

CMS42P03V8-HF

P-Channel
RoHS Device
Halogen Free

Description

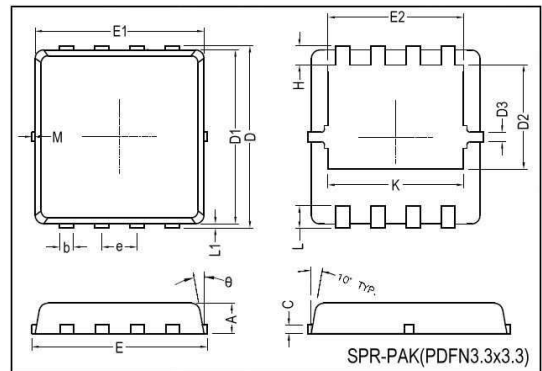
The CMS42P03V8 is the highest performance trench P-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The CMS42P03V8 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Excellent CdV/dt effect decline
- Green Device Available
- Super Low Gate Charge
- 100% EAS Guaranteed

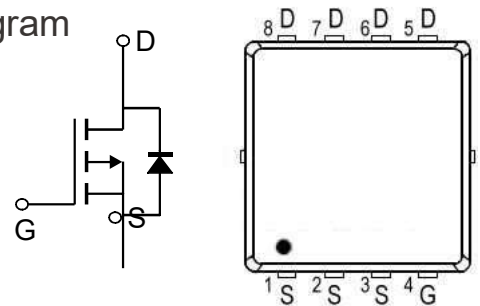
Package Dimensions



REF.	Millimeter			REF.	Millimeter		
	Min.	Nom.	Max.		Min.	Nom.	Max.
A	0.70	0.75	0.80	E1	3.00	3.15	3.20
b	0.25	0.30	0.35	E2	2.39	2.49	2.59
C	0.10	0.15	0.25	e	0.65 BSC		
D	3.25	3.35	3.45	H	0.30	0.39	0.50
D1	3.00	3.10	3.20	L	0.30	0.40	0.50
D2	1.48	1.58	1.68	L1	-	0.13	0.20
D3	-	0.13	-	θ	-	10°	12°
E	3.20	3.30	3.40	M	-	-	0.15

Circuit diagram

- G : Gate
- S : Source
- D : Drain



Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹	$I_D @ T_C = 25^\circ C$	-42 ⁴	A
Continuous Drain Current ¹	$I_D @ T_C = 100^\circ C$	-27	A
Pulsed Drain Current ^{1,2}	I_{DM}	-130	A
Continuous Drain Current	$I_D @ T_A = 25^\circ C$	-9	A
	$I_D @ T_A = 70^\circ C$	-7.2	A
Total Power Dissipation ⁴	$P_D @ T_C = 25^\circ C$	37	W
	$P_D @ T_A = 25^\circ C$	1.67	W
Single Pulse Avalanche Energy, $L=0.1mH^3$	E_{AS}	88	mJ
Single Pulse Avalanche Current, $L=0.1mH^3$	I_{AS}	-42	A
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 ~ +150	$^\circ C$

Thermal Data

Parameter	Symbol	Conditions	Max. Value	Unit
Thermal Resistance Junction-ambient ¹	$R_{\theta JA}$	Steady State	75	$^\circ C/W$
Thermal Resistance Junction-case ¹	$R_{\theta JC}$	Steady State	3.38	$^\circ C/W$

Company reserves the right to improve product design, functions and reliability without notice.

REV:A

Electrical Characteristics (T_j = 25 °C unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV _{DSS}	-30	-	-	V	V _{GS} =0, I _D =-250uA
Gate Threshold Voltage	V _{GS(th)}	-1.0	-	-2.5	V	V _{DS} =V _{GS} , I _D =-250uA
Gate-Source Leakage Current	I _{GSS}	-	-	±100	nA	V _{GS} = ±20V
Drain-Source Leakage Current(T _j =25 °C)	I _{DSS}	-	-	-1	uA	V _{DS} =-30V, V _{GS} =0
Drain-Source Leakage Current(T _j =55 °C)		-	-	-5	uA	V _{DS} =-24V, V _{GS} =0
Static Drain-Source On-Resistance ²	R _{DS(ON)}	-	-	15	mΩ	V _{GS} =-10V, I _D =-30A
		-	-	25		V _{GS} =-4.5V, I _D =-15A
Total Gate Charge ²	Q _g	-	22	-	nC	I _D =-15A V _{DS} =-15V V _{GS} =-4.5V
Gate-Source Charge	Q _{gs}	-	8.7	-		
Gate-Drain ("Miller") Charge	Q _{gd}	-	7.2	-		
Turn-on Delay Time ²	T _{d(on)}	-	8	-	ns	V _{DD} =-15V I _D =-15A V _{GS} =-10V R _G =3.3Ω
Rise Time	T _r	-	73.7	-		
Turn-off Delay Time	T _{d(off)}	-	61.8	-		
Fall Time	T _f	-	24.4	-		
Input Capacitance	C _{iss}	-	2215	-	pF	V _{GS} =0V V _{DS} =-15V f=1.0MHz
Output Capacitance	C _{oss}	-	310	-		
Reverse Transfer Capacitance	C _{rss}	-	237	-		
Gate Resistance	R _g	-	9	-	Ω	f=1.0MHz

Guaranteed Avalanche Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Single Pulse Avalanche Energy ⁵	EAS	22	-	-	mJ	V _{DD} =-25V, L=0.1mH, I _{AS} =-21A

Source-Drain Diode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward On Voltage ²	V _{SD}	-	-	-1.2	V	I _S =-30A, V _{GS} =0V, T _J =25□
Continuous Source Current ^{1,6}	I _S	-	-	-42	A	V _G =V _D =0V, Force Current
Pulsed Source Current ^{2,6}	I _{SM}	-	-	-130	A	
Reverse Recovery Time	t _{rr}	-	19	-	ns	I _F =-15A, dI/dt=100A/μs, T _J =25°C
Reverse Recovery Charge	Q _{rr}	-	9	-	nC	

Notes: 1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.

2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.

3. The EAS data shows Max. rating. The test condition is V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-42A.

4. The power dissipation is limited by 150 °C junction temperature. Package Limitation current is 40A.

5. The Min. value is 100% EAS tested guarantee.

6. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Company reserves the right to improve product design, functions and reliability without notice.

Typical Characteristics

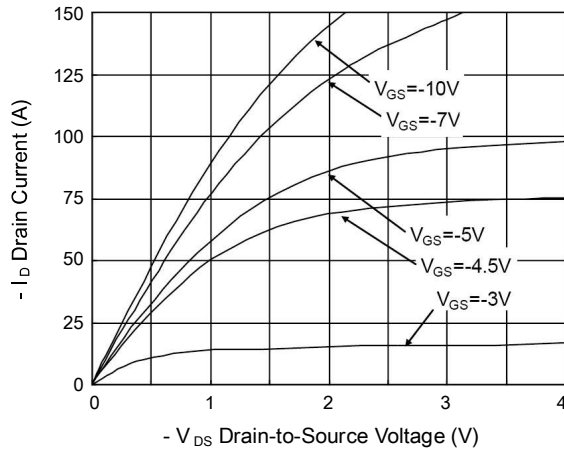


Fig.1 Typical Output Characteristics

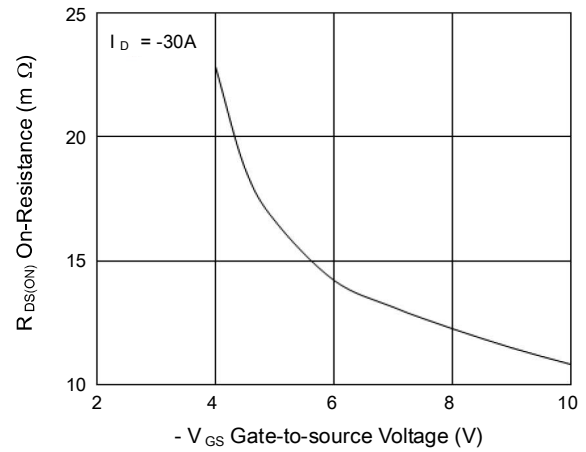


Fig.2 On-Resistance vs. G-S Voltage

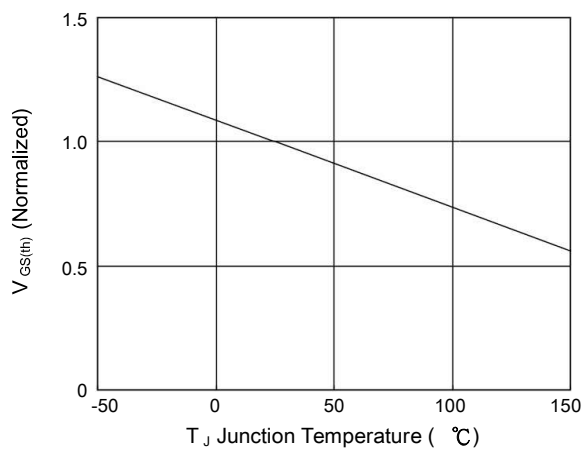


Fig.3 Normalized $V_{GS(th)}$ vs. T_J

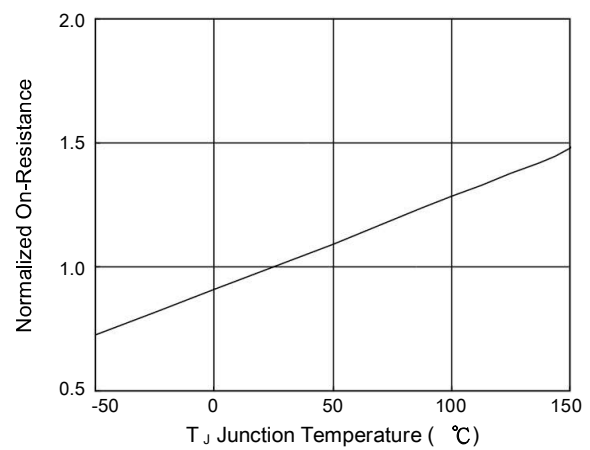


Fig.4 Normalized $R_{DS(ON)}$ vs. T_J

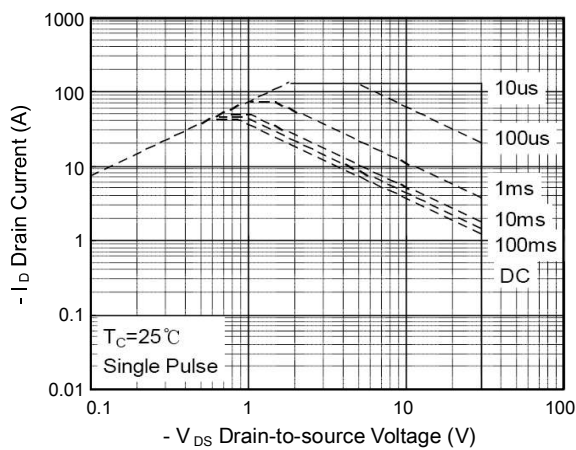


Fig.5 Safe Operating Area

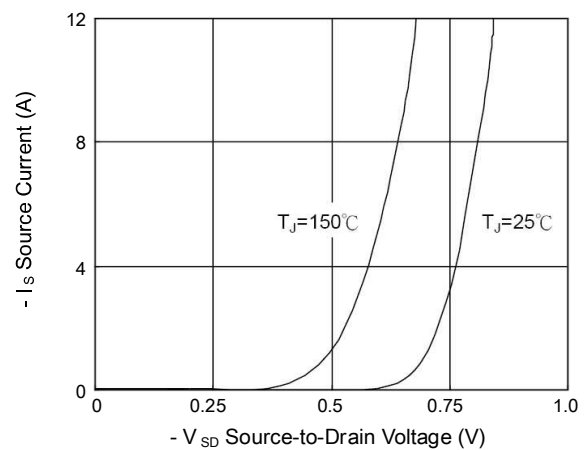


Fig.6 Forward Characteristics of Reverse

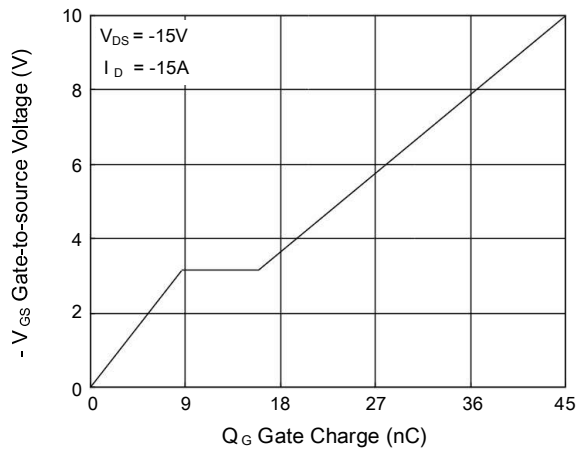


Fig.7 Gate Charge Characteristics

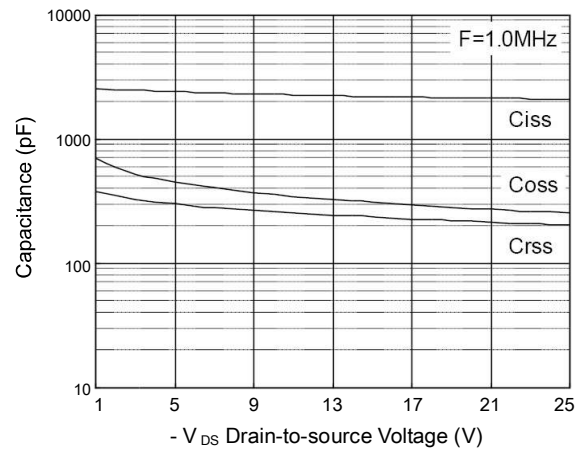


Fig.8 Capacitance Characteristics

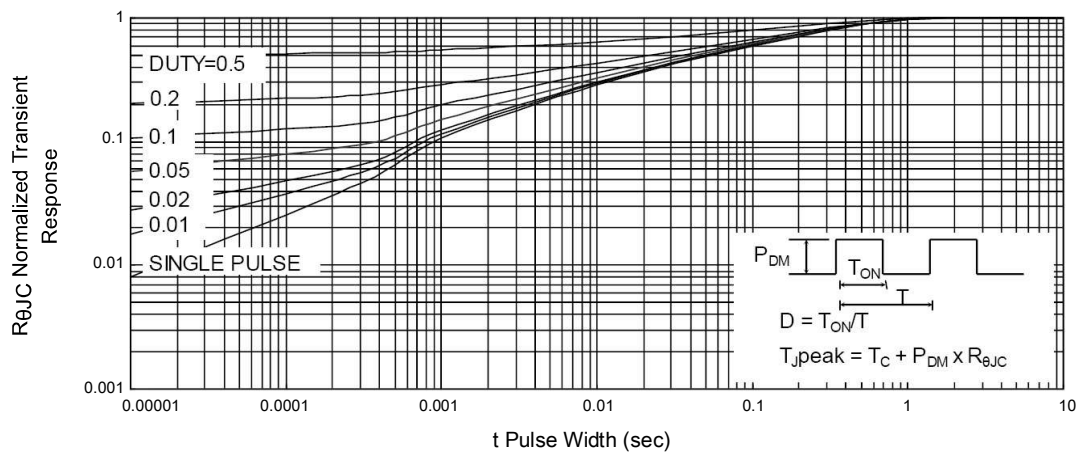


Fig.9 Normalized Maximum Transient Thermal Impedance

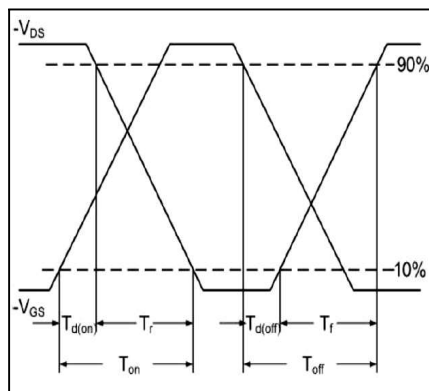


Fig.10 Switching Time Waveform

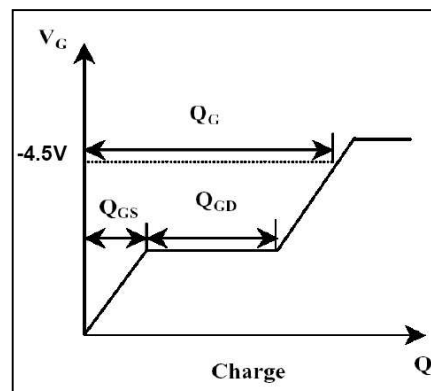
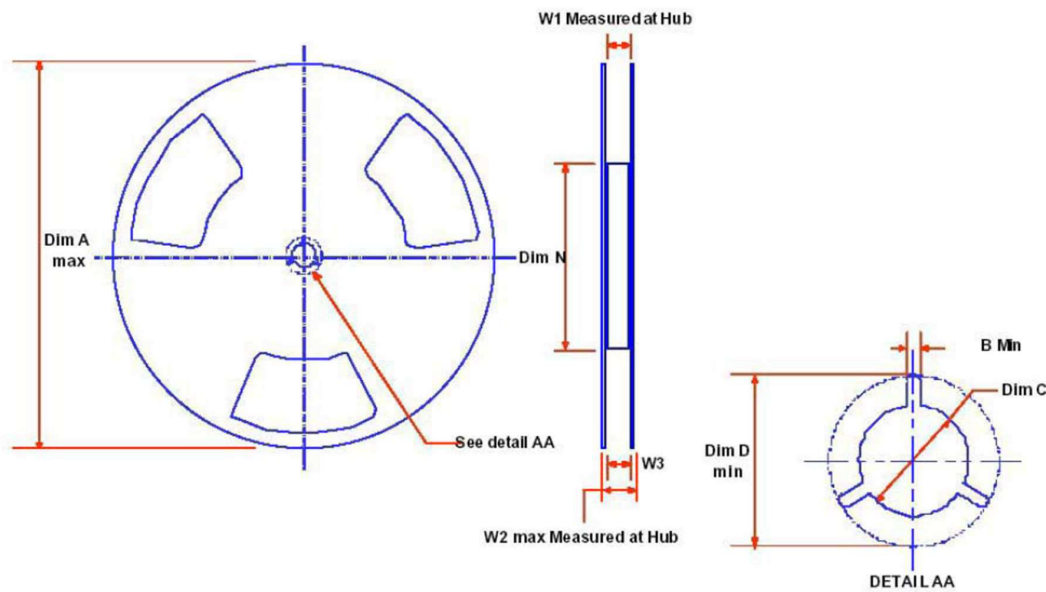
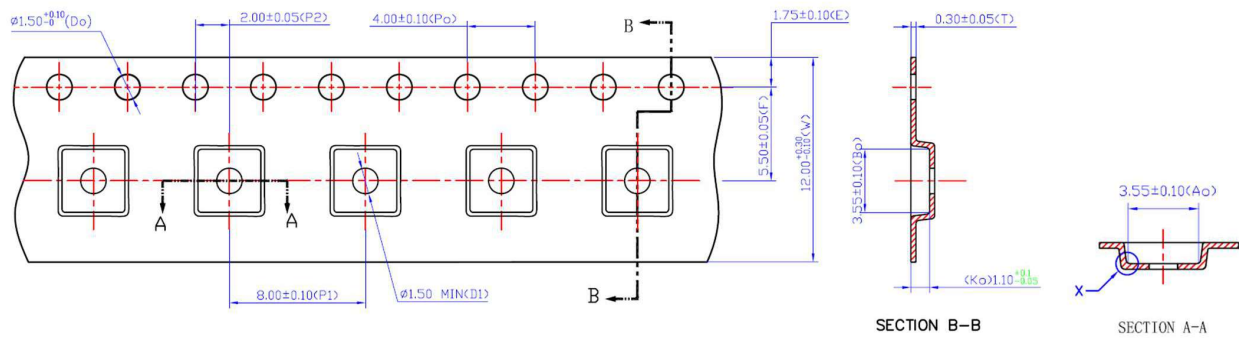


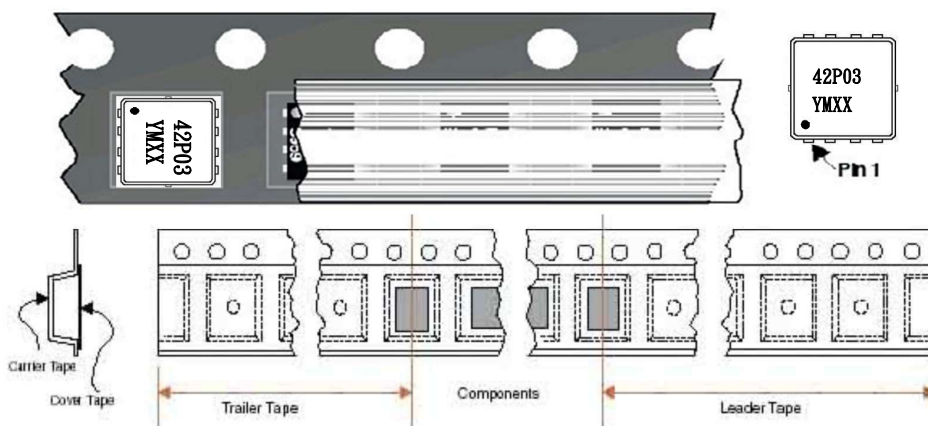
Fig.11 Gate Charge Waveform

Reel Taping Specification



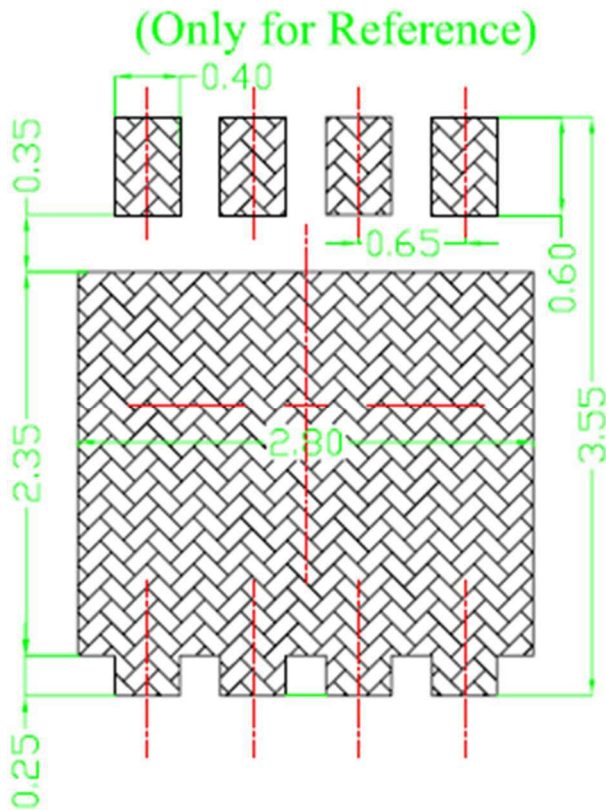
Dimensions are in inches and millimeters

Tape Size	Reel Option	Dim A	Dim B	Dim C	Dim D	Dim N	Dim W1	Dim W2	Dim W3 (LSL-USL)
12mm	13" Dia (STD/L99Z)	13.00 330+/-1	0.069 1.5 Min.	0.512 13.0 Min.	0.796 20.2 (ref.)	7.00 178+0/-2	0.488 +0.078/-0.000 12.4+2/0	0.724 18.4 (ref.)	0.469 – 0.606 11.9 – 15.4



Package	Trail	Leader	Quantity/Reel
SPR-PAK	50±2 pockets	14±2 pockets	3K

Suggested PAD Layout: (All Dimensions are in mm.)



Standard Packaging:

Package Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SPR-PAK	3000	13