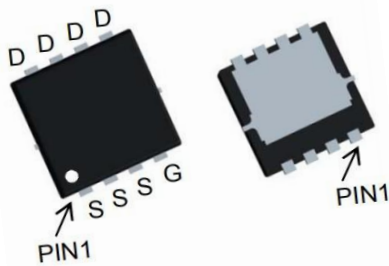


Features

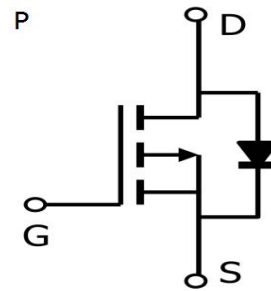
The TW60P02CC is the high cell density trench P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The TW60P02CC meet the RoHS and Green Product requirement with full function reliability approved.

Product Summary

V_{DS}	-20V
I_D	-60A
$R_{DS(ON)}$ (at $V_{GS} = -4.5V$)	< 8.5m Ω
$R_{DS(ON)}$ (at $V_{GS} = -2.5V$)	< 12m Ω



PDFN3X3



Maximum Ratings ($T_a = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	
Continuous Drain Current, $V_{GS} @ -4.5V$	$I_{D@TC=25^\circ\text{C}}$	-60	A
Continuous Drain Current, $V_{GS} @ -4.5V$	$I_{D@TC=70^\circ\text{C}}$	-38	
Pulsed Drain Current ①	I_{DM}	-130	
Total Power Dissipation	$PD@TC=25^\circ\text{C}$	42	W
Storage Temperature Range	TSTG	-55 to 150	$^\circ\text{C}$
Operating Junction Temperature	T_J	-55 to 150	$^\circ\text{C}$

Thermal Data

Parameter	Symbol	Max.	Unit
Thermal Resistance Junction-Ambie	$R_{\theta JA}$	75	$^\circ\text{C}/\text{W}$

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = -250μA	-20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-15V, V _{GS} =0V, T _J =25°C			-1	μA
Gate-Body leakage Current	I _{GSS}	V _{GS} =±12V, V _{DS} =0V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =-250μA	-0.35	-0.65	-1.0	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = -4.5V, I _D = -15A		6.6	8.5	mΩ
		V _{GS} = -2.5V, I _D = -12A		8	12	mΩ
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} = -10V, V _{GS} = 0V, f = 1.0MHz		4600		pF
Output Capacitance	C _{oss}			460		pF
Reverse Transfer Capacitance	C _{rss}			459		pF
Total Gate Charge	Q _g	V _{DS} = -10V, V _{GS} = -4.5V, I _D = -15A		56		nC
Gate Source Charge	Q _{gs}			8		nC
Gate Drain Charge	Q _{gd}			16		nC
Switching Parameters						
Turn-On DelayTime	t _{d(on)}	V _{DD} = -10V, I _D = -13A, R _{GEN} =2.7Ω, V _{GS} =-10V		11		ns
Turn-On Rise Time	t _r			110		ns
Turn-Off DelayTime	t _{d(off)}			157		ns
Turn-Off Fall Time	t _f			160		ns
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain to Source Diode Forward Current		I _S			-60	A
Maximum Pulsed Drain to Source Diode Forward Current		I _{SM}			-220	A
Drain to Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-1A, T _J =25°C			-1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F =-10A, dI/dt=100A/μs, T _J =25°C		23		NS
Body Diode Reverse Recovery Charge	Q _{rr}				14	

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

Figure 1: Output Characteristics

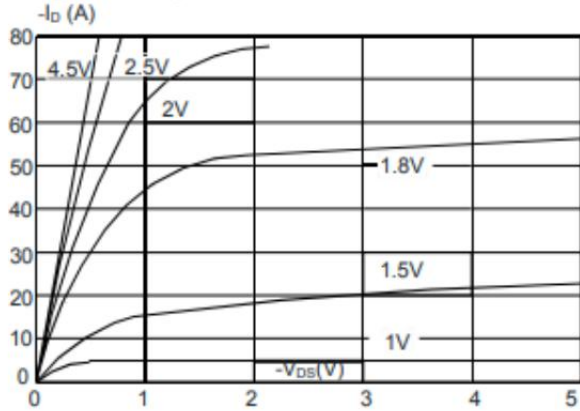


Figure 2: Typical Transfer Characteristics

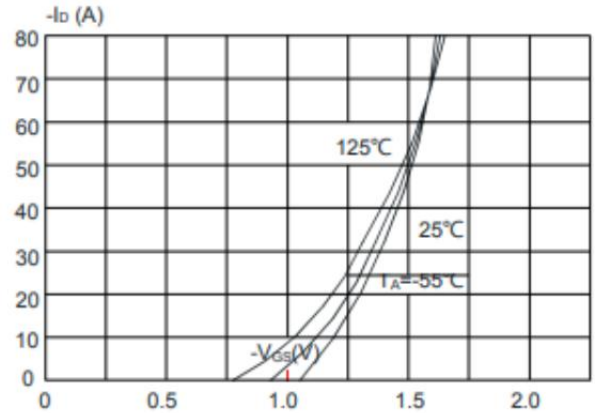


Figure 3: On-resistance vs. Drain Current

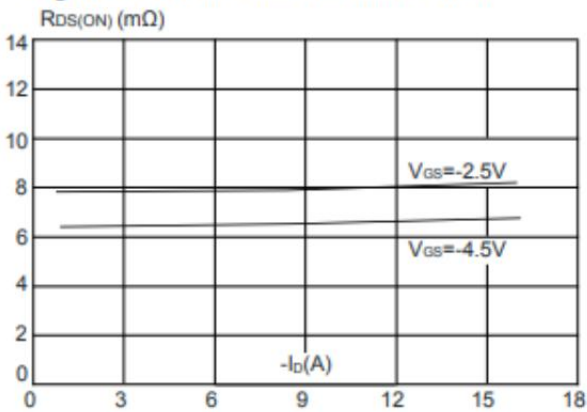


Figure 4: Body Diode Characteristics

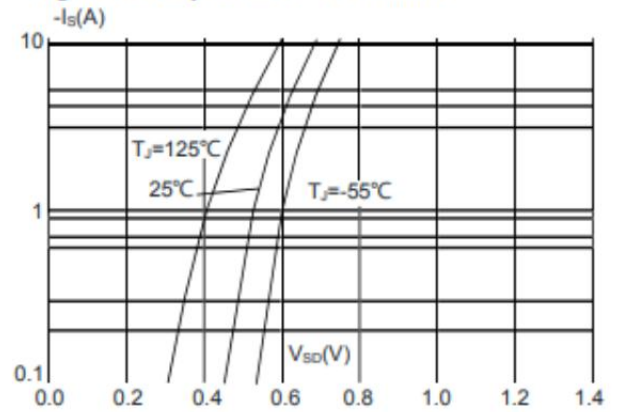


Figure 5: Gate Charge Characteristics

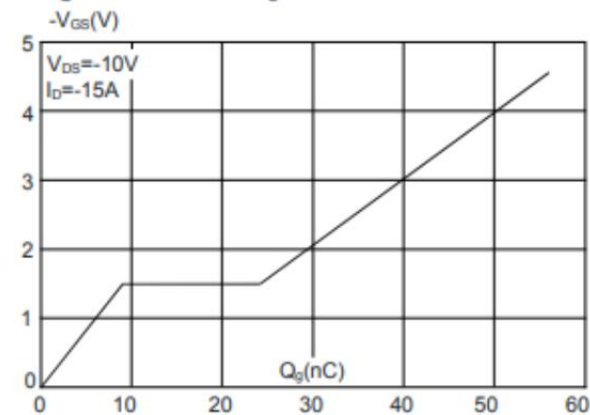
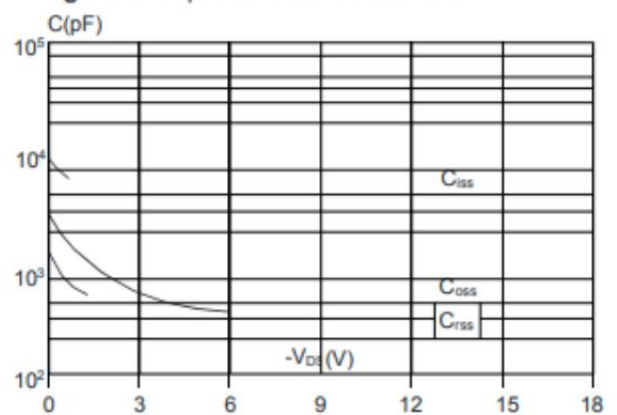


Figure 6: Capacitance Characteristics



Typical Electrical and Thermal Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

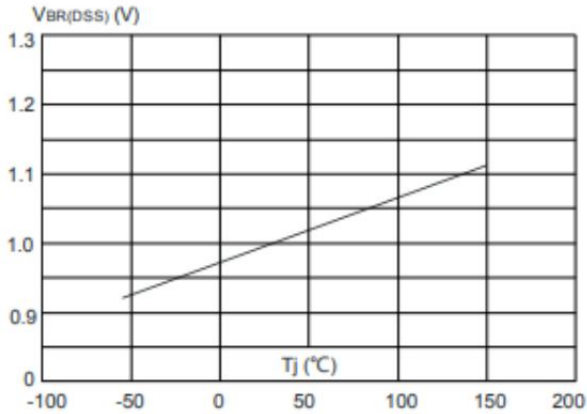


Figure 8: Normalized on Resistance vs. Junction Temperature

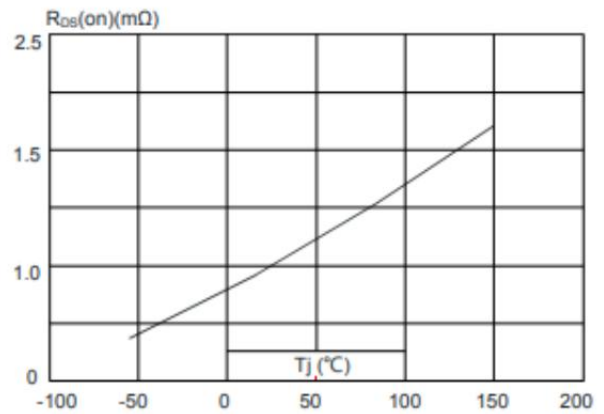


Figure 9: Maximum Safe Operating Area

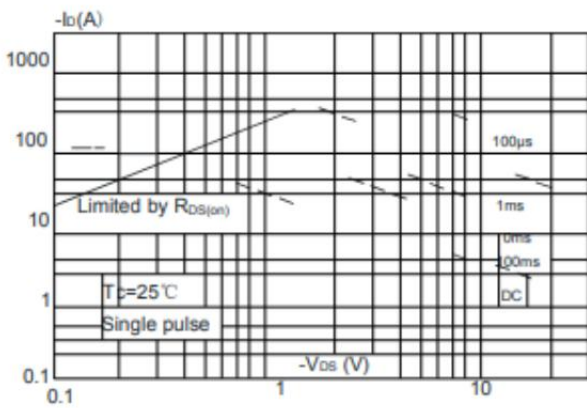


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

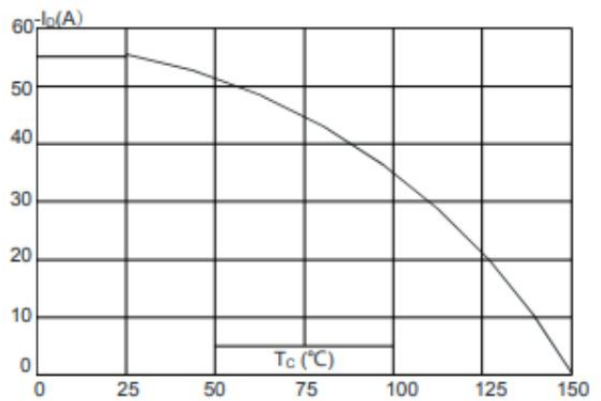
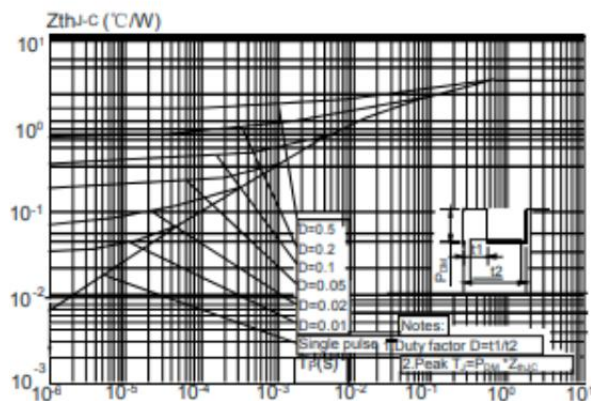
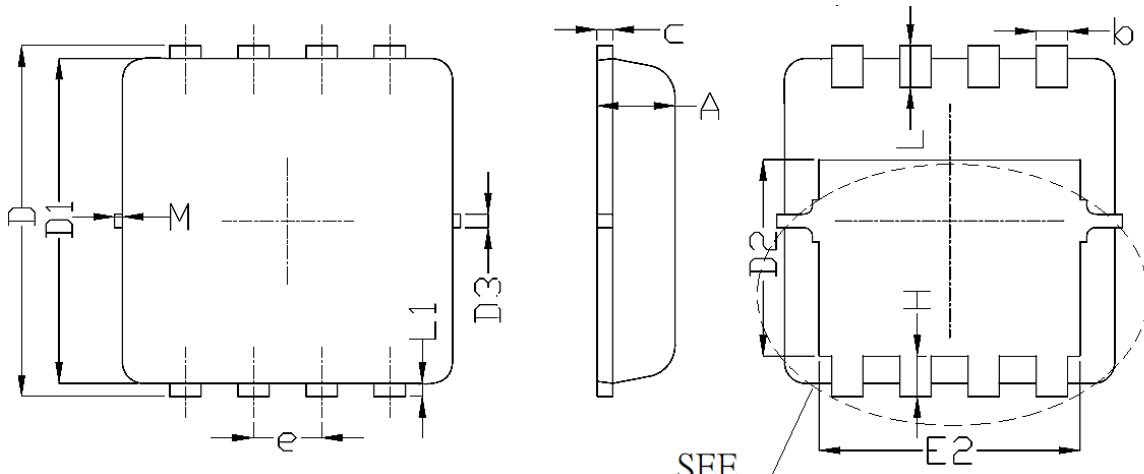


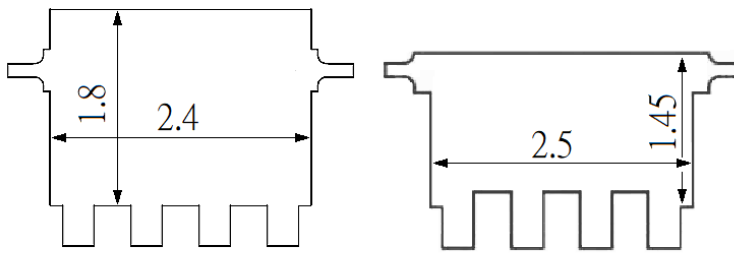
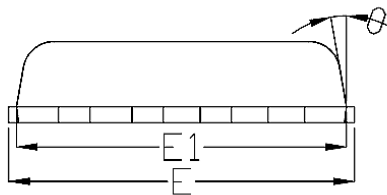
Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Package Information



SEE
DETAIL



OPTION 1

OPTION 2

DETAIL

SYMBOL	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	0.7	0.775	0.85
b	0.25	0.3	0.35
c	0.1	0.15	0.25
D	3.15	3.3	3.4
D1	2.95	3.1	3.2
D2	1.7	1.8	1.93
D3		0.13	
E	3.05	3.25	3.35
E1	2.95	3.15	3.2
E2	2.3	2.4	2.55
e	0.65 BSC		
H	0.33	0.43	0.53
L	0.3	0.4	0.5
L1	0.08	0.13	0.18
θ	-	10°	12°
M	-	-	0.15