

42A N-Channel ENHANCEMENT MODE POWER MOSFET 60V

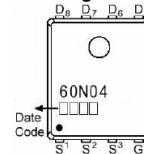
PRIMARY CHARACTERISTICS	
BV_{DSS}	60V
$R_{DS(ON)}$	12mΩ
I_D	42A

FEATURES

- Low On-Resistance
- Low Input Capacitance
- Green Device Available
- Low Miller Charge
- 100% EAS and 100% Rg Guaranteed

PR-PAK PACKAGE

Marking :



Date Code

G2Pjg0UyTqPz 4=2014, 5=2015

The second code : Month=A,B,C,D.....

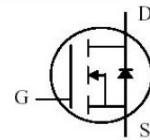
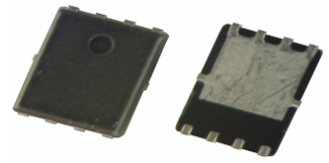
A B C D E F G H I J K L M

1 2 3 4 5 6 7 8 X 9 10 11 12

The third code : Production Type No. 01-99

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Ex : 4A01= 2014101 Produce


DESCRIPTION

- The SPR60N04 uses advanced Trench technology and designs to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.
- The SPR60N04 meet the RoHS and Green Product requirement, 100% EAS and 100% Rg guaranteed with full function reliability approved.

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	$I_D @ T_C=25^\circ C$	42	A
	$I_D @ T_C=100^\circ C$	26	A
	$I_D @ T_A=25^\circ C$	8.5	A
	$I_D @ T_A=70^\circ C$	6.8	A
Pulsed Drain Current ²	$I_{DM} @ T_C=25^\circ C$	84	A
Total Power Dissipation ⁴	$P_D @ T_C=25^\circ C$	60	W
	$P_D @ T_A=25^\circ C$	2	W
Single Pulse Avalanche Energy, $L=0.1mH^3$	E_{AS}	61	mJ
Single Pulse Avalanche Current, $L=0.1mH^3$	I_{AS}	35	A
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 ~ +150	°C

Thermal Data

Parameter	Symbol	Conditions	Max. Value	Unit
Thermal Resistance Junction-ambient ¹	$R_{\theta JA}$	Steady State	62.5	°C/W
Thermal Resistance Junction-case ¹	$R_{\theta JC}$	Steady State	2.1	°C/W


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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV _{DSS}	60	-	-	V	V _{GS} =0, I _D =250uA
Gate Threshold Voltage	V _{GS(th)}	1.0	1.7	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	I _{DSS}	-	-	1	uA	V _{DS} =60V, V _{GS} =0
Static Drain-Source On-Resistance ²	R _{DS(on)}	-	10	12	mΩ	V _{GS} =10V, I _D =10A
		-	11	15		V _{GS} =4.5V, I _D =8A
Total Gate Charge ²	Q _g	-	40	-	nC	I _D =10A V _{DS} =30V V _{GS} =10V
Gate-Source Charge	Q _{gs}	-	6	-		
Gate-Drain ("Miller") Change	Q _{gd}	-	7.2	-		
Turn-on Delay Time ²	T _{d(on)}	-	14	-	ns	V _{DS} =15V I _D =10A V _{GS} =10V R _G =6Ω
Rise Time	T _r	-	25	-		
Turn-off Delay Time	T _{d(off)}	-	58	-		
Fall Time	T _f	-	18	-		
Input Capacitance	C _{iss}	-	2142	-	pF	V _{GS} =0V V _{DS} =25V f=1.0MHz
Output Capacitance	C _{oss}	-	149	-		
Reverse Transfer Capacitance	C _{rss}	-	86	-		
Gate Resistance	R _g	-	1.6	3.2	Ω	f=1.0MHz

Guaranteed Avalanche Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Single Pulse Avalanche Energy ⁵	EAS	33.8	-	-	mJ	V _{DD} =25V, L=0.1mH, I _{AS} =26A

Source-Drain Diode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Diode Forward Voltage ²	V _{SD}	-	0.67	1.0	V	I _S =1A, V _{GS} =0V
Continuous Source Current ^{1,6}	I _S	-	-	42	A	---

Notes: 1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, ≤10sec, 125°C/W at steady state.

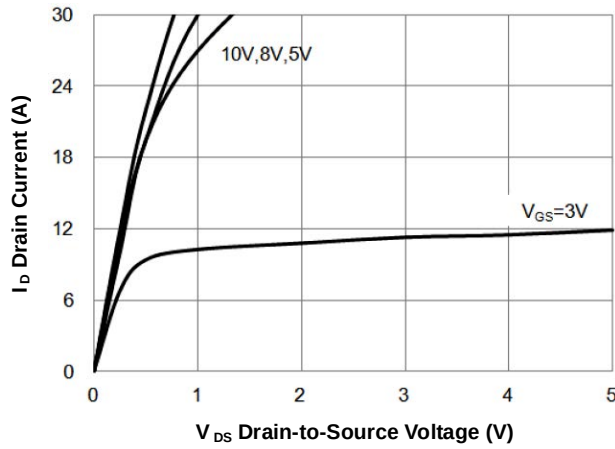
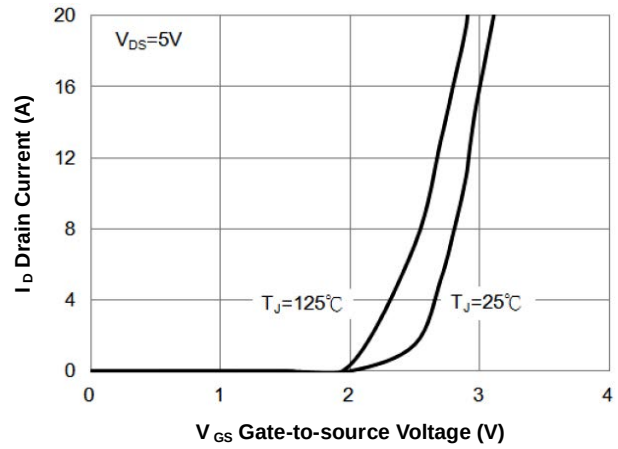
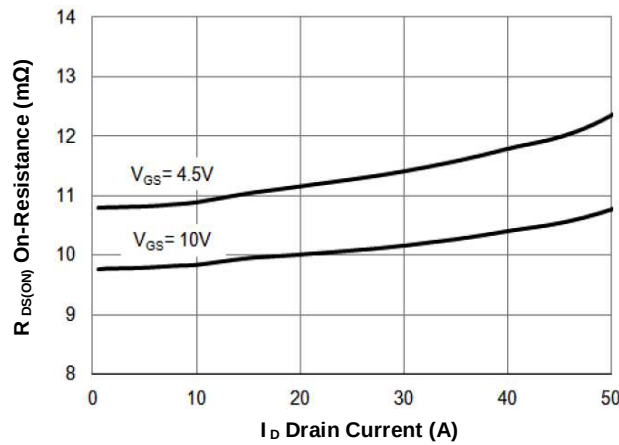
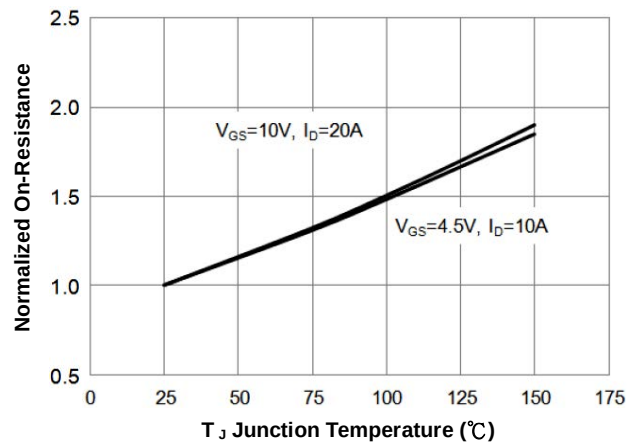
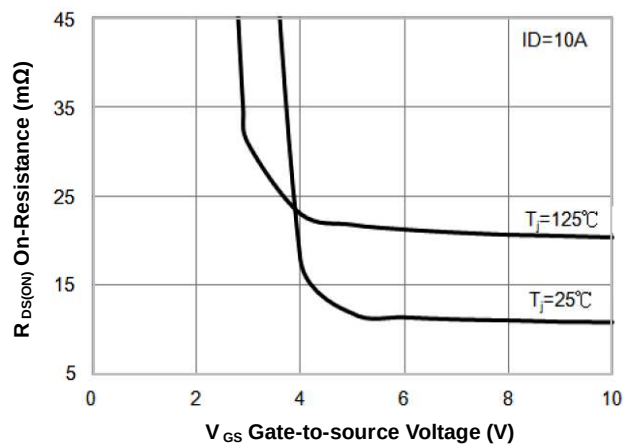
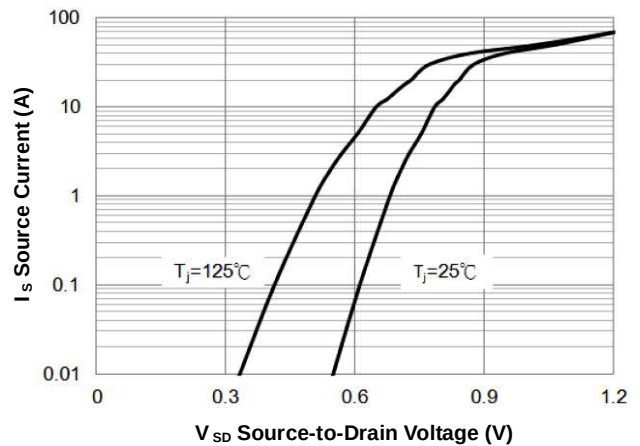
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.

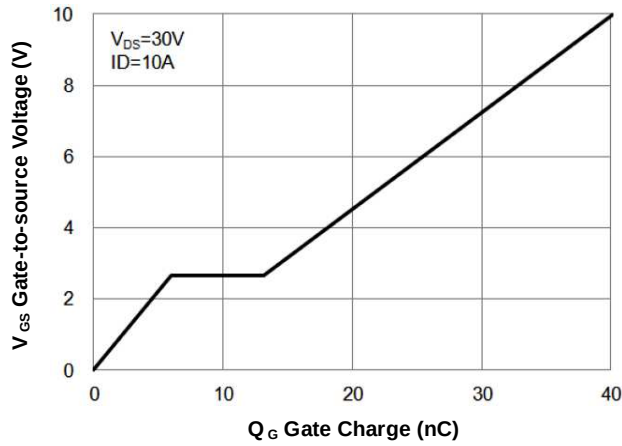
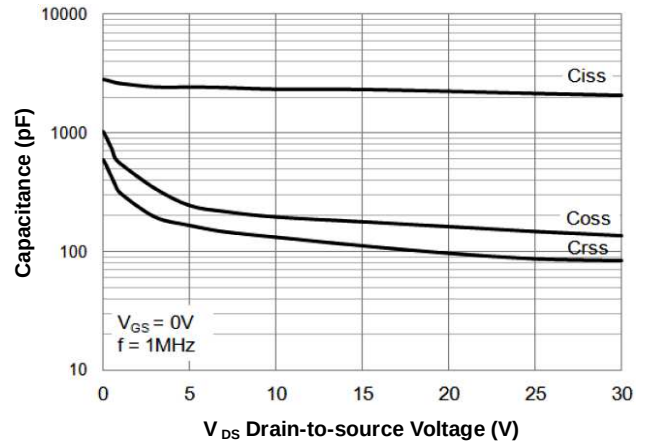
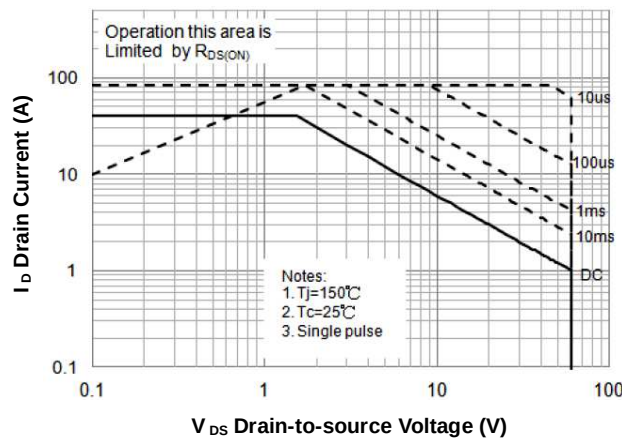
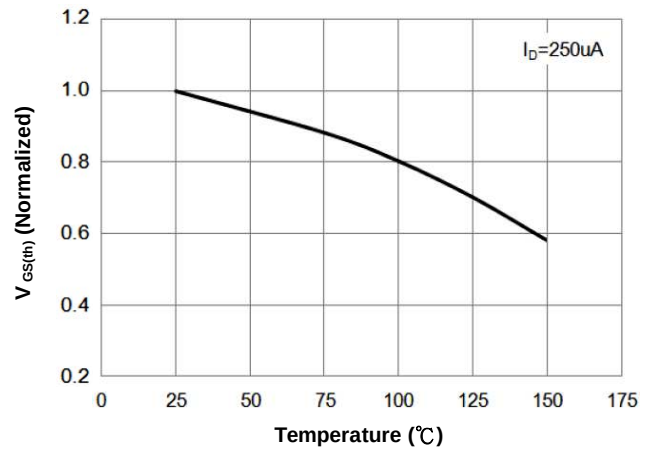
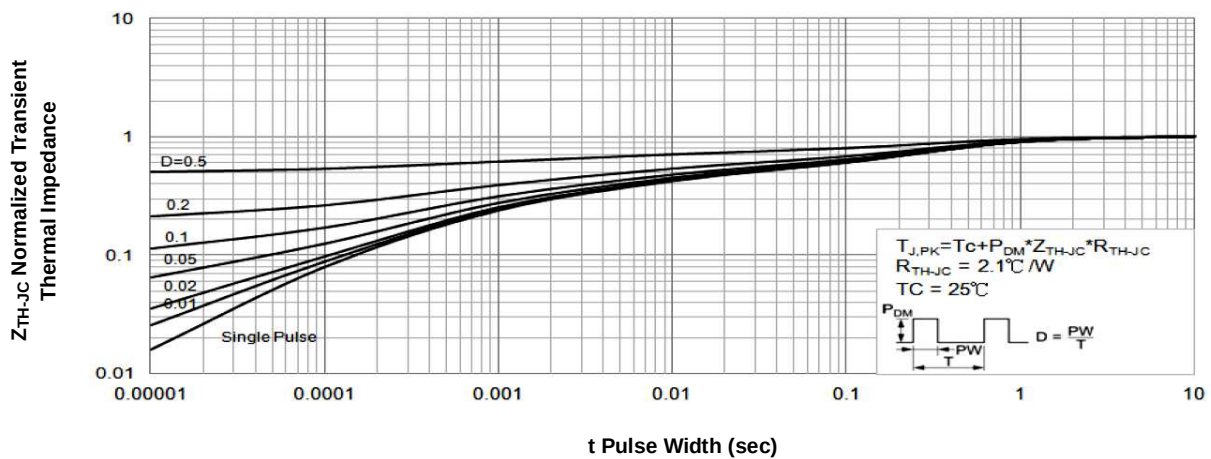
3. The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=35A.

4. The power dissipation is limited by 150°C junction temperature.

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.

**42A N-Channel ENHANCEMENT MODE POWER MOSFET 60V****Typical Characteristics****Fig.1 Typical Output Characteristics****Fig.2 Transfer Characteristics****Fig.3 On-Resistance vs. Drain Current****Fig.4 Normalized $R_{DS(on)}$ vs. T_J** **Fig.5 On-Resistance vs. G-S Voltage****Fig.6 Forward Characteristics of Reverse**

**42A N-Channel ENHANCEMENT MODE POWER MOSFET 60V****Fig.7 Gate Charge Characteristics****Fig.8 Capacitance Characteristic****Fig.9 Safe Operating Area****Fig.10 Normalized $V_{GS(th)}$ vs. Temperature****Fig.11 Normalized Transient Thermal Impedance**

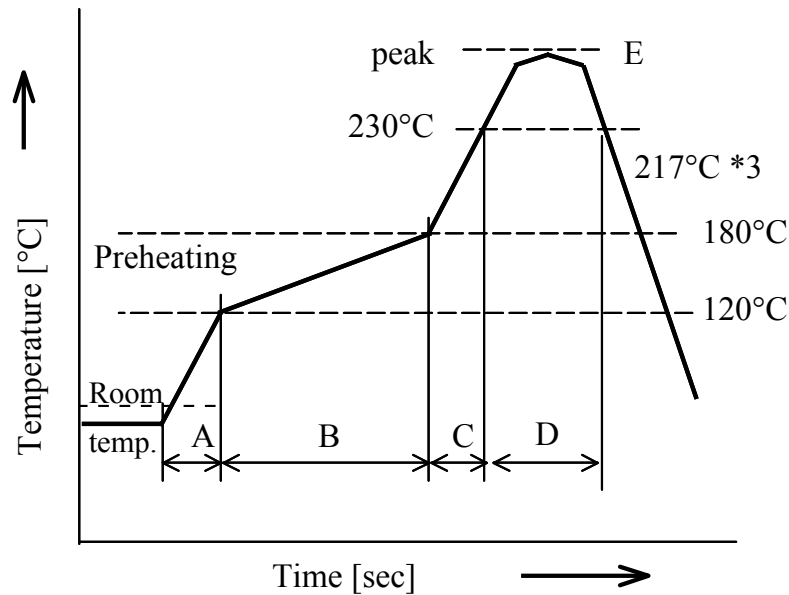
◆Mounting and Storage Conditions(Reflow soldering Temperature profile)

Willas has set the following requirements for the heat resistance of components.

[Assumption] Moisture absorption prior to the reflow/flow soldering of components in dry pack.

With components in dry pack, reflow/flow soldering shall be completed within 168 hours after unpacking

(Storage environment:30°C 70%RH)



Conditions

	Components size ^{*1}	28mm or less	Unit
A	Temp. rise gradient ^{*2}	1 - 3	°C/sec
B	Heating time	50 - 150	sec
	Heating temperature	120 - 180	°C
C	Temp. rise gradient ^{*2}	1 - 3	°C/sec
D	Time over 230°C	90	sec
E	Peak temperature	260	°C
	Peak-temp. hold time	1-5	sec
Soldering		2	times

*1.Length or width, whichever is the greater outside dimension (length for a rectangular component)

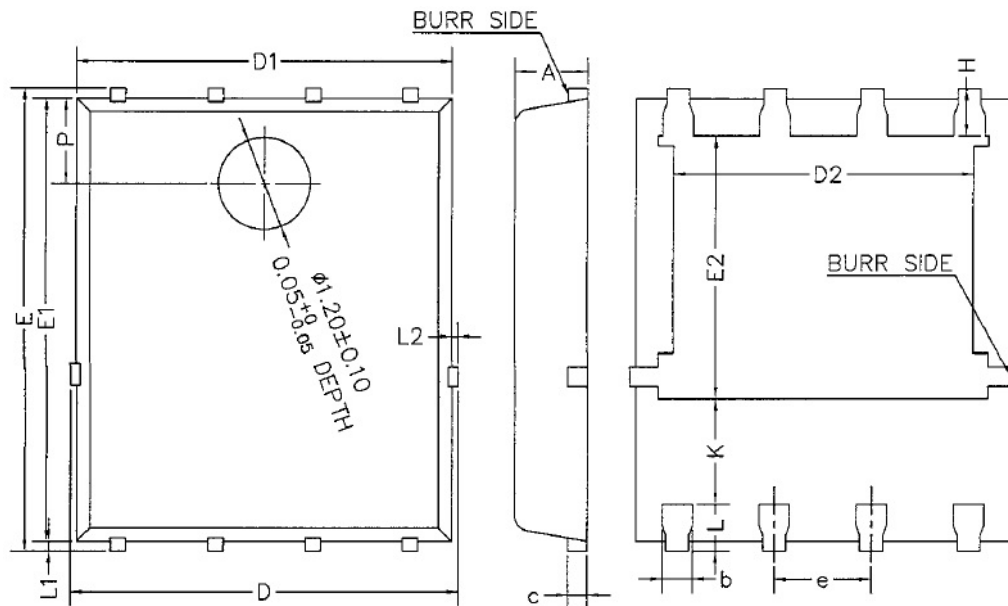
*2.Temperatures and time for A through E in the table above shall be measured on the top surface of the components size.

*3.Time over 217 °C be 90-150 seconds .



Outline Drawing

PR-PAK



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

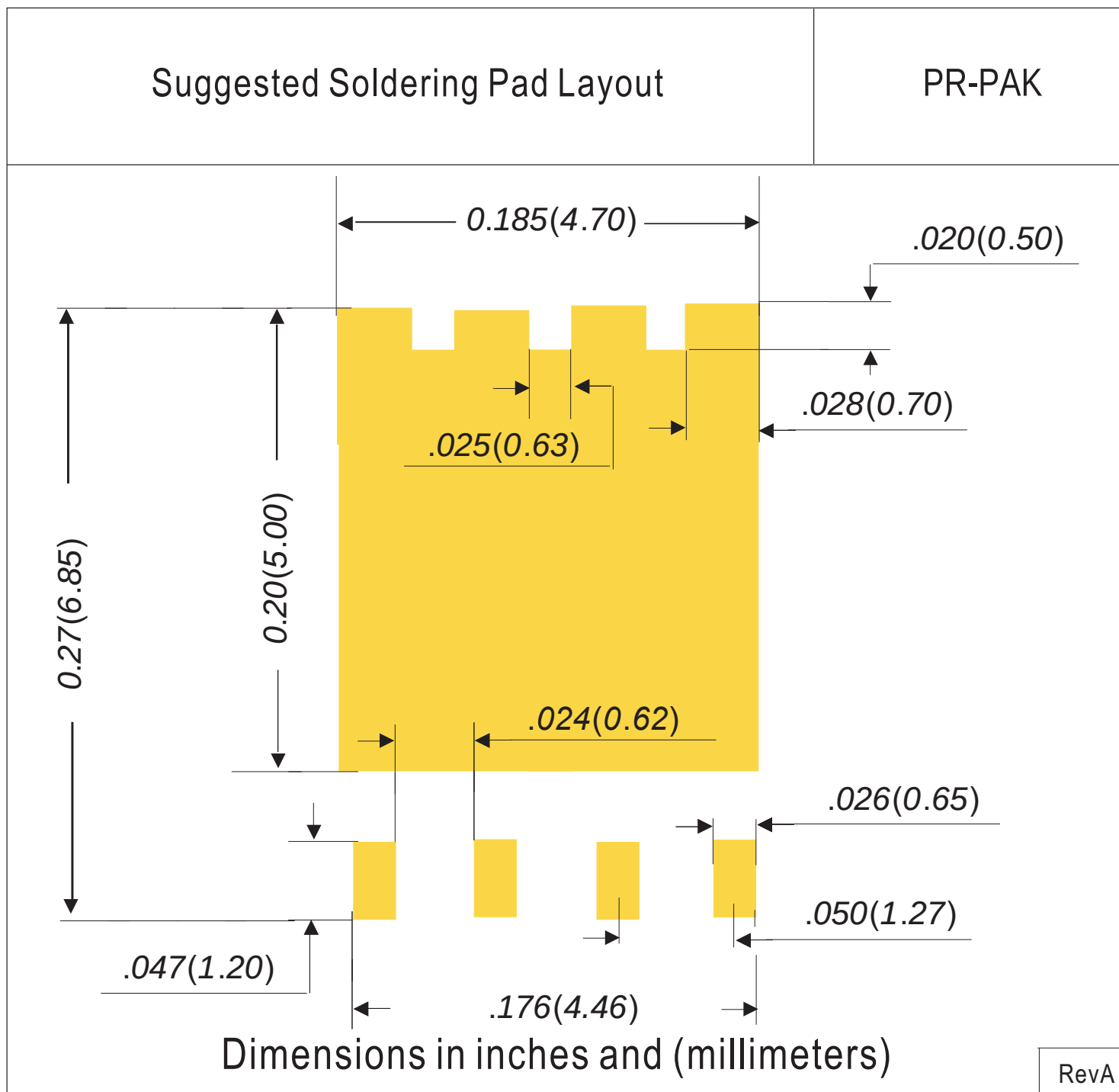
SYMBOL	MIN	NOM	MAX
A	0.90	0.95	1.00
b	0.35	0.40	0.45
c	0.21	0.25	0.34
D	—	—	5.10
D1	4.80	4.90	5.00
D2	3.82	3.92	4.02
e	1.17	1.27	1.37
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	OptionA 3.34 OptionB 3.18	3.44 3.28	3.54 3.38
H	0.51	0.61	0.71
K	1.10	—	—
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
L2	—	—	0.10
P	1.00	1.10	1.20
θ	8°	10°	12°

NOTES:

1. ALL DIMENSIONS REFER TO JEDEC STANDARD MO-240 AA
DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
2. EXPOSED DAP SIZES AND OUTLOOK ARE VARIABLES DEPENDING ON LEADFRAME.
3. OPTION A IS FOR PDFN8A LF, OPTION B IS FOR PDFN8B LF.

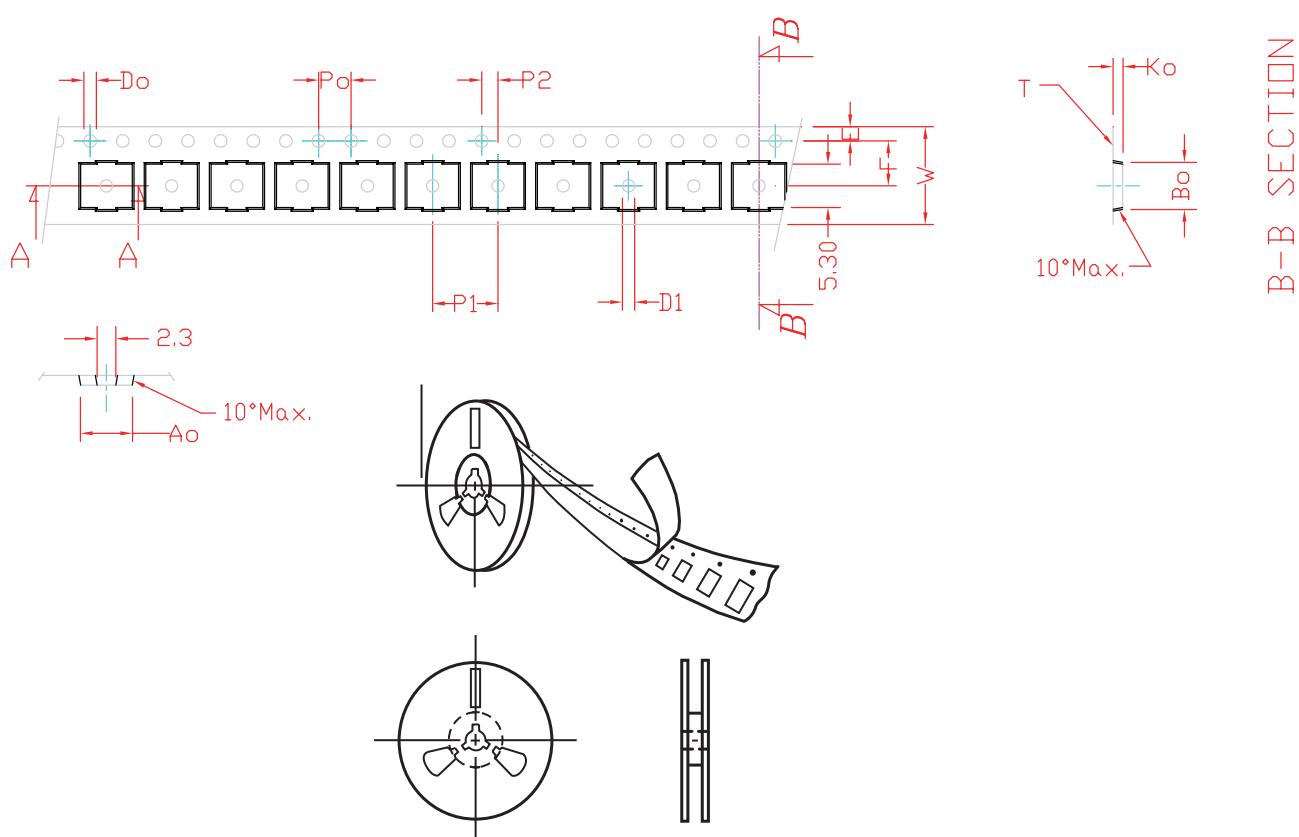
Dimensions in inches and (millimeters)

Rev.B



Reel Taping Specification - Surface Mount Device

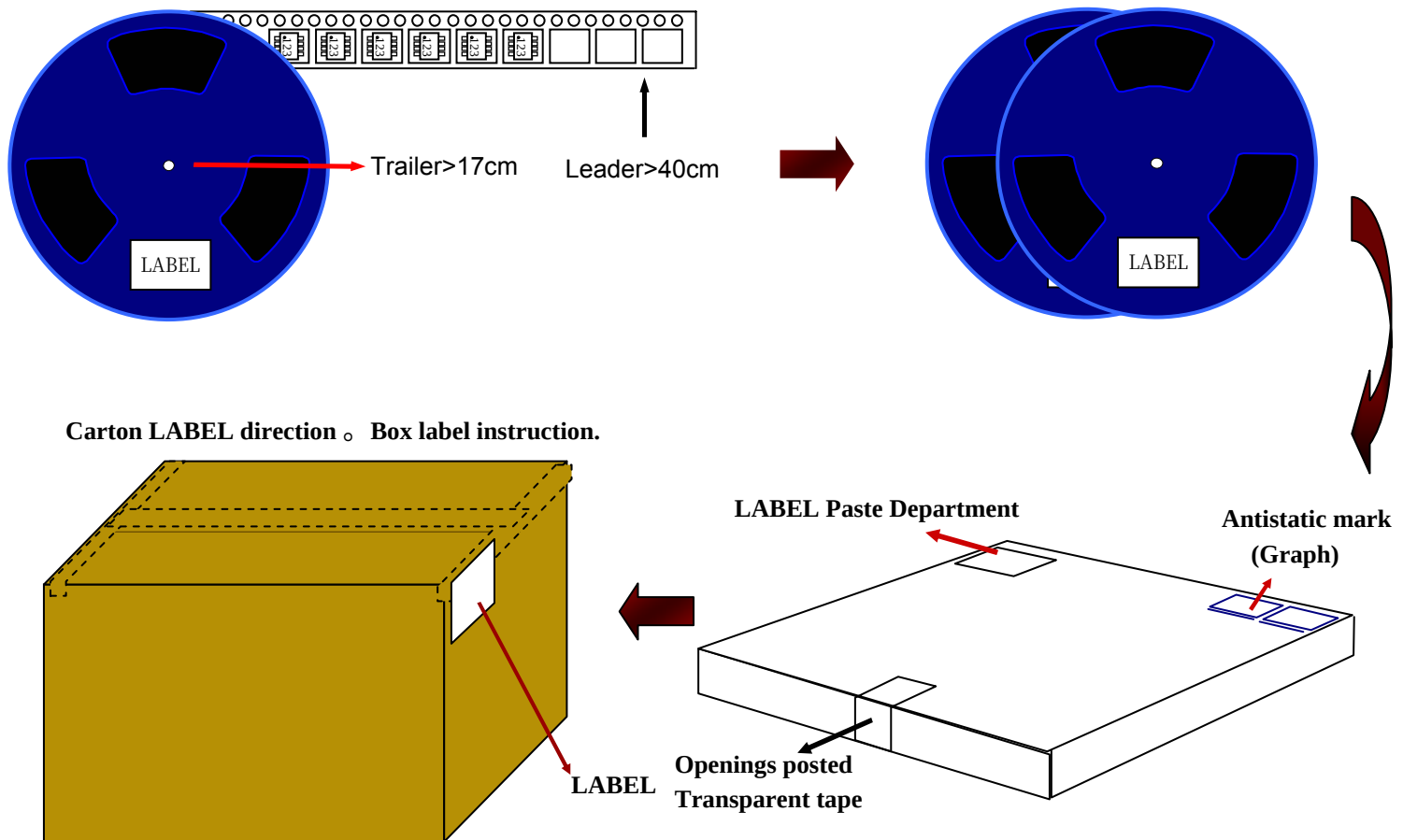
Package	Packing Option	Immediate Quantity	Intermediate Container	Intermediate Quantity	Outer box Quantity
PR-PAK	13" Reel	3000 pcs (reel)	Box	6000 pcs (2 reels)	30 K (5Box)



A-A SECTION

symbol	A_0	B_0	K_0	P_0	P_1	P_2	T
Spec	6.33 ± 0.1	5.78 ± 0.1	1.18 ± 0.1	4.00 ± 0.1	8.0 ± 0.10	2.0 ± 0.05	0.29 ± 0.02
symbol	E	F	D_0	D_1	W	$10P_0$	
Spec	1.75 ± 0.1	5.5 ± 0.05	1.50 ± 0.10	1.5 ± 0.25	$12.0^{+0.3}_{-0.1}$	40.0 ± 0.2	

Packing Method



Note:

- 1 exclusive white color box.
- 2 Use 10cm yellow tape to fixed on reel tall and add put a protect ring.
- 3 Full box use transparent tape must sticked of pizza box.
- 4 It must use padding to fix to prevent movement if container is not full with products.

Ordering Information:

Device PN	Packing
SPR60N04 -T ⁽¹⁾ H ⁽²⁾ -WS	Tape&Reel: 3 Kpcs/Reel

Note: (1) Packing code, Tape & Reel Packing

(2) Haloge free product for packing code suffix "H"

*****Disclaimer*****

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