V, ID = 5A		15	20	mΩ
		VGS = 4.5V, ID = 3A		21	29	mΩ
Dynamic Parameters						
Input Capacitance	C_{iss}	VDS = 15V,VGS =0V, f=1MHz		490		pF
Output Capacitance	C_{oss}			79		pF
Reverse Transfer Capacitance	C_{rss}			61		pF
Total Gate Charge	Q_g	VDS = 10V,VGS = 4.5V, ID = 25A		10		nC
Gate Source Charge	Q_{gs}			1.7		nC
Gate Drain Charge	Q_{gd}			2.5		nC
Switching Parameters						
Turn-On DelayTime	td(on)	VDS=15V, ID=3A, VGS=10V, RREN =3Ω		6		ns
Turn-On Rise Time	tr			15		ns
Turn-Off DelayTime	td(off)			17		ns
Turn-Off Fall Time	tf			17		ns
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain to Source Diode Forward Current		IS			9	A
Maximum Pulsed Drain to Source Diode Forward Cur		ISM			36	A
Drain to Source Diode Forward Voltage	VSD	VGS=0V, IS=30A			1.2	V
Body Diode Reverse Recovery Time	trr	IF=20A,dI/dt=100A/μs		7		NS
Body Diode Reverse Recovery Charge	Qrr			2		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

Figure1: Output Characteristics

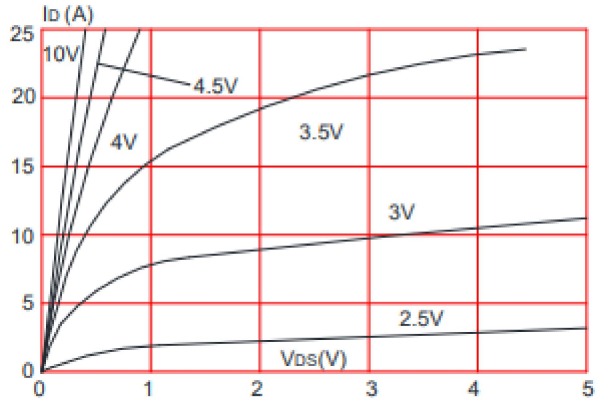


Figure 2: Typical Transfer Characteristics

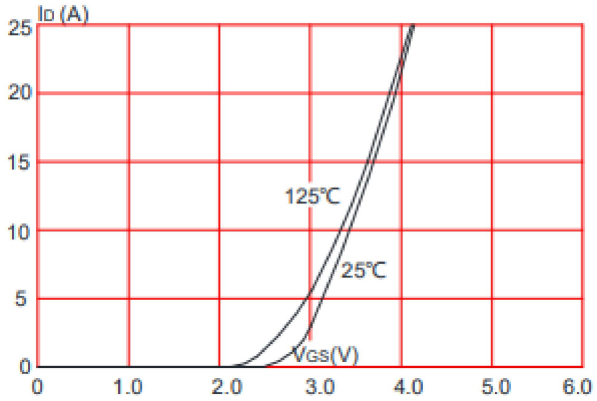


Figure 3: On-resistance vs. Drain Current

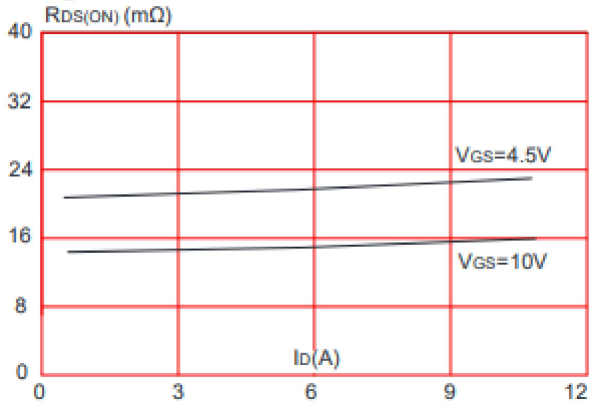


Figure 4: Body Diode Characteristics

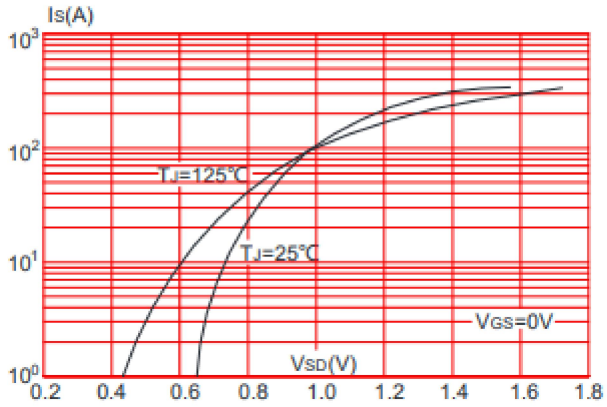


Figure 5: Gate Charge Characteristics

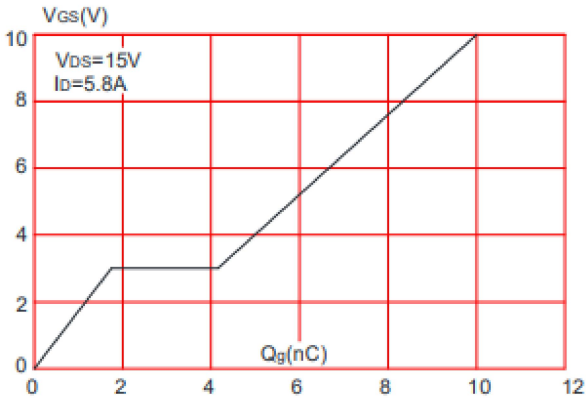
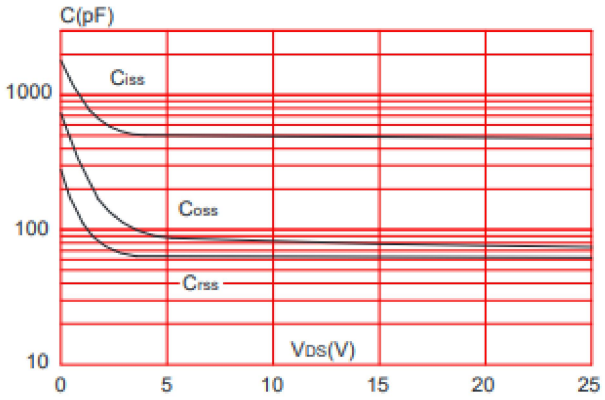


Figure 6: Capacitance Characteristics



Typical Electrical and Thermal Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

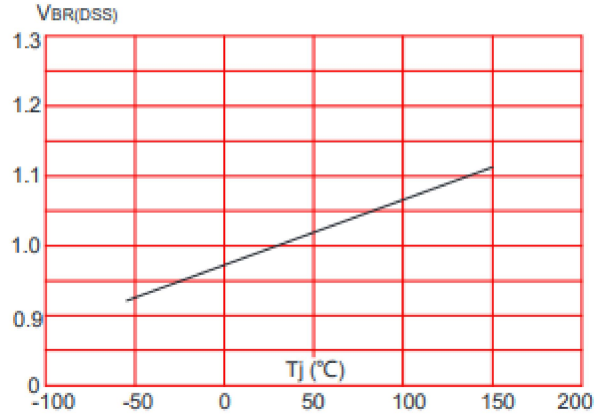


Figure 8: Normalized on Resistance vs. Junction Temperature

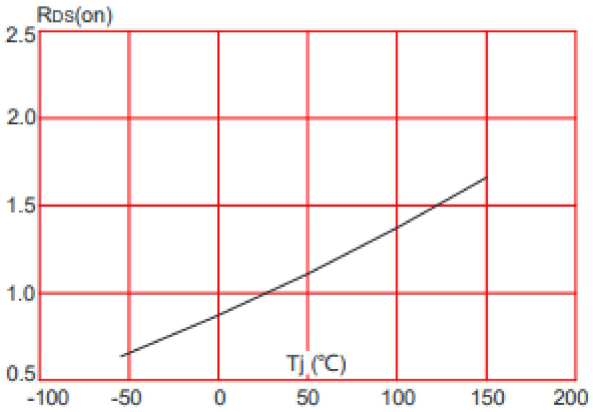


Figure 9: Maximum Safe Operating Area

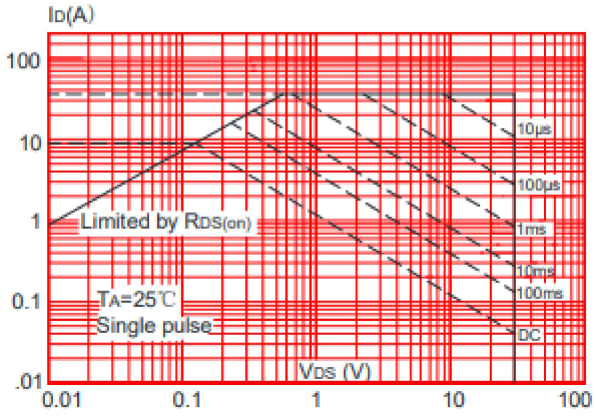


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

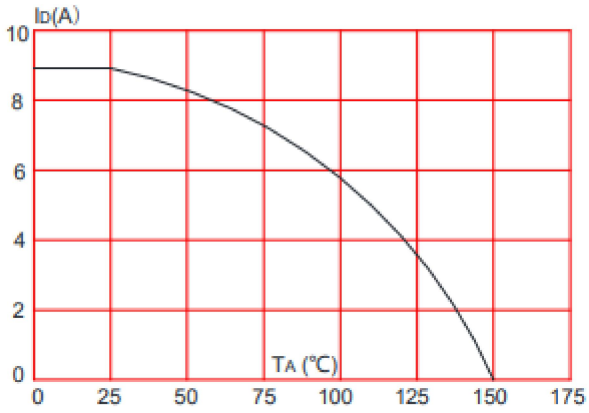
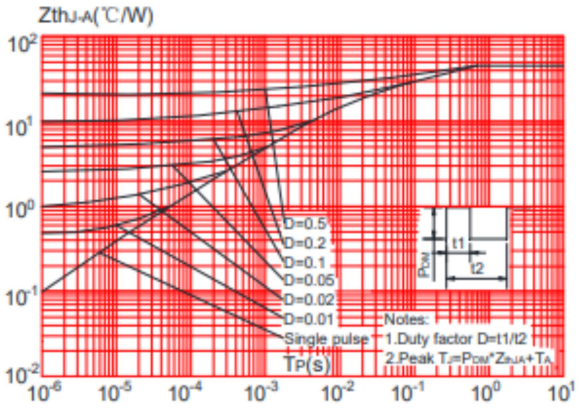
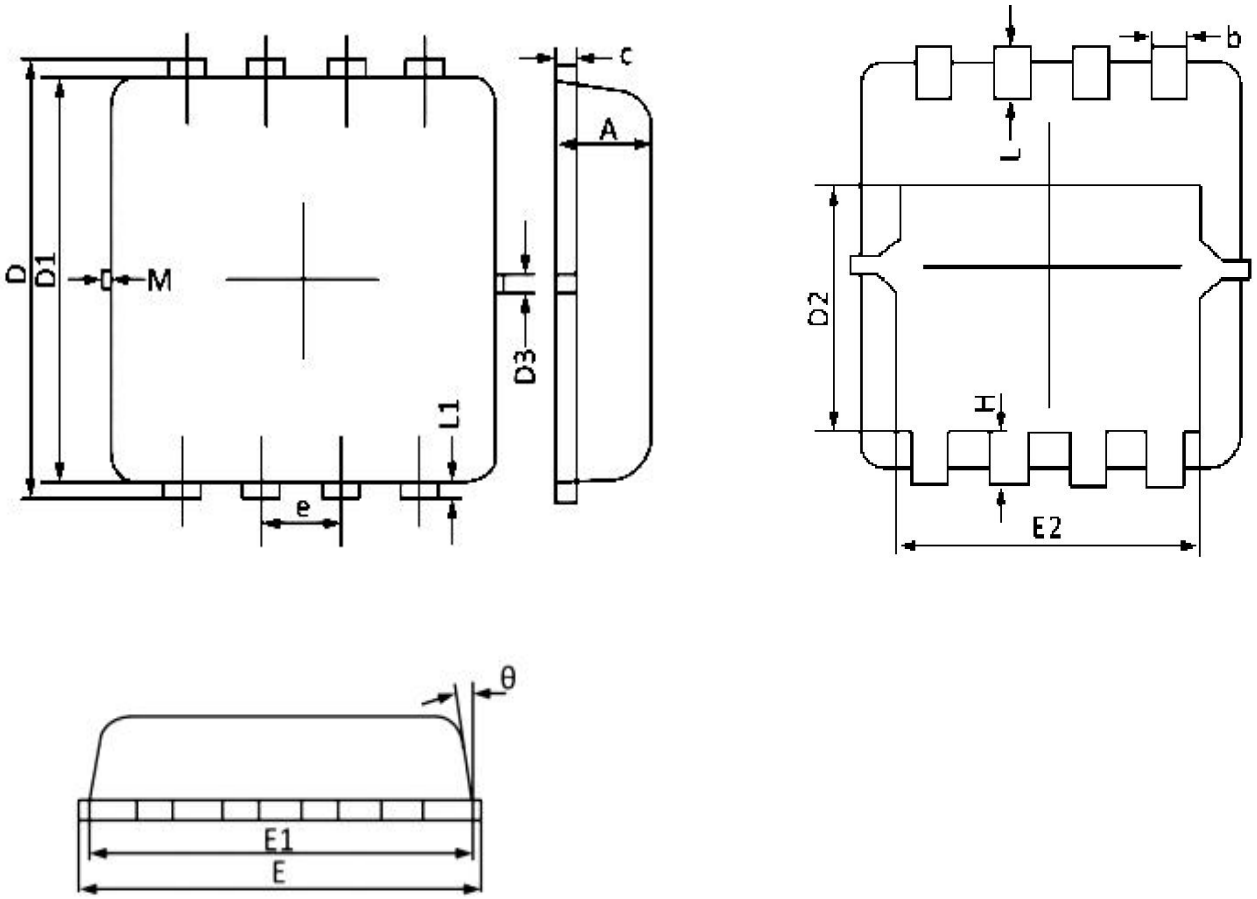


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



PDFN3X3 Package Outline Dimesions



DIMENSIONS(unit:mm)

Symbol	Min	Typ	Max	Sybol	Min	Typ	Max
A	0.70	0.75	0.80	**b**	0.25	0.30	0.35
C	0.10	0.15	0.25	**D**	3.25	3.35	3.45
D1	3.00	3.10	3.20	**D2**	1.78	1.88	1.98
D3		0.13		**E**	3.20	3.30	3.40
E1	3.00	3.15	3.20	**E2**	2.39	2.49	2.59
e	0.65BSC			**H**	0.30	0.39	0.50
L	0.30	0.40	0.50	**L1**		0.13	
θ		10°	12°	**M**	★	★	0.15