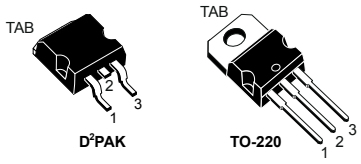
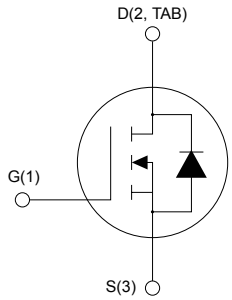
STB26NM60N, STP26NM60N

Datasheet

N-channel 600 V, 135 mΩ typ., 20 A MDmesh II Power MOSFETs in D²PAK and TO-220 packages





Features

Order code	V_{DS}	$R_{DS(on)}$ max.	I_D
STB26NM60N	600 V	165 mΩ	20 A
STP26NM60N			

- 100% avalanche tested
- Low input capacitance and gate charge
- Low gate input resistance

Applications

- Switching applications

Description

These devices are N-channel Power MOSFETs developed using the second generation of MDmesh technology. These revolutionary Power MOSFETs associate a vertical structure to the company's strip layout to yield one of the world's lowest on-resistance and gate charge. They are therefore suitable for the most demanding high-efficiency converters.

STPOWER

Product status links
STB26NM60N
STP26NM60N

Product summary	
Order code	**STB26NM60N**
Marking	26NM60N
Package	D²PAK
Packing	Tape and reel
Order code	**STP26NM60N**
Marking	26NM60N
Package	TO-220
Packing	Tube

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	600	V
V_{GS}	Gate-source voltage	±30	V
I_D	Drain current (continuous) at T_C = 25 °C	20	A
I_D	Drain current (continuous) at T_C = 100 °C	12.6	A
I_{DM}(1)	Drain current (pulsed)	80	A
P_{TOT}	Total power dissipation at T_C = 25 °C	140	W
dv/dt(2)	Peak diode recovery voltage slope	15	V/ns
T_{stg}	Storage temperature range	-55 to 150	°C
T_J	Operating junction temperature range		°C

1. *Pulse width limited by safe operating area.*
2. *I_{SD} ≤ 20 A, di/dt ≤ 400 A/µs, $V_{DS}(peak)$ ≤ $V_{(BR)DSS}$, V_{DD} = 480 V.*

Table 2. Thermal data

Symbol	Parameter	Value		Unit
		D²PAK	TO-220	
R_{thJC}	Thermal resistance, junction-to-case	0.89		°C/W
R_{thJA}	Thermal resistance, junction-to-ambient	30(1)	62.5	°C/W

1. *When mounted on a standard 1 inch² area of FR-4 PCB with 2-oz copper.*

Table 3. Avalanche characteristics

Symbol	Parameter	Value	Unit
I_{AR}	Avalanche current, repetitive or not-repetitive (pulse width limited by T_J max.)	6	A
E_{AS}	Single pulse avalanche energy (starting T_J = 25 °C, I_D = I_{AR}, V_{DD} = 50 V)	610	mJ

2 Electrical characteristics

T_C = 25 °C unless otherwise specified.

Table 4. On/off states

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	I_D = 1 mA, V_{GS} = 0 V	600			V
I_{DSS}	Zero gate voltage drain current	V_{GS} = 0 V, V_{DS} = 600 V			1	µA
		V_{GS} = 0 V, V_{DS} = 600 V, T_C = 125 °C(1)			100	
I_{GSS}	Gate body leakage current	V_{DS} = 0 V, V_{GS} = ±30 V			±100	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS} = V_{GS}, I_D = 250 µA	2	3	4	V
$R_{DS(on)}$	Static drain-source on resistance	V_{GS} = 10 V, I_D = 10 A		135	165	mΩ

1. *Specified by design, not tested in production.*

Table 5. Dynamic

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance	V_{DS} = 50 V, f = 1 MHz, V_{GS} = 0 V	-	1800	-	pF
C_{oss}	Output capacitance		-	115	-	pF
C_{rss}	Reverse transfer capacitance		-	6	-	pF
$C_{oss\ eq.}$(1)	Equivalent output capacitance	V_{DS} = 0 to 480 V, V_{GS} = 0 V	-	310	-	pF
R_g	Gate input resistance	f = 1 MHz, open drain	-	2.8	-	Ω
Q_g	Total gate charge	V_{DD} = 480 V, I_D = 20 A, V_{GS} = 0 to 10 V (see the Figure 13. Test circuit for gate charge behavior)	-	60	-	nC
Q_{gs}	Gate-source charge		-	8.5	-	nC
Q_{gd}	Gate-drain charge		-	30	-	nC

1. *$C_{oss\ eq.}$ is defined as a constant equivalent capacitance giving the same charging time as C_{oss} when V_{DS} increases from 0 to 80% V_{DSS}.*

Table 6. Switching times

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	V_{DD} = 300 V, I_D = 10 A, R_G = 4.7 Ω, V_{GS} = 10 V (see the Figure 12. Test circuit for resistive load switching times and Figure 17. Switching time waveform)	-	13	-	ns
t_r	Rise time		-	25	-	ns
$t_{d(off)}$	Turn-off delay time		-	85	-	ns
t_f	Fall time		-	50	-	ns

Table 7. Source-drain diode

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain current		-		20	A
I_{SDM}(1)	Source-drain current (pulsed)		-		80	A
V_{SD}(2)	Forward on voltage	I_{SD} = 20 A, V_{GS} = 0 V	-		1.5	V
t_{rr}	Reverse recovery time	I_{SD} = 20 A, di/dt = 100 V, V_{DD} = 60 V (see the Figure 14. Test circuit for inductive load switching and diode recovery times)	-	370		ns
Q_{rr}	Reverse recovery charge		-	5.8		µC
I_{RRM}	Reverse recovery current		-	31.6		A
t_{rr}	Reverse recovery time	I_{SD} = 20 A, di/dt = 100 A/µs, V_{DD} = 60 V T_J = 150 °C (see the Figure 14. Test circuit for inductive load switching and diode recovery times)	-	450		ns
Q_{rr}	Reverse recovery charge		-	7.5		µC
I_{RRM}	Reverse recovery current		-	32.5		A

1. *Pulse width limited by safe operating area.*
2. *Pulsed: pulse duration = 300 µs, duty cycle 1.5%.*

2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

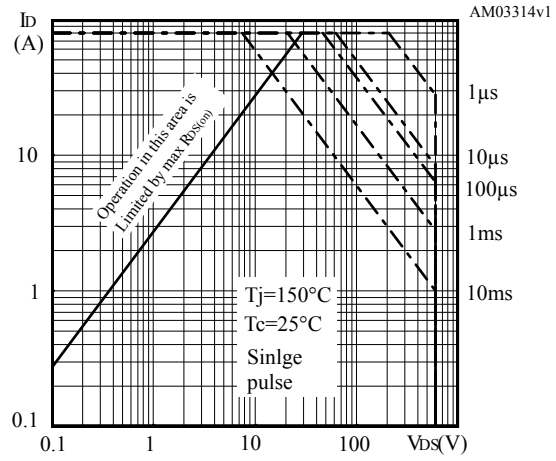


Figure 2. Normalized transient thermal impedance

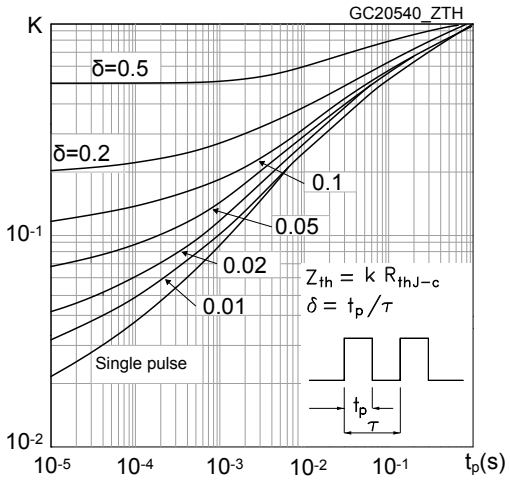


Figure 3. Typical output characteristics

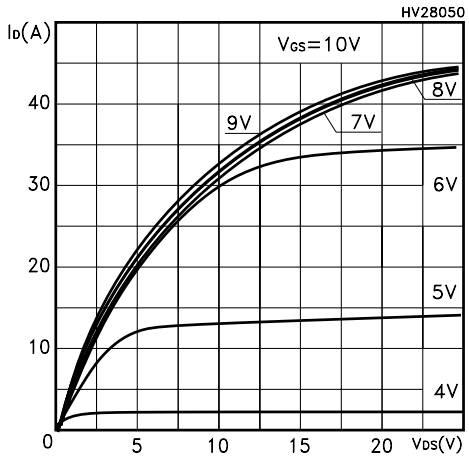


Figure 4. Typical transfer characteristics

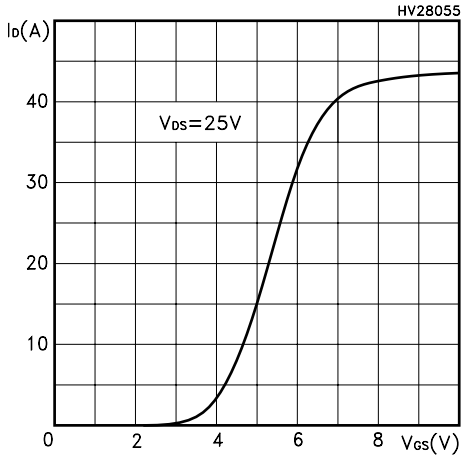


Figure 5. Typical gate charge vs gate-source voltage

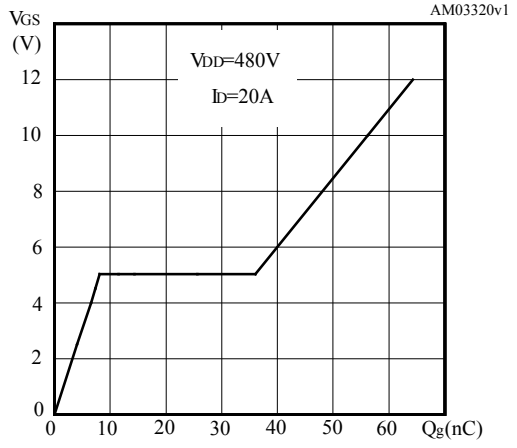


Figure 6. Typical drain-source on-resistance

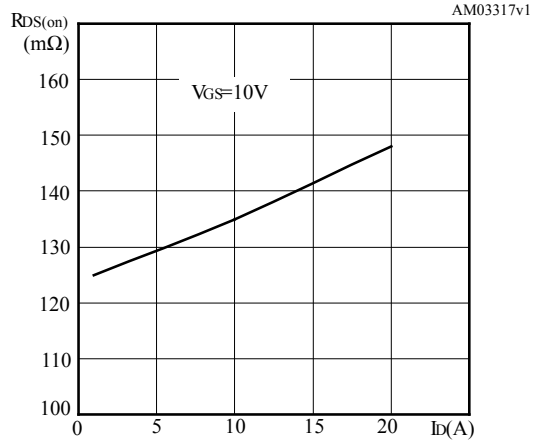


Figure 7. Typical capacitance characteristics

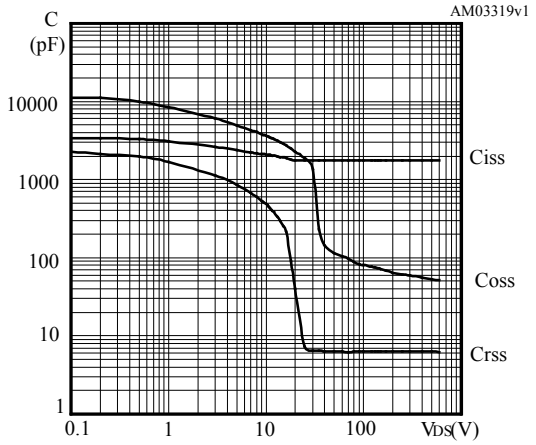


Figure 8. Normalized gate threshold vs temperature

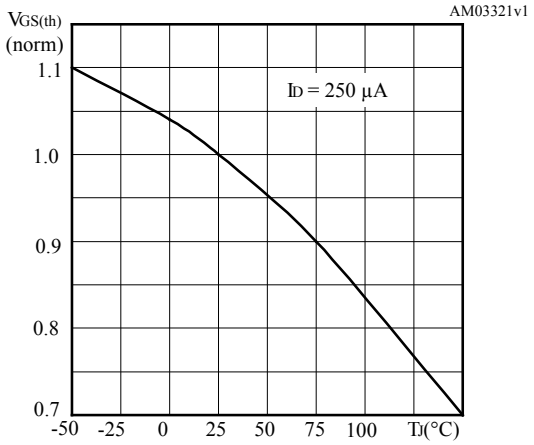


Figure 9. Normalized on-resistance vs temperature

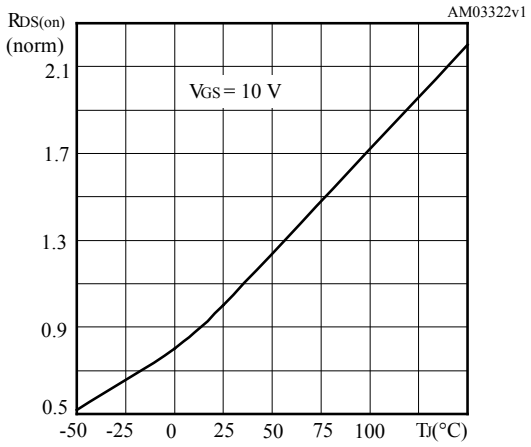


Figure 10. Normalized breakdown voltage vs temperature

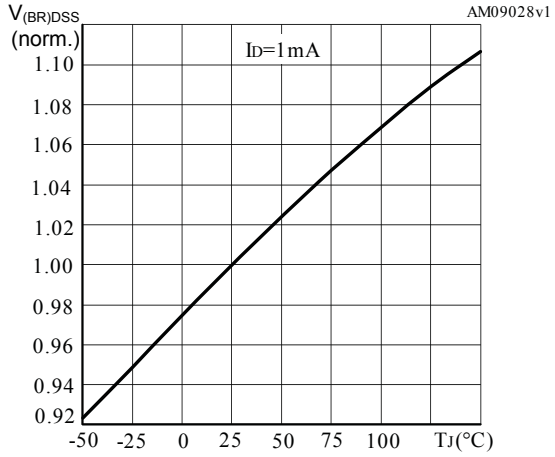
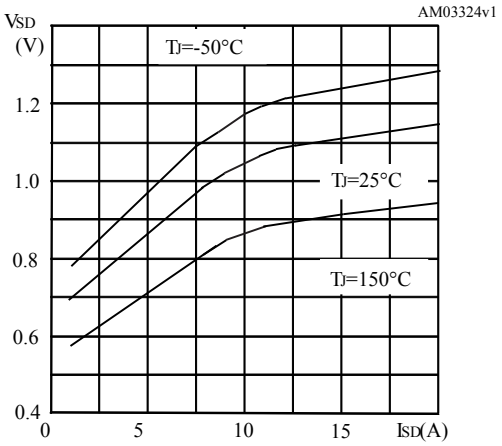
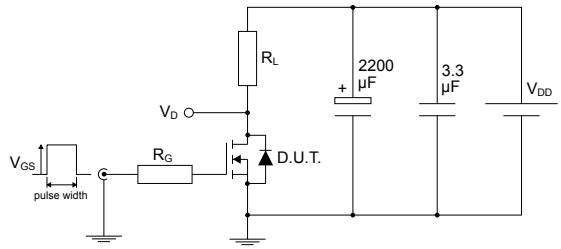


Figure 11. Typical reverse diode forward characteristics



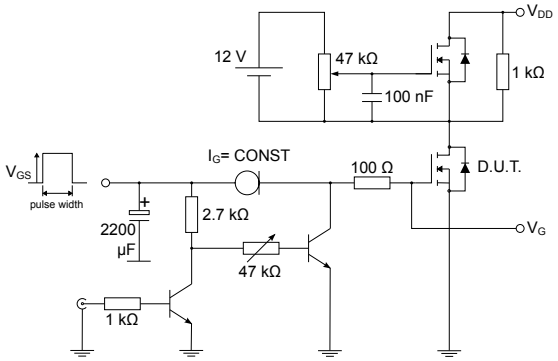
3 Test circuits

Figure 12. Test circuit for resistive load switching times



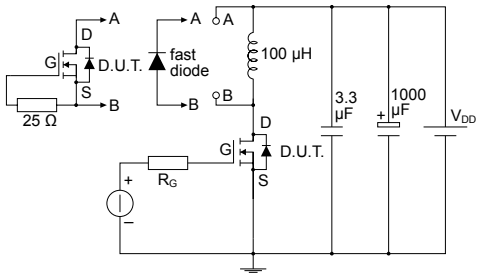
AM01468v1

Figure 13. Test circuit for gate charge behavior



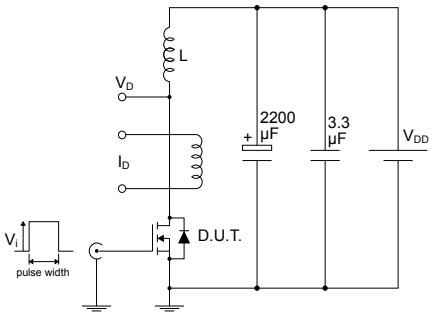
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Figure 14. Test circuit for inductive load switching and diode recovery times



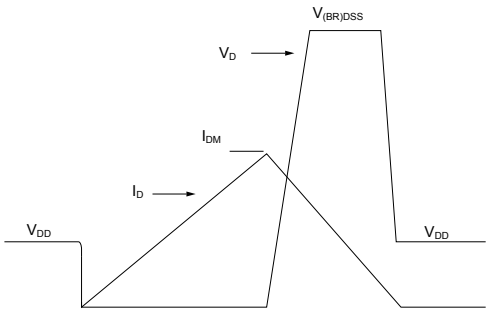
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Figure 15. Unclamped inductive load test circuit



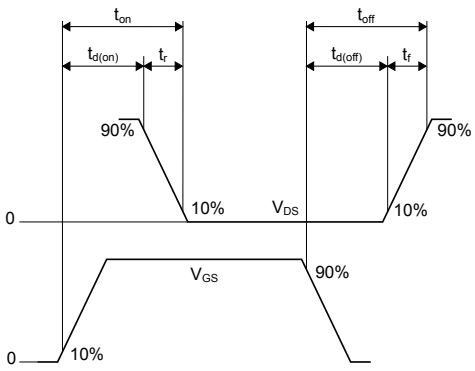
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Figure 16. Unclamped inductive waveform



AM01472v1

Figure 17. Switching time waveform



AM01473v1

4 Package information

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.

4.1 D²PAK (TO-263) type A package information

Figure 18. **D²PAK (TO-263) type A package outline**

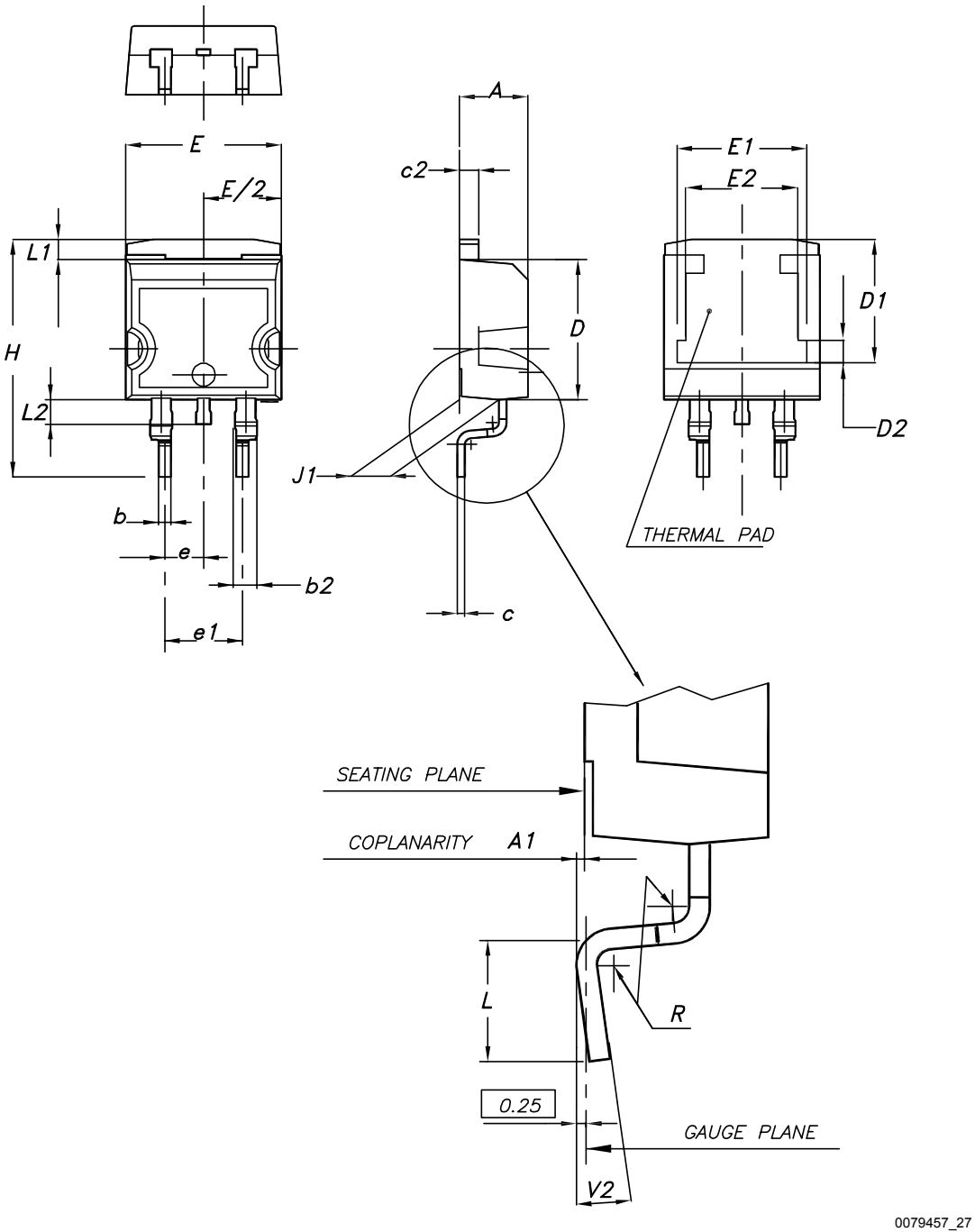
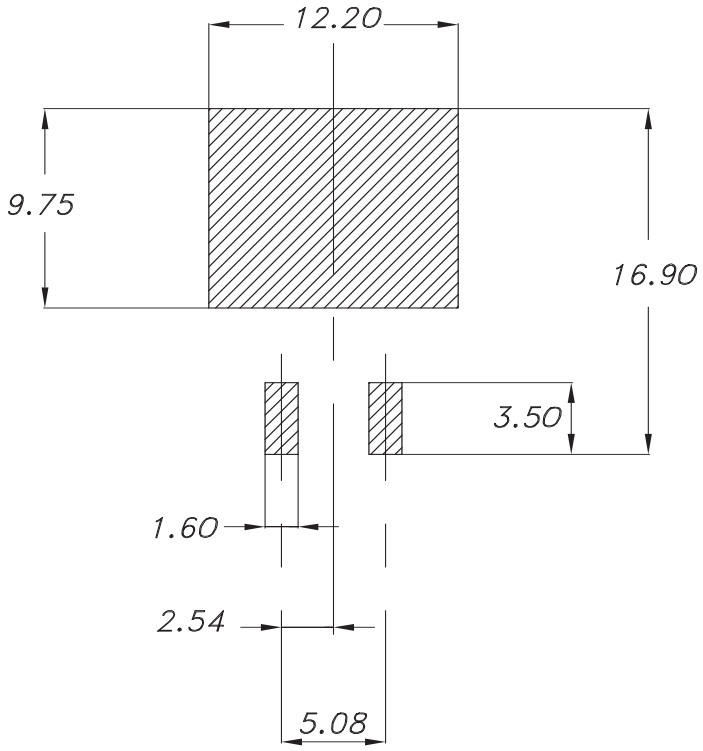


Table 8. D²PAK (TO-263) type A package mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
A1	0.03		0.23
b	0.70		0.93
b2	1.14		1.70
c	0.45		0.60
c2	1.23		1.36
D	8.95		9.35
D1	7.50	7.75	8.00
D2	1.10	1.30	1.50
E	10.00		10.40
E1	8.30	8.50	8.70
E2	6.85	7.05	7.25
e		2.54	
e1	4.88		5.28
H	15.00		15.85
J1	2.49		2.69
L	2.29		2.79
L1	1.27		1.40
L2	1.30		1.75
R		0.40	
V2	0°		8°

Figure 19. D²PAK (TO-263) recommended footprint (dimensions are in mm)



4.2 TO-220 type A package information

Figure 20. **TO-220 type A package outline**

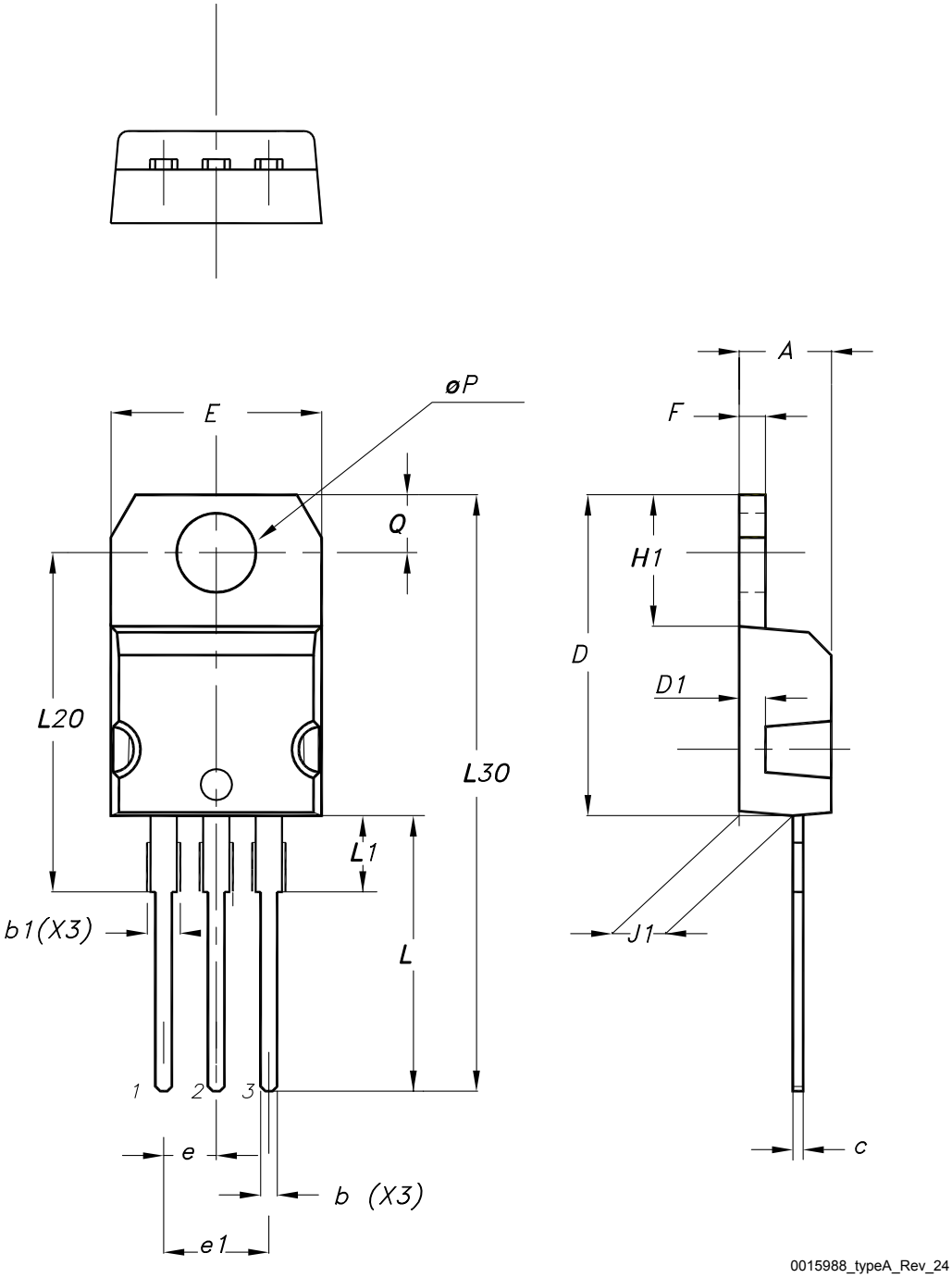
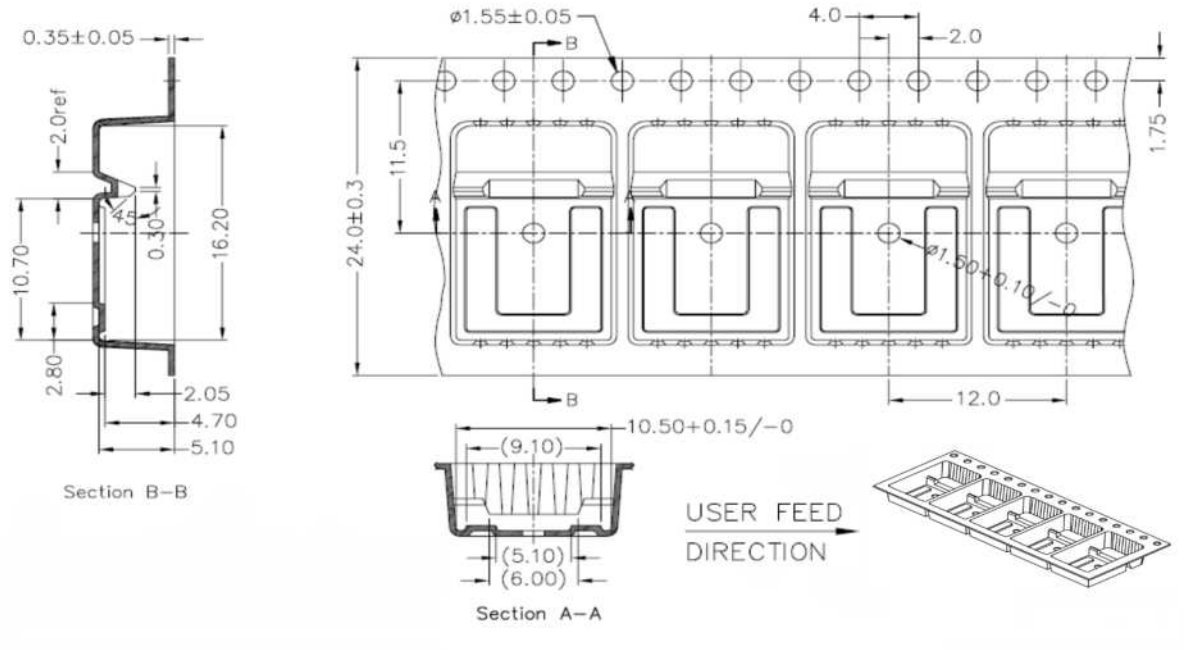


Table 9. **TO-220 type A package mechanical data**

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.55
c	0.48		0.70
D	15.25		15.75
D1		1.27	
E	10.00		10.40
e	2.40		2.70
e1	4.95		5.15
F	1.23		1.32
H1	6.20		6.60
J1	2.40		2.72
L	13.00		14.00
L1	3.50		3.93
L20		16.40	
L30		28.90	
øP	3.75		3.85
Q	2.65		2.95
Slug flatness		0.03	0.10

4.3 D²PAK packing information

Figure 21. **D²PAK tape drawing (dimensions are in mm)**



DM01095771_2

Revision history

Table 10. **Document revision history**

Date	Version	Changes
29-Apr-2009	1	First release.
17-Dec-2009	2	Added new package, mechanical data: D²PAK
20-Jun-2011	3	Inserted device in I²PAK.
13-Mar-2012	4	Updated P_{TOT} and derating factor in *Table 2*. Update $R_{thj\text{-}case}$ for TO-220FP in *Table 3*. Update *Figure 10* and *Figure 15*. Update *Section 5: Packaging mechanical data*.
20-Jun-2012	5	Updated title on the cover page. Minor text changes.
09-Sep-2013	6	– The part numbers STI26NM60N and STW26NM60N have been moved to the separate datasheets – Modified: V_{GS} value in *Table 2*.
12-Dec-2016	7	The part number STF26NM60N has been moved to a separate datasheet. Modified *Table 2: "Absolute maximum ratings"*, *Table 3: "Thermal data"*, *Table 5: "On/off states"*, *Table 6: "Dynamic"* and *Table 7: "Switching times"*. Modified *Section 2.1: "Electrical characteristics (curves)"*. Minor text changes.
12-Sep-2025	8	Updated Section 4: Package information. Minor text changes.

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