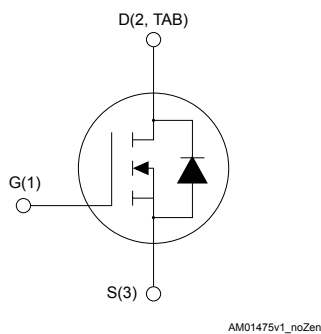
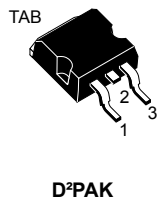


N-channel 55 V, 6.5 mΩ typ., 80 A STripFET II Power MOSFET in a D²PAK package



Product status link

[STB140NF55T4](#)

Product summary

Order code	STB140NF55T4
Marking	B140NF55
Package	D ² PAK
Packing	Tape and reel

Features

Order code	V _{DS}	R _{DS(on)} max.	I _D
STB140NF55T4	55 V	8 mΩ	80 A

- Exceptional dv/dt capability
- Low gate charge
- 100% avalanche tested

Applications

- Motor control
- High current, switching application

Description

This Power MOSFET has been developed using STMicroelectronics' unique STripFET process, which is specifically designed to minimize input capacitance and gate charge. This renders the device suitable for use as primary switch in advanced high-efficiency isolated DC-DC converters for telecom and computer applications, and applications with low gate charge driving requirements.

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	55	V
V_{GS}	Gate-source voltage	± 20	V
$I_D^{(1)}$	Drain current (continuous) at $T_C = 25\text{ }^\circ\text{C}$	80	A
	Drain current (continuous) at $T_C = 100\text{ }^\circ\text{C}$	80	
$I_{DM}^{(2)}$	Drain current (pulsed)	320	A
P_{TOT}	Total power dissipation at $T_C = 25\text{ }^\circ\text{C}$	300	W
$dv/dt^{(3)}$	Peak diode recovery voltage slope	10	V/ns
T_{stg}	Storage temperature range	-55 to 175	$^\circ\text{C}$
T_J	Operating junction temperature range		$^\circ\text{C}$

1. Limited by package.
2. Pulse width limited by safe operating area.
3. $I_{SD} \leq 80\text{ A}$, $di/dt \leq 300\text{ A}/\mu\text{s}$, $V_{DD} = 44\text{ V}$.

Table 2. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance, junction-to-case	0.5	$^\circ\text{C}/\text{W}$
$R_{thJA}^{(1)}$	Thermal resistance, junction-to-ambient	35	$^\circ\text{C}/\text{W}$

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 non-repetitive (pulse width limited by T_J max.)	40	A
E_{AS}	Single pulse avalanche energy (starting $T_J = 25\text{ }^\circ\text{C}$, $I_D = I_{AR}$, $V_{DD} = 30\text{ V}$)	1.3	J

2 Electrical characteristics

$T_C = 25\text{ °C}$ unless otherwise specified.

Table 4. On/off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	$I_D = 250\text{ }\mu\text{A}$, $V_{GS} = 0\text{ V}$	55			V
I_{DSS}	Zero gate voltage drain current	$V_{GS} = 0\text{ V}$, $V_{DS} = 55\text{ V}$			1	μA
		$V_{GS} = 0\text{ V}$, $V_{DS} = 55\text{ V}$, $T_C = 125\text{ °C}^{(1)}$			10	
I_{GSS}	Gate-body leakage current	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$			± 100	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	2	3	4	V
$R_{DS(on)}$	Static drain-source on-resistance	$V_{GS} = 10\text{ V}$, $I_D = 40\text{ A}$		6.5	8	m Ω

1. Specified by design, not tested in production.

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance	$V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$, $V_{GS} = 0\text{ V}$	-	5300	-	pF
C_{oss}	Output capacitance		-	1000	-	pF
C_{rss}	Reverse transfer capacitance		-	290	-	pF
Q_g	Total gate charge	$V_{DD} = 44\text{ V}$, $I_D = 80\text{ A}$, $V_{GS} = 0\text{ to }10\text{ V}$, $R_G = 4.7\text{ }\Omega$ (see Figure 13. Test circuit for gate charge behavior)	-	142	-	nC
Q_{gs}	Gate-source charge		-	27	-	nC
Q_{gd}	Gate-drain charge		-	55	-	nC

Table 6. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	$V_{DD} = 27.5\text{ V}$, $I_D = 40\text{ A}$, $R_G = 4.7\text{ }\Omega$, $V_{GS} = 10\text{ V}$	-	30	-	ns
t_r	Rise time		-	150	-	ns
$t_{d(off)}$	Turn-off delay time	(see Figure 12. Test circuit for resistive load switching times and Figure 17. Switching time waveform)	-	125	-	ns
t_f	Fall time		-	45	-	ns

Table 7. Source-drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain current		-		80	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)		-		320	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 80\text{ A}$, $V_{GS} = 0\text{ V}$	-		1.5	V
t_{rr}	Reverse recovery time	$I_{SD} = 80\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $V_{DD} = 20\text{ V}$, $T_J = 150\text{ °C}$ (see Figure 14. Test circuit for inductive load switching and diode recovery times)	-	90		ns
Q_{rr}	Reverse recovery charge		-	275		nC
I_{RRM}	Reverse recovery current		-	6.5		A

1. Pulse width is limited by safe operating area.

2. Pulsed: pulse duration = 300 μs , duty cycle 1.5%.

2.1 Electrical characteristics (curves)

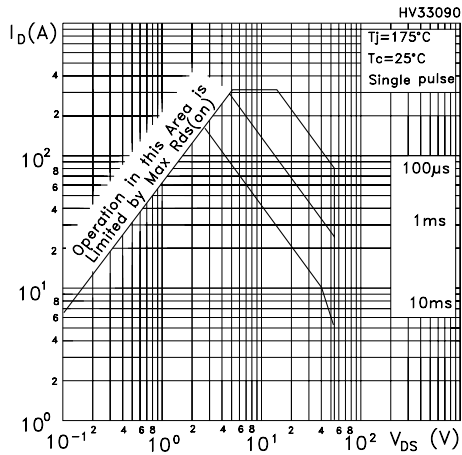
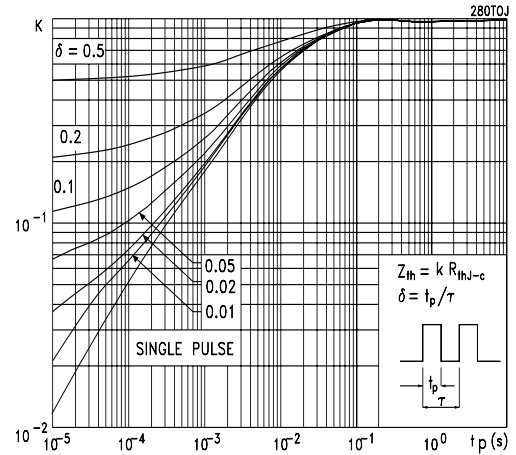
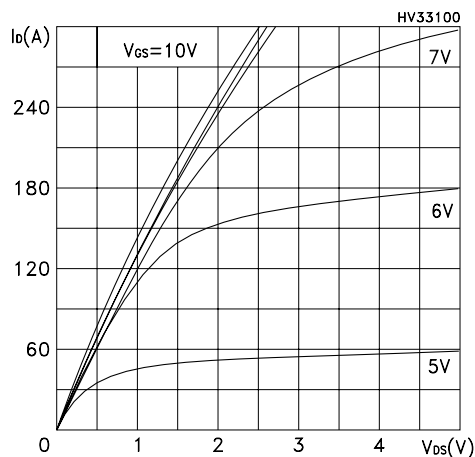
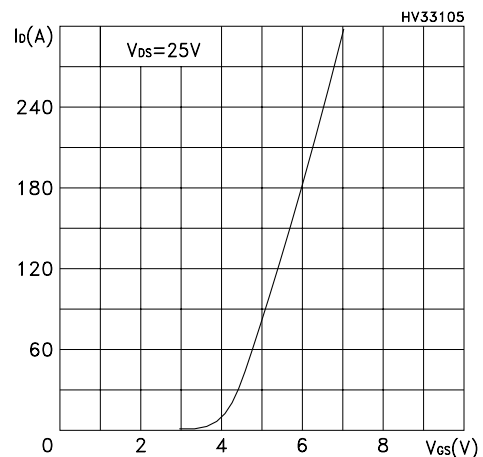
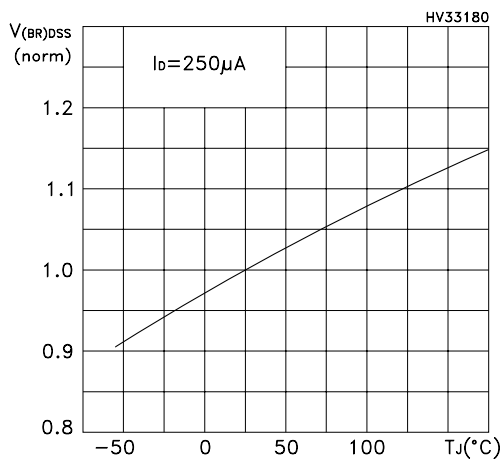
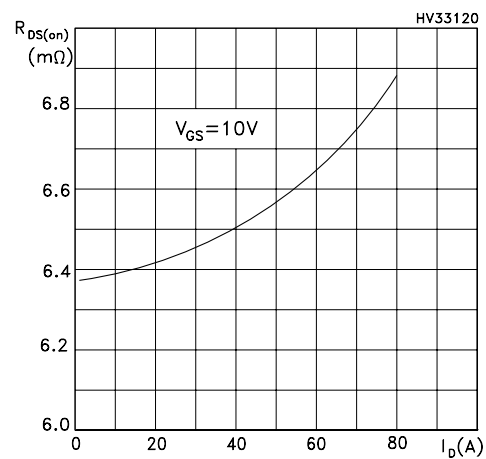
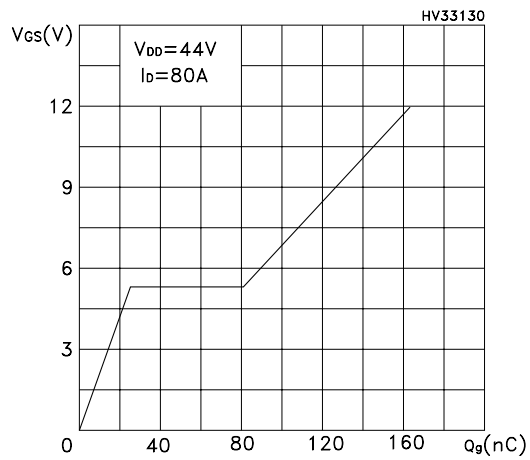
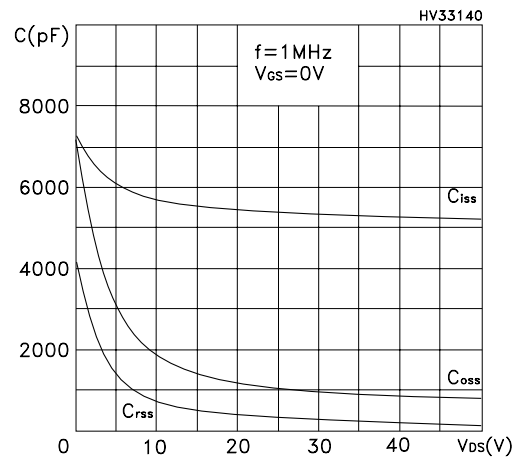
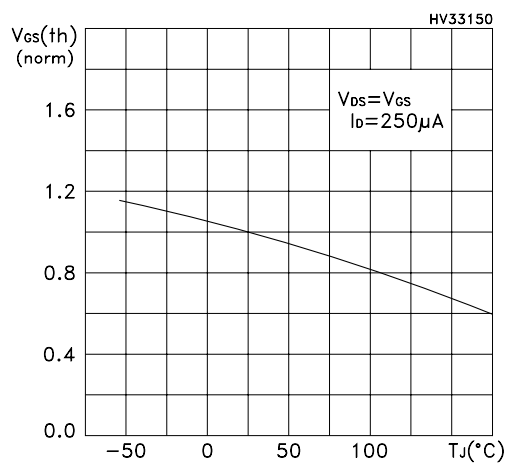
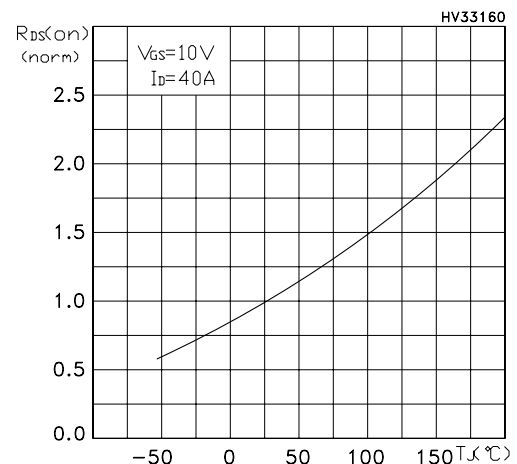
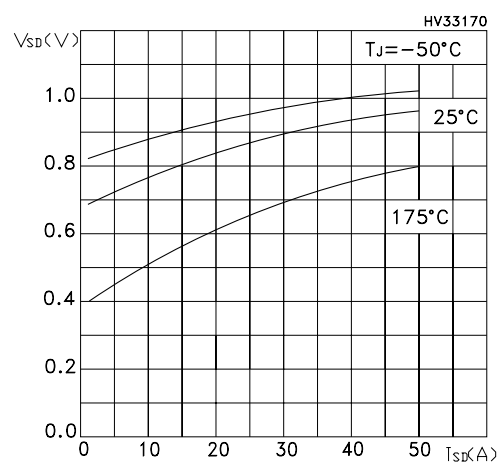
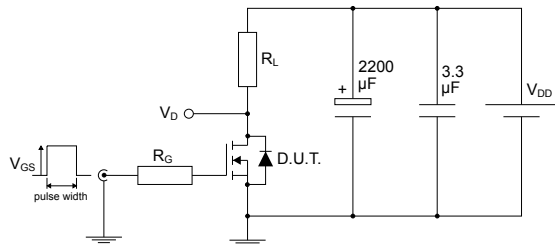
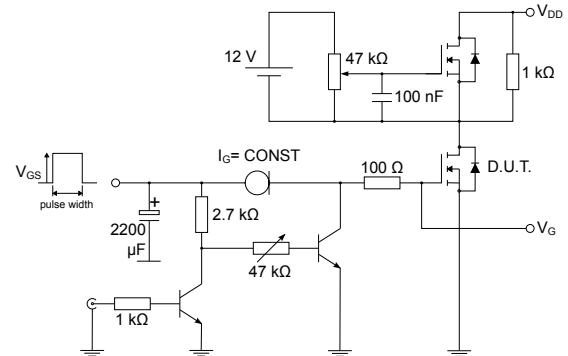
Figure 1. Safe operating area

Figure 2. Normalized transient thermal impedance

Figure 3. Typical output characteristics

Figure 4. Typical transfer characteristics

Figure 5. Normalized breakdown voltage vs temperature

Figure 6. Typical drain-source on-resistance


Figure 7. Typical gate charge characteristics

Figure 8. Typical capacitance characteristics

Figure 9. Normalized gate threshold vs temperature

Figure 10. Normalized on-resistance vs temperature

Figure 11. Typical reverse diode forward characteristics


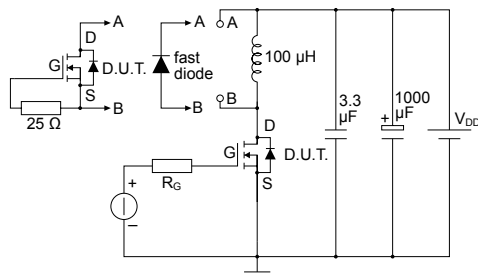
3 Test circuits

Figure 12. Test circuit for resistive load switching times


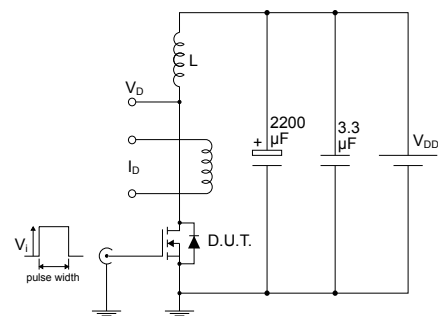
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Figure 13. Test circuit for gate charge behavior


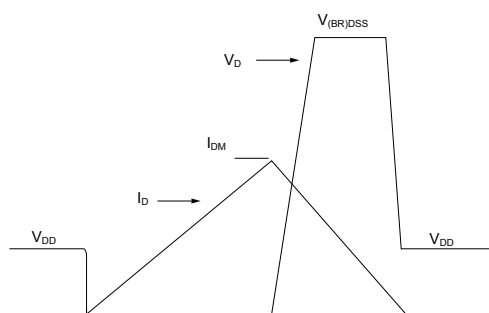
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Figure 14. Test circuit for inductive load switching and diode recovery times


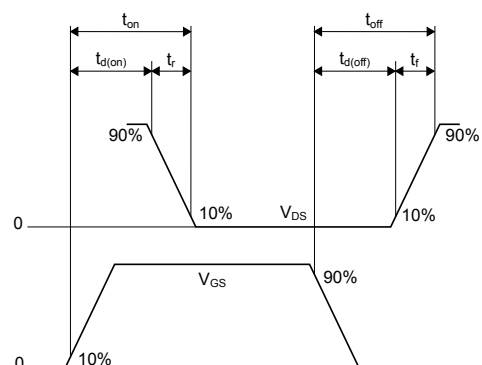
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Figure 15. Unclamped inductive load test circuit


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Figure 16. Unclamped inductive waveform


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Figure 17. Switching time waveform


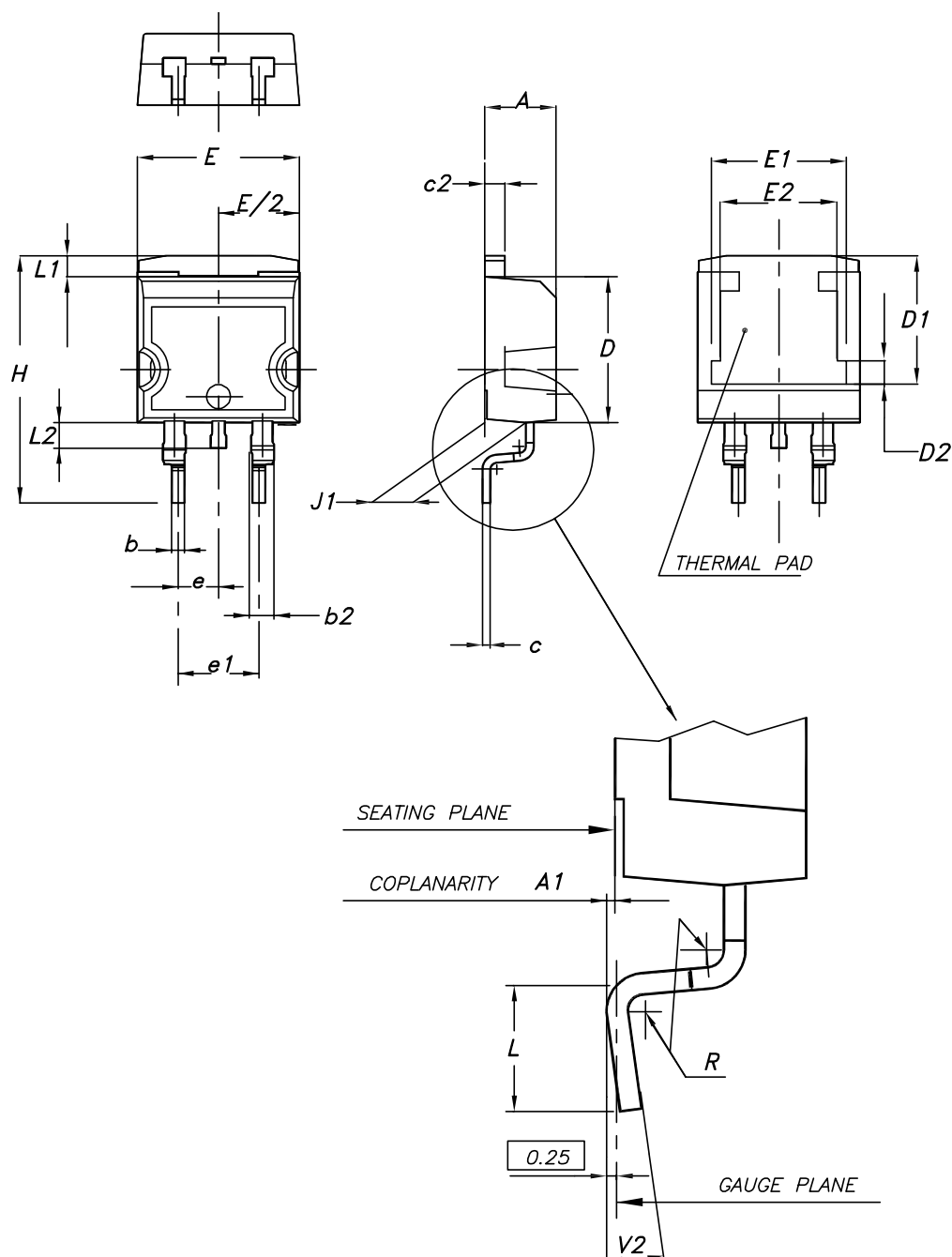
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4 Package information

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

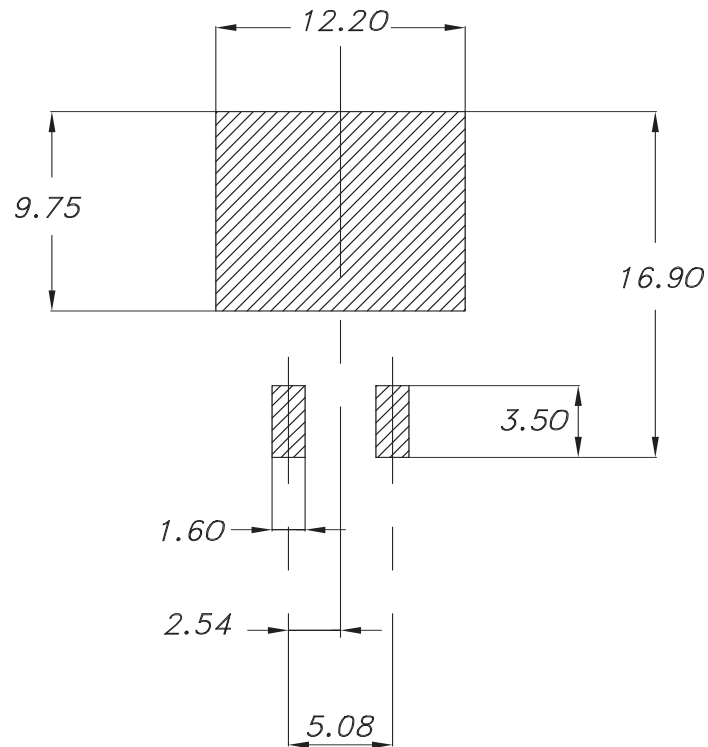


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Table 8. D²PAK (TO-263) type A package mechanical data

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°

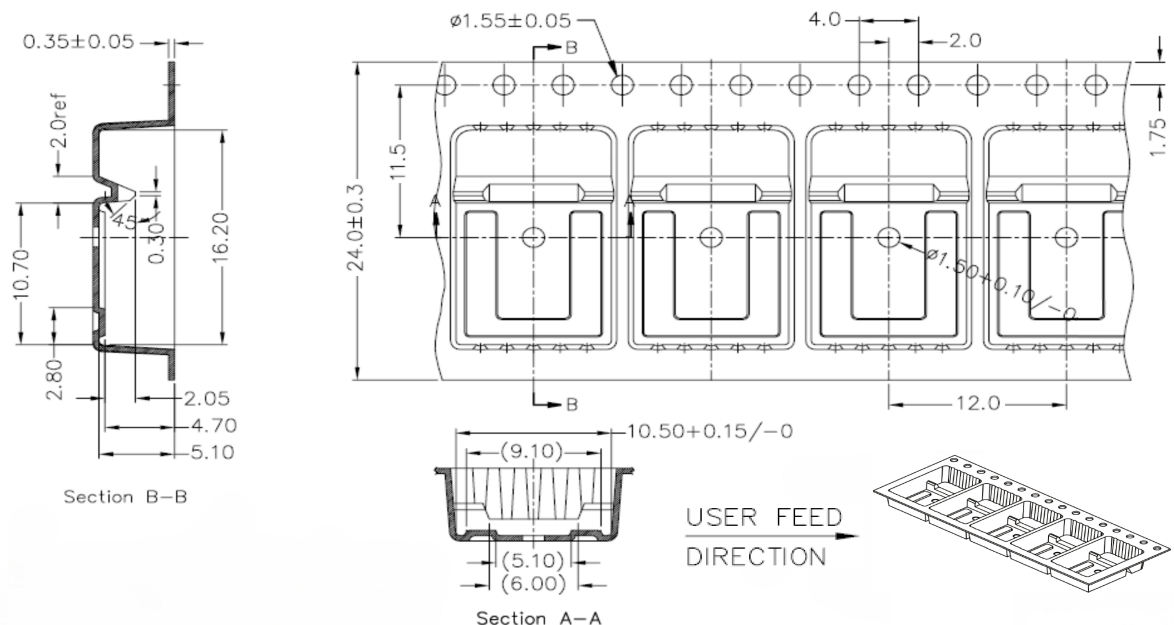
Figure 19. D²PAK (TO-263) recommended footprint (dimensions are in mm)



0079457_Rev27_footprint

4.2 D²PAK packing information

Figure 20. D²PAK tape drawing (dimensions are in mm)



DM01095771_3

Revision history

Table 9. Document revision history

Date	Revision	Changes
14-Oct-2026	1	First release. Part number STB140NF55T4 previously included in datasheet DS4145.

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