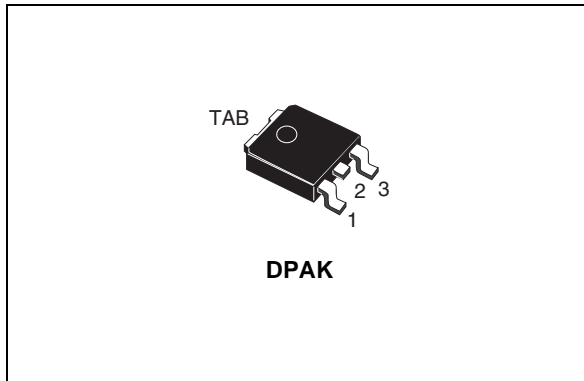


Automotive P-channel 40 V, 15 mΩ typ., 50 A, STripFET™ VII DeepGATE™ Power MOSFET in a DPAK package

Datasheet - preliminary data



Features

Order code	V _{DSS}	R _{DS(on)} max	I _D
STD45P4LLF6	40 V	15 mΩ	50 A

- Designed for automotive applications
- 100% avalanche tested
- Logic level
- 175°C junction temperature

Applications

- Switching applications

Description

This device utilizes the 7th generation of design rules of ST's proprietary STripFET™ technology, with a new gate structure. The resulting Power MOSFET exhibits the lowest R_{DS(on)} in all packages.

Figure 1. Internal schematic diagram

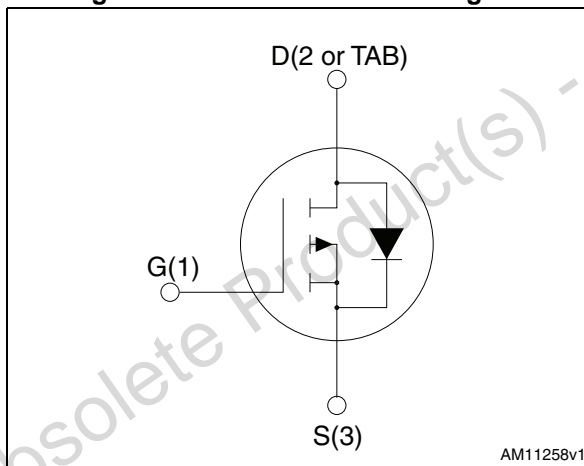


Table 1. Device summary

Order code	Marking	Package	Packaging
STD45P4LLF6	45P4LLF6	DPAK	Tape and reel

Note: For the P-channel Power MOSFETs the actual polarity of the voltages and the current must be reversed.

Contents

1	Electrical ratings	3
2	Electrical characteristics	4
3	Test circuits	5
4	Package mechanical data	6
5	Packaging mechanical data	7
6	Packaging mechanical data	10
7	Revision history	12

Obsolete Product(s) - Obsolete Product(s)



1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	40	V
V_{GS}	Gate-source voltage	± 20	V
I_D	Drain current (continuous) at $T_C = 25\text{ }^\circ\text{C}$	50	A
I_D	Drain current (continuous) at $T_C = 100\text{ }^\circ\text{C}$	35	A
$I_{DM}^{(1)}$	Drain current (pulsed)	200	A
$P_{TOT}^{(1)}$	Total dissipation at $T_C = 25\text{ }^\circ\text{C}$	70	W
T_J	Storage temperature	-55 to 175	$^\circ\text{C}$

1. Pulse width limited by safe operating area.

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case max	2.14	$^\circ\text{C/W}$
$R_{thj-pcb}^{(1)}$	Thermal resistance junction-pcb max	35	$^\circ\text{C/W}$

1. When mounted on FR-4 board, 1 inch², 2 oz Cu, $t < 10$ sec

Note: For the P-channel Power MOSFETs the actual polarity of the voltages and the current must be reversed.

2 Electrical characteristics

($T_{CASE} = 25\text{ °C}$ unless otherwise specified)

Table 4. Static

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown Voltage	$V_{GS} = 0, I_D = 250\ \mu A$	40			V
I_{DSS}	Zero gate voltage drain current	$V_{GS} = 0, V_{DS} = 40\ V$			1	μA
		$V_{GS} = 0, V_{DS} = 40\ V,$ $T_C = 125\text{ °C}$			10	μA
I_{GSS}	Gate body leakage current	$V_{DS} = 0, V_{GS} = \pm 20\ V$			± 100	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu A$		1.5		V
$R_{DS(on)}$	Static drain-source on- resistance	$V_{GS} = 10\ V, I_D = 25\ A$			15	m Ω
		$V_{GS} = 4.5\ V, I_D = 25\ A$			20	m Ω

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min	Typ.	Max.	Unit
C_{iss}	Input capacitance	$V_{GS} = 0, V_{DS} = 25\ V,$ $f = 1\ MHz$	-	2900	-	pF
C_{oss}	Output capacitance		-	400	-	pF
C_{rss}	Reverse transfer capacitance		-	153	-	pF
Q_g	Total gate charge	$V_{DD} = 20\ V, I_D = 50\ A$ $V_{GS} = 4.5\ V$ (see Figure 3)	-	30	-	nC

Note: For the P-channel Power MOSFETs the actual polarity of the voltages and the current must be reversed.

3 Test circuits

Figure 2. Switching times test circuit for resistive load

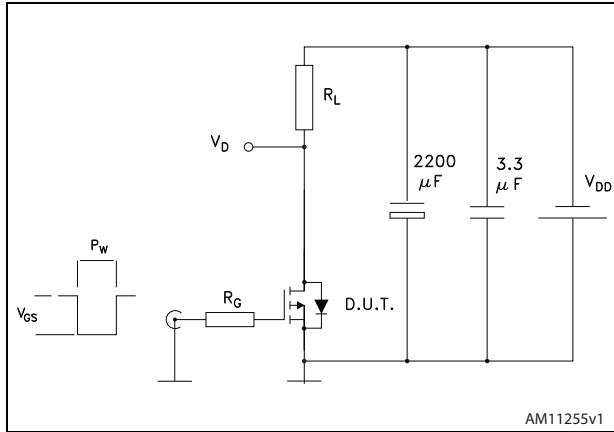


Figure 3. Gate charge test circuit

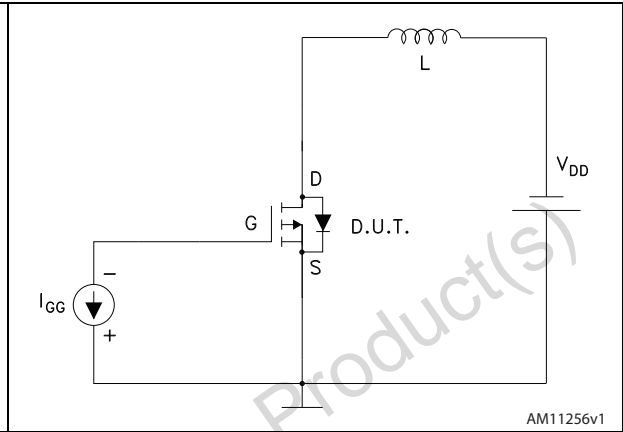
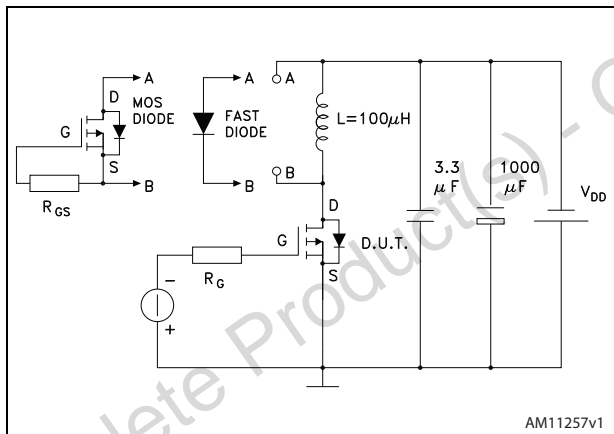


Figure 4. Test circuit for diode recovery behavior



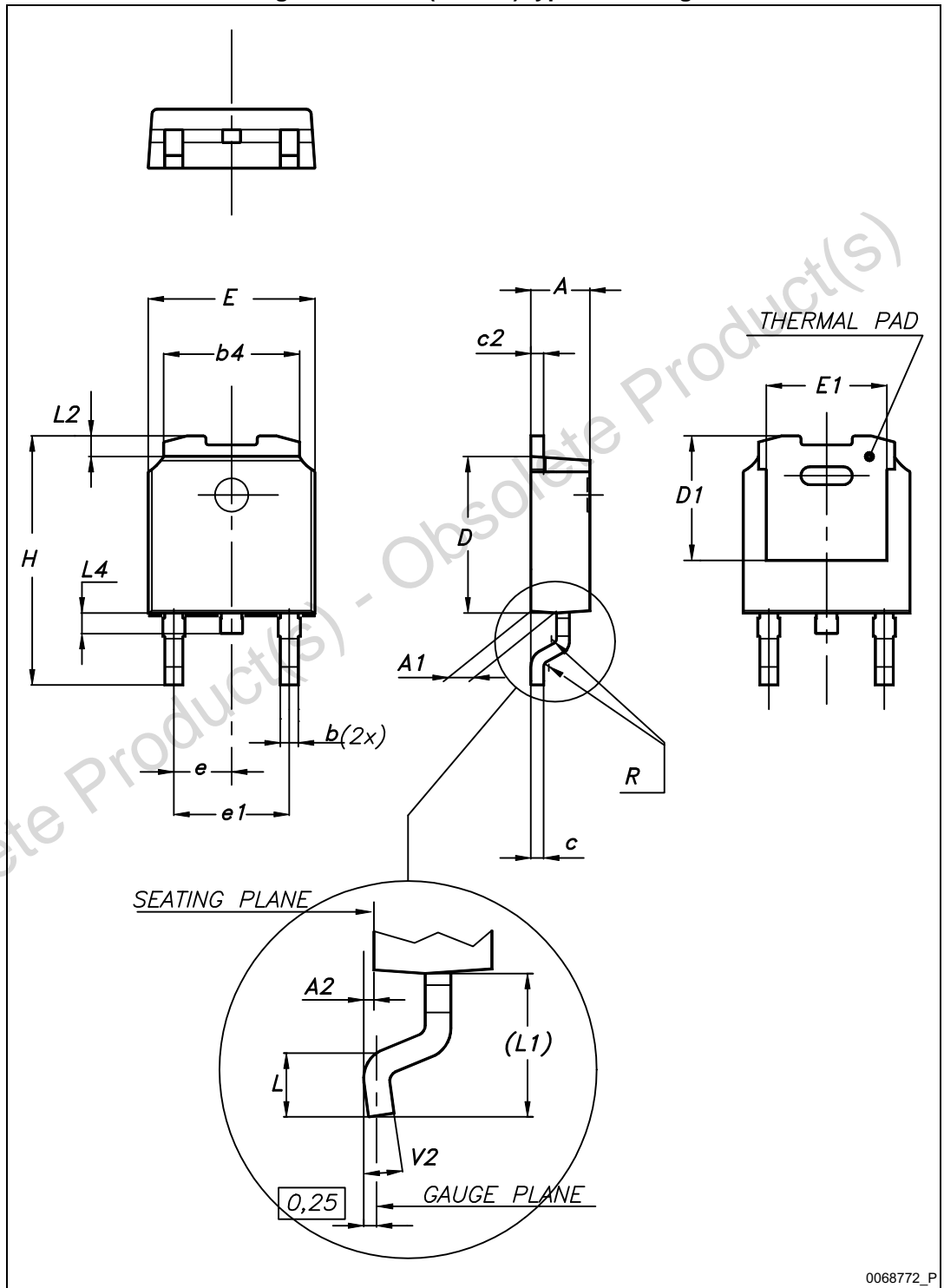
4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

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5 Packaging mechanical data

Figure 5. DPAK (TO-252) type A drawing

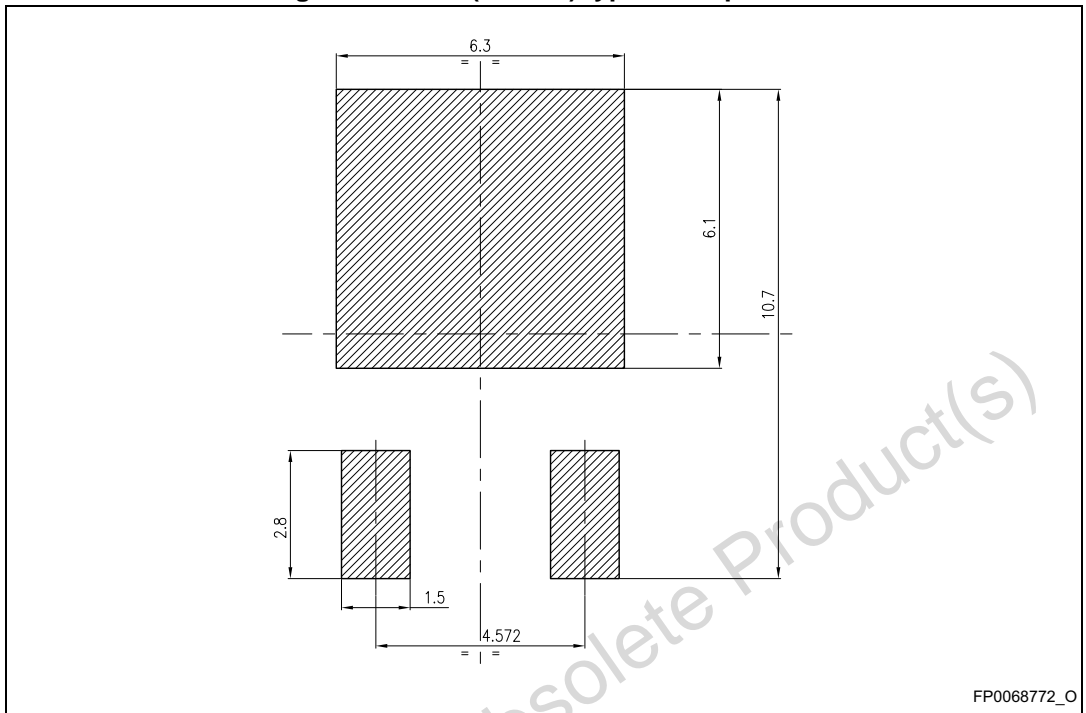


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Table 6. DPAK (TO-252) type A mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	2.20		2.40
A1	0.90		1.10
A2	0.03		0.23
b	0.64		0.90
b4	5.20		5.40
c	0.45		0.60
c2	0.48		0.60
D	6.00		6.20
D1		5.10	
E	6.40		6.60
E1		4.70	
e		2.28	
e1	4.40		4.60
H	9.35		10.10
L	1.00		1.50
(L1)		2.80	
L2		0.80	
L4	0.60		1.00
R		0.20	
V2	0°		8°

Figure 6. DPAK (TO-252) type A footprint (a)



a. All dimensions are in millimeters

6 Packaging mechanical data

Figure 7. Tape for DPAK (TO-252)

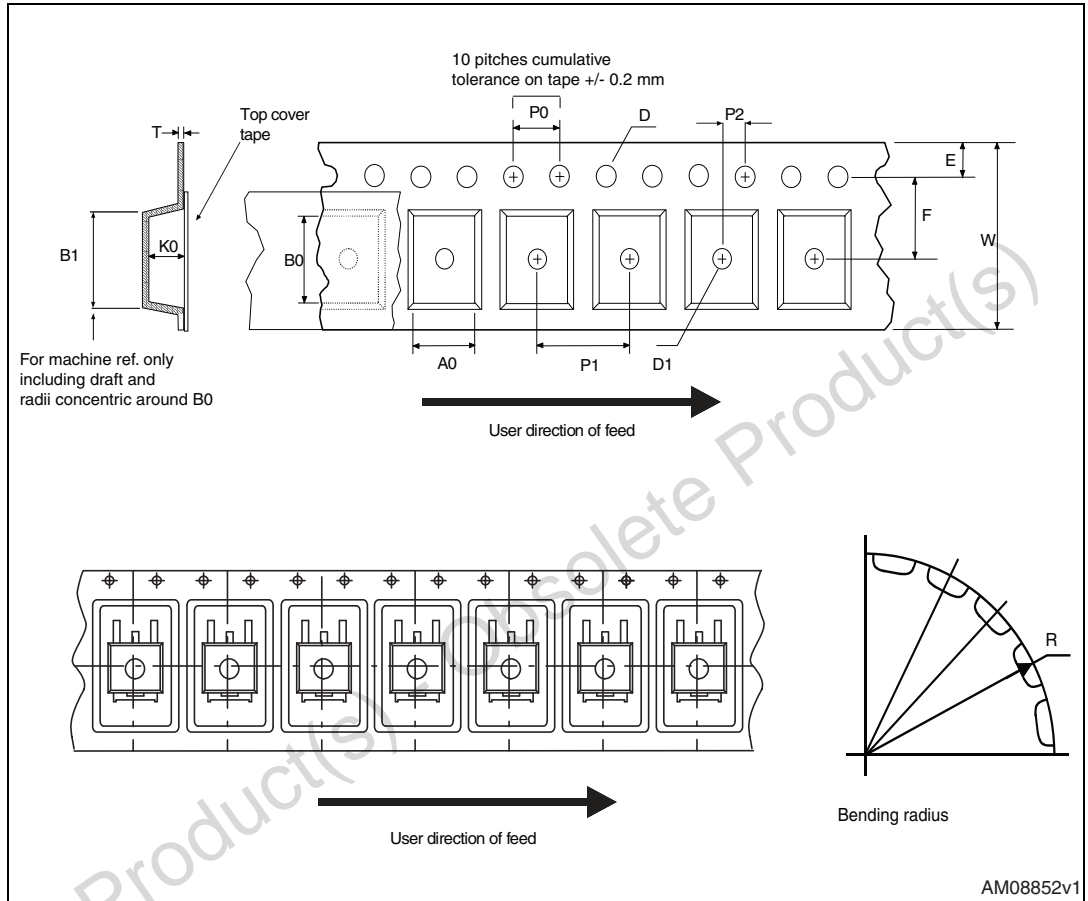


Figure 8. Reel for DPAK (TO-252)

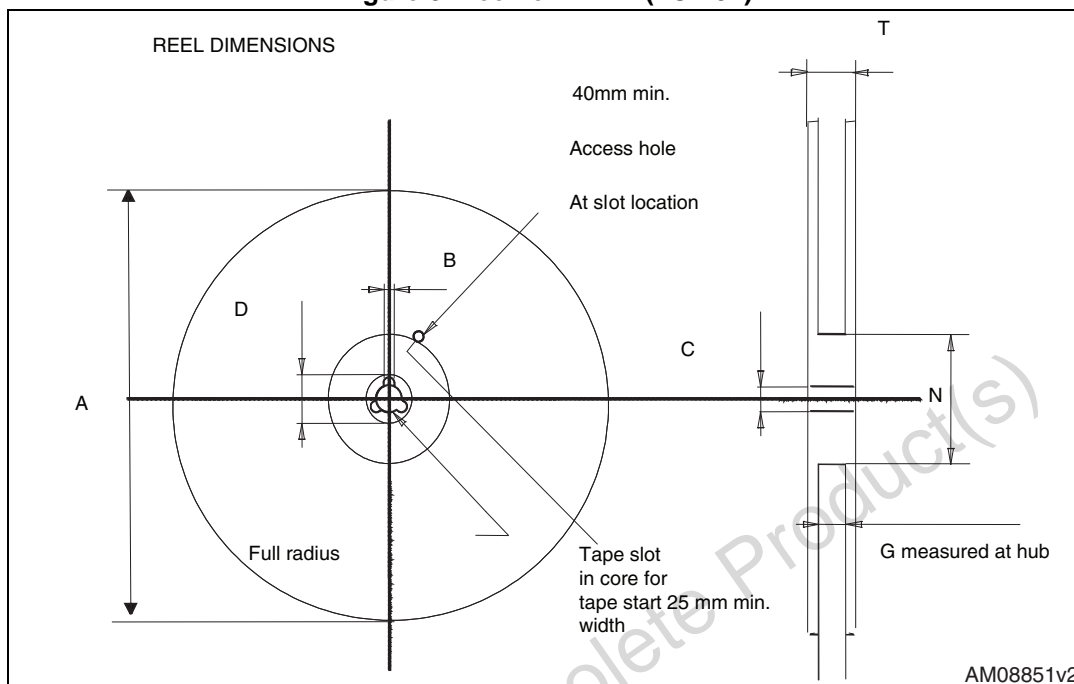


Table 7. DPAK (TO-252) tape and reel mechanical data

Tape			Reel		
Dim.	mm		Dim.	mm	
	Min.	Max.		Min.	Max.
A0	6.8	7	A		330
B0	10.4	10.6	B	1.5	
B1		12.1	C	12.8	13.2
D	1.5	1.6	D	20.2	
D1	1.5		G	16.4	18.4
E	1.65	1.85	N	50	
F	7.4	7.6	T		22.4
K0	2.55	2.75			
P0	3.9	4.1		Base qty.	2500
P1	7.9	8.1		Bulk qty.	2500
P2	1.9	2.1			
R	40				
T	0.25	0.35			
W	15.7	16.3			

7 Revision history

Table 8. Document revision history

Date	Revision	Changes
05-Jun-2014	1	First release

Obsolete Product(s) - Obsolete Product(s)

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