

L A M P I R A N

N-channel 68 V, 0.0082 Ω , 98 A, TO-220
STripFET™ II Power MOSFET

Features

Type	V_{DSS}	$R_{DS(on)}$ max	I_D
STP80NF70	68 V	< 0.0098 Ω	98 A

- Exceptional dv/dt capability
- 100% avalanche tested

Application

- Switching applications

Description

The STP80NF70 is a N-channel Power MOSFET realized with STMicroelectronics unique STripFET™ process. It has specifically been designed to minimize input capacitance and gate charge. The device is therefore suitable in advanced high-efficiency switching applications.

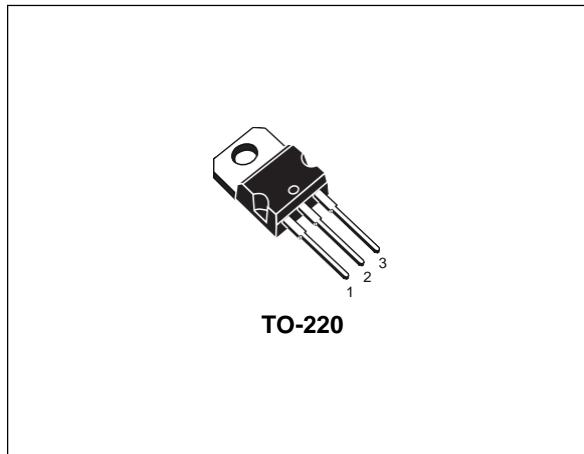


Figure 1. Internal schematic diagram

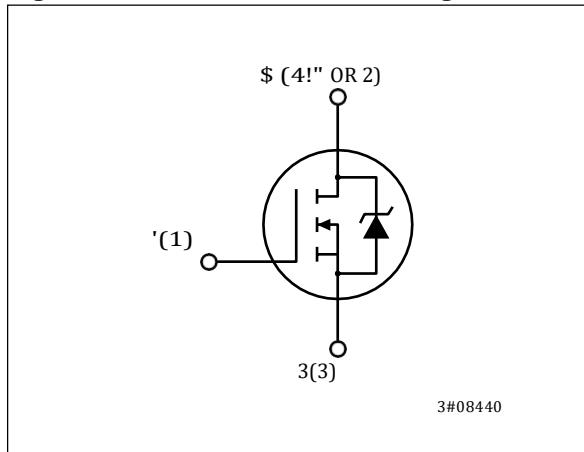


Table 1. Device summary

Order code	Marking	Package	Packaging
STP80NF70	80NF70	TO-220	Tube

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1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage ($V_{GS} = 0$)	68	V
V_{GS}	Gate-source voltage	± 20	V
I_D	Drain current (continuous) at $T_C = 25^\circ\text{C}$	98	A
I_D	Drain current (continuous) at $T_C = 100^\circ\text{C}$	68	A
$I_{DM}^{(1)}$	Drain current (pulsed)	392	A
P_{TOT}	Total dissipation at $T_C = 25^\circ\text{C}$	190	W
	Derating factor	1.27	W/ $^\circ\text{C}$
$dv/dt^{(2)}$	Peak diode recovery voltage slope	13	V/ns
$E_{AS}^{(3)}$	Single pulse avalanche energy	700	mJ
T_{stg}	Storage temperature	-55 to 175	$^\circ\text{C}$
T_J	Operating junction temperature		

1. Pulse width limited by safe operating area.
2. $I_{SD} \leq 80$ A, $di/dt \leq 300$ A/ μs , $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq T_{JMAX}$.
3. Starting $T_J = 25^\circ\text{C}$, $I_D = 40$ A, $V_{DD} = 34$ V.

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case max	0.79	$^\circ\text{C/W}$
$R_{thj-amb}$	Thermal resistance junction-ambient max	62.5	$^\circ\text{C/W}$
T_I	Maximum lead temperature for soldering purpose ⁽¹⁾	300	$^\circ\text{C}$

1. 1.6 mm from case for 10 sec.

2 Electrical characteristics

($T_{CASE}=25^\circ\text{C}$ unless otherwise specified).

Table 4. On/off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	$I_D = 250 \mu\text{A}, V_{GS} = 0$	68			V
I_{DSS}	Zero gate voltage drain current ($V_{GS} = 0$)	$V_{DS} = \text{Max rating}, V_{DS} = \text{Max rating} @ 125^\circ\text{C}$			1 10	μA μA
I_{GSS}	Gate body leakage current ($V_{DS} = 0$)	$V_{GS} = \pm 20 \text{ V}$			± 100	nA
$V_{GS(\text{th})}$	Gate threshold voltage	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	2	3	4	V
$R_{DS(\text{on})}$	Static drain-source on resistance	$V_{GS} = 10 \text{ V}, I_D = 40 \text{ A}$		0.0082	0.0098	Ω

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$g_{fs}^{(1)}$	Forward transconductance	$V_{DS} = 15 \text{ V}, I_D = 40 \text{ A}$	-	60	-	S
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	$V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}, V_{GS} = 0$	-	2550 550 175	-	pF pF pF
Q_g Q_{gs} Q_{gd}	Total gate charge Gate-source charge Gate-drain charge	$V_{DD} = 34 \text{ V}, I_D = 80 \text{ A}$ $V_{GS} = 10 \text{ V}$	-	75 17 30	-	nC nC nC

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

Table 6. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r $t_{d(off)}$ t_f	Turn-on delay time Rise time Turn-off delay time Fall time	$V_{DD} = 34 \text{ V}, I_D = 40 \text{ A}, R_G = 4.7 \Omega, V_{GS} = 10 \text{ V}$ <i>Figure 13 on page 9</i>	-	17 60 90 75	-	ns ns ns ns

Table 7. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain current		-		98	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)		-		392	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 80 \text{ A}, V_{GS} = 0$	-		1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	$I_{SD} = 80 \text{ A},$ $di/dt = 100 \text{ A}/\mu\text{s},$ $V_{DD} = 25 \text{ V}, T_J = 150 \text{ }^\circ\text{C}$ <i>Figure 15 on page 9</i>	-	70 160 4.7		ns nC A

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

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

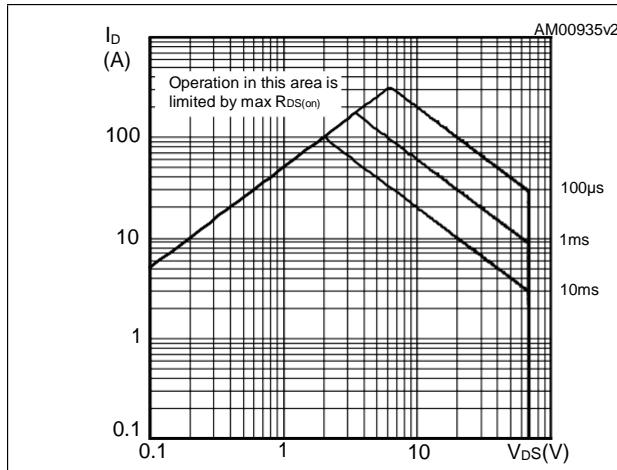


Figure 3. Thermal impedance

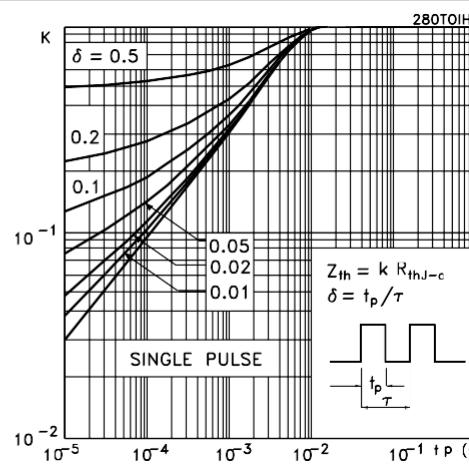


Figure 4. Output characteristics

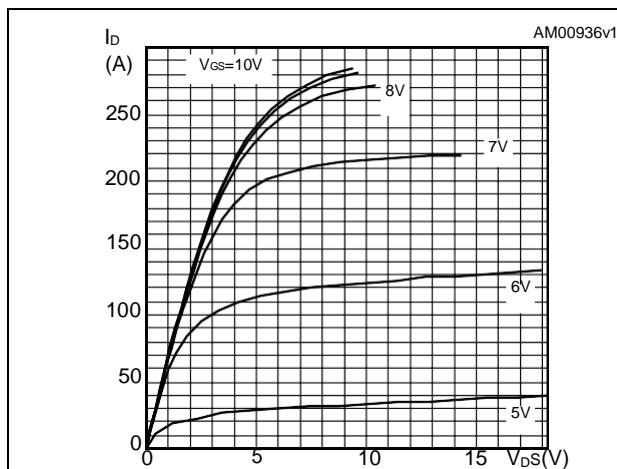


Figure 5. Transfer characteristics

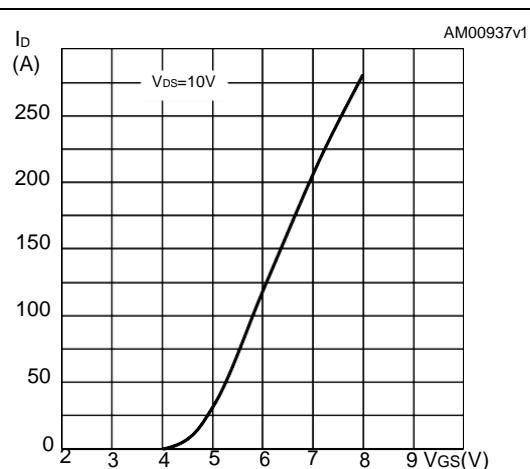


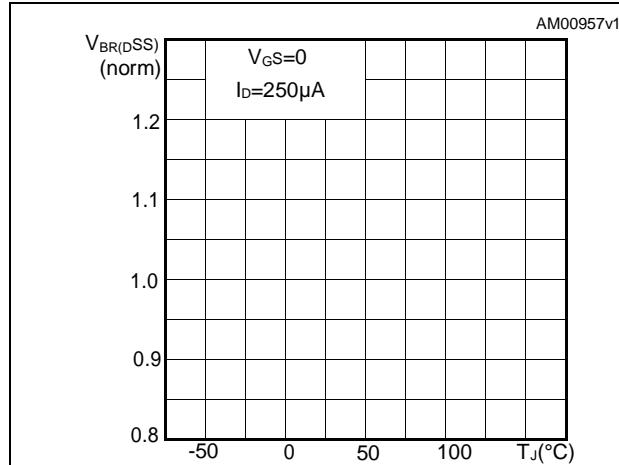
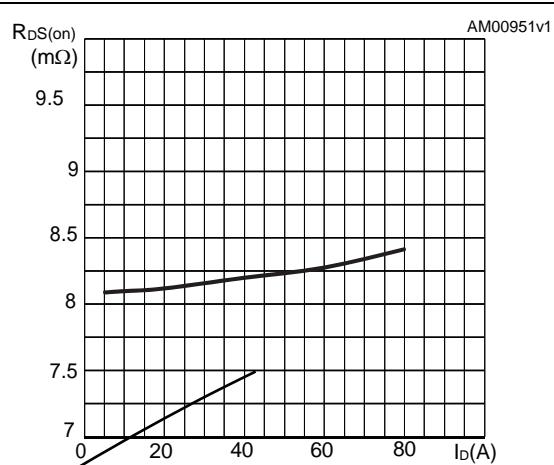
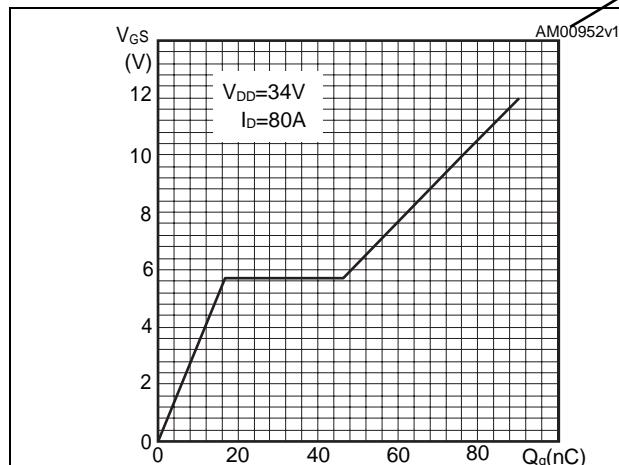
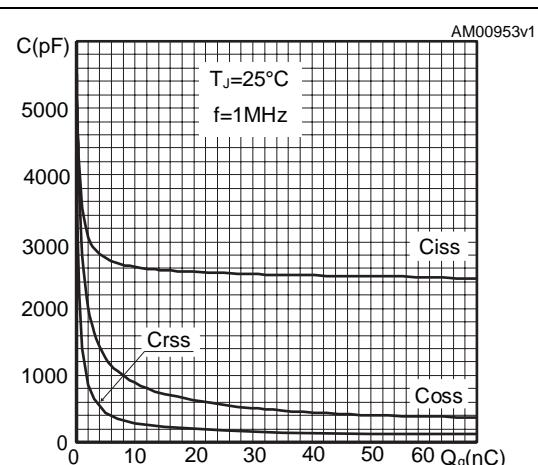
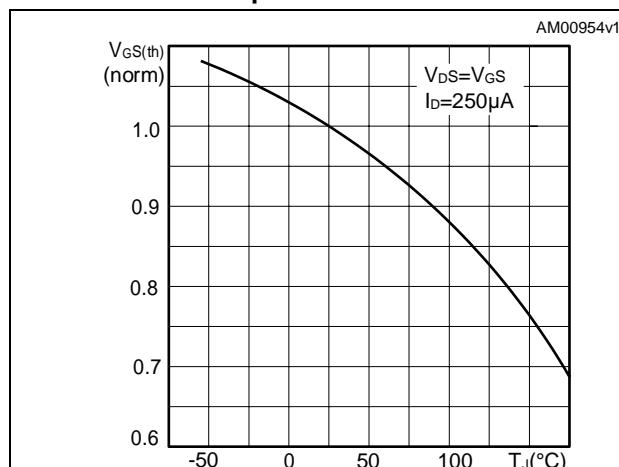
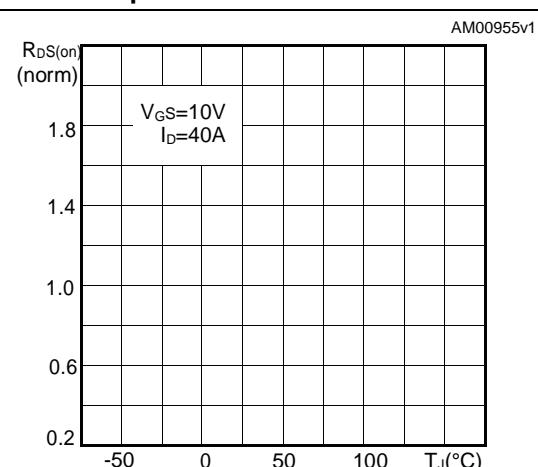
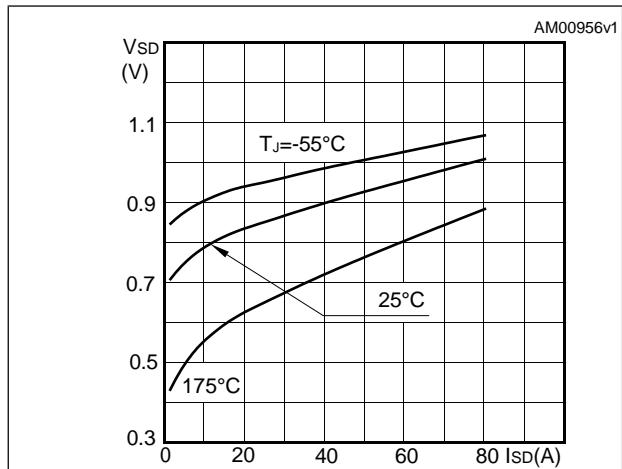
Figure 6. Normalized BV_{DSS} vs temperature**Figure 7. Static drain-source on resistance****Figure 8. Gate charge vs gate-source voltage****Figure 9. Capacitance variations****Figure 10. Normalized gate threshold voltage vs temperature****Figure 11. Normalized on resistance vs temperature**

Figure 12. Source-drain diode forward characteristics



3 Test circuits

Figure 13. Switching times test circuit for resistive load

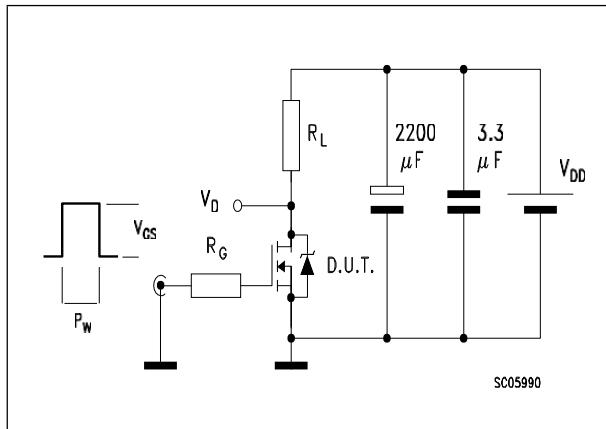


Figure 14. Gate charge test circuit

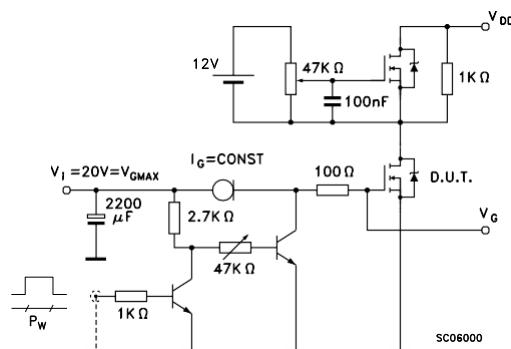


Figure 15. Test circuit for inductive load switching and diode recovery times

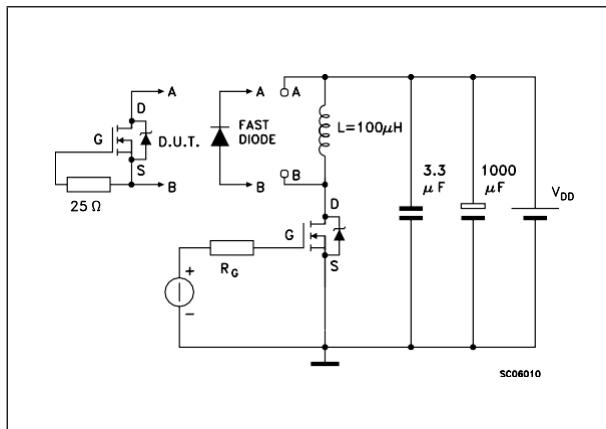


Figure 16. Unclamped inductive load test circuit

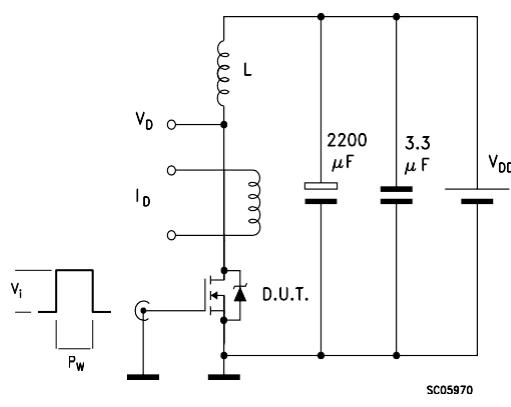
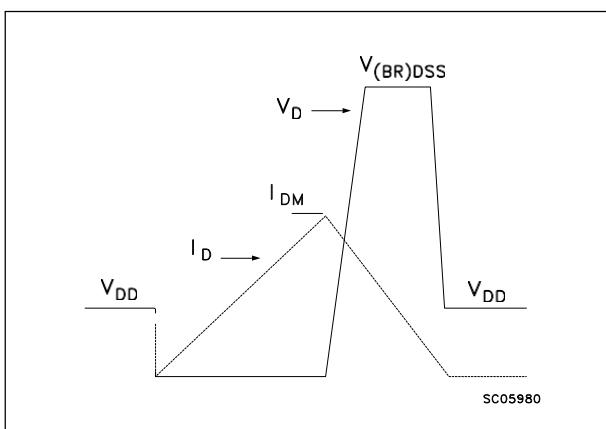


Figure 17. Unclamped inductive waveform

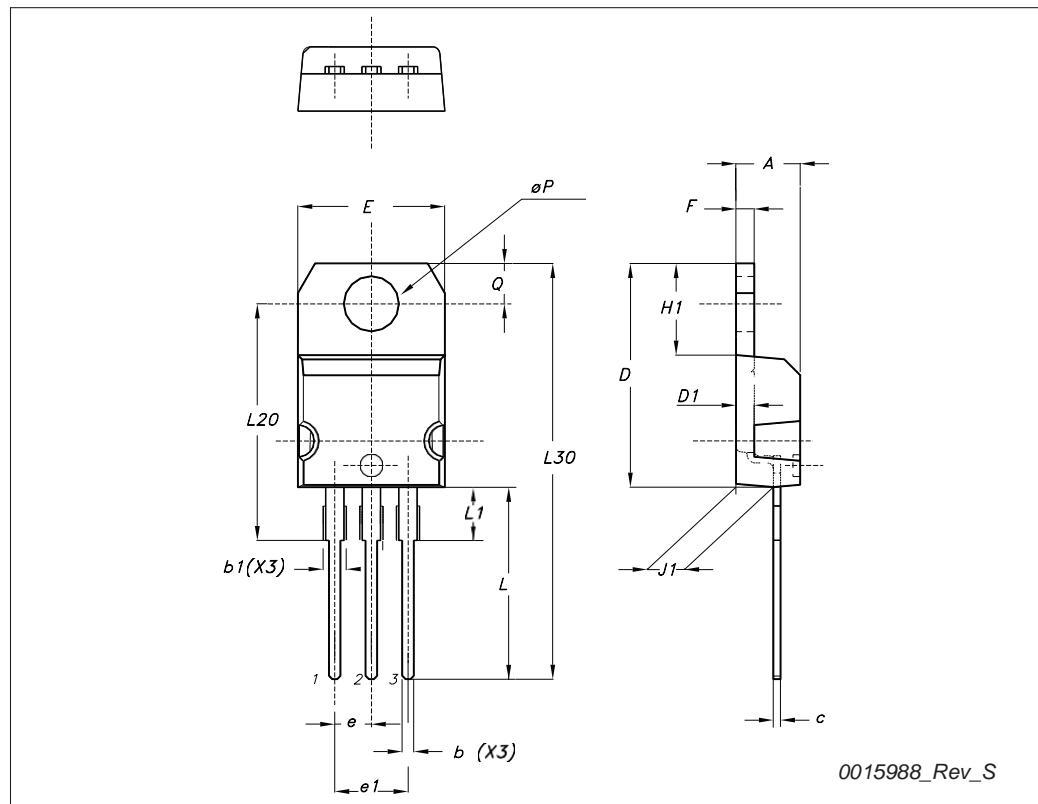


4 Package mechanical data

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.

TO-220 type A mechanical data

Dim	mm		
	Min	Typ	Max
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.70
c	0.48		0.70
D	15.25		15.75
D1		1.27	
E	10		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		14
L1	3.50		3.93
L20		16.40	
L30		28.90	
$\varnothing P$	3.75		3.85
Q	2.65		2.95



5 Revision history

Table 8. Document revision history

Date	Revision	Changes
11-Jun-2010	1	First release.

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Inductors

Surface Mount for Power Applications



Features

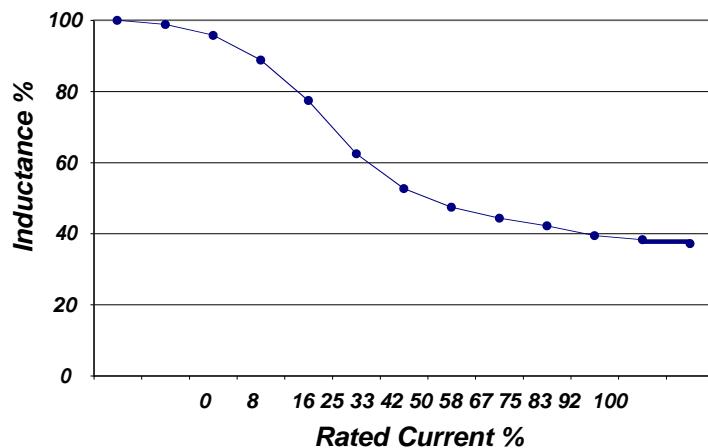
- Low profile 8.46mm in height
- Current ratings up to 100A



Inductance Values at 20°C

Part Number	-----Inductance (uH +/- 20%)-----			Rated DC Current (Amps)	DC Resistance	
	I = 0	1/2 (I max)	I max		m Ohm Typ	m Ohm Max.
31499-01	332.10	167.38	117.56	3.33	220.70	260.43
31499-02	243.09	122.52	86.05	3.90	132.50	156.35
31499-03	133.21	67.14	47.16	5.26	68.84	81.23
31499-04	79.38	40.01	28.10	6.82	40.97	48.34
31499-05	47.40	23.89	16.78	8.82	24.90	29.38
31499-06	29.89	15.06	10.58	11.11	13.67	16.13
31499-07	19.84	10.00	7.02	13.64	9.33	11.01
31499-08	13.28	6.70	4.70	16.67	6.41	7.56
31499-09	8.04	4.05	2.84	21.43	3.90	4.49
31499-10	5.90	2.98	2.09	25.00	2.81	3.23
31499-11	4.10	2.07	1.45	30.00	1.75	2.01
31499-12	2.62	1.32	0.93	37.50	1.24	1.43
31499-13	1.48	0.74	0.52	50.00	0.71	0.82
31499-14	1.03	0.52	0.36	60.00	0.50	0.58
31499-15	0.66	0.33	0.23	75.00	0.36	0.419
31499-16	0.37	0.19	0.13	100.00	0.22	0.23

Inductance vs. Current

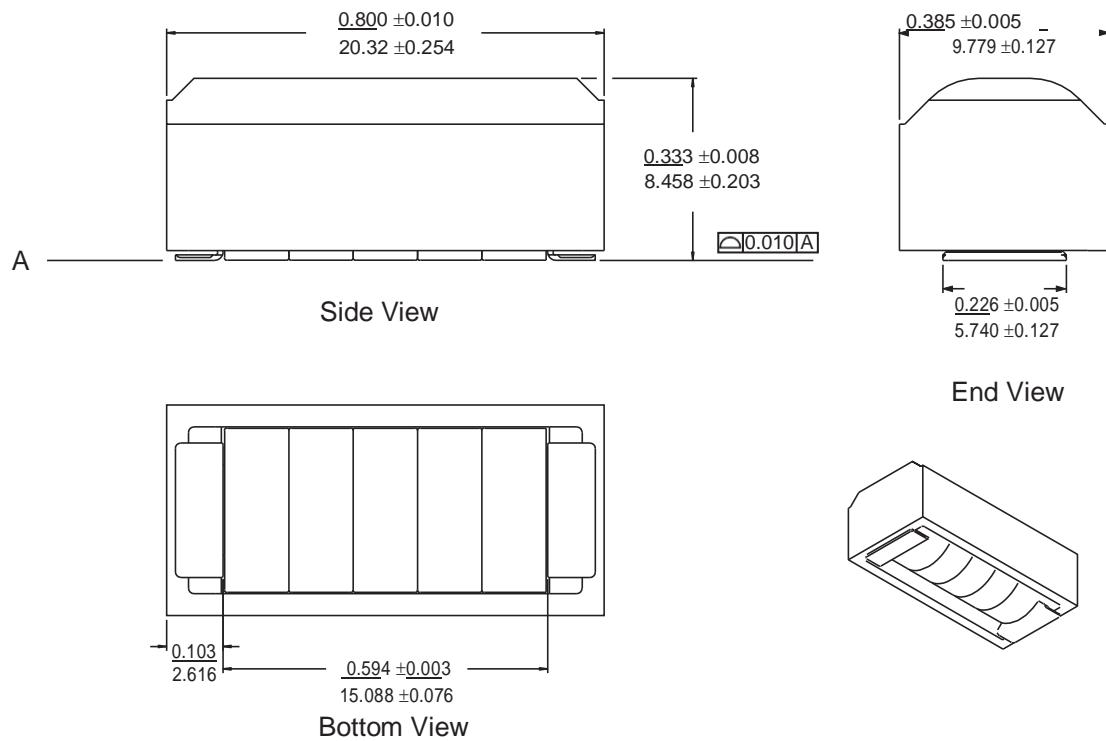


Temperature Maximum Values

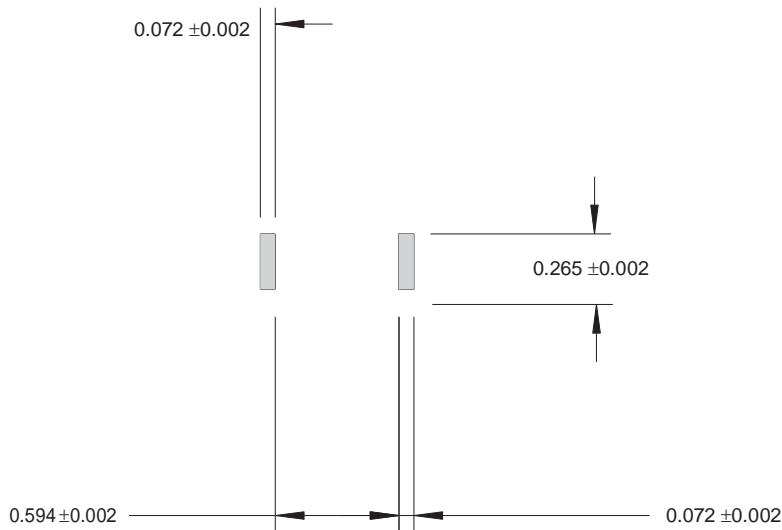
Operating Temperature: -55C to +125C
Storage Temperature: -65C to +125C

Approximate Weight ≤ 8 grams

Mechanical Outline (All measurements are in inches)



Recommended Pad Dimensions (All measurements are in inches)



Recommended solder 0.08" thick SAC 305 solder paste.
63/27 solder paste may be used for non-RoHS applications.



KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN

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PELAKSANAAN REVISI SKRIPSI

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Judul Laporan Skripsi : Analisa Model Sistem Transfer Energi Listrik dengan Metode Nirkabel
pada Robot *Line Follower*.

Telah melaksanakan revisi terhadap Skripsi yang disidangkan pada hari Selasa tanggal 26 bulan Juli tahun 2017. Pelaksanaan revisi terhadap Skripsi tersebut telah disetujui oleh Dosen Penilai yang memberikan revisi :

No.	Komentar	Nama Dosen Penilai *)	Tanggal	Tanda Tangan
1.	<i>Hlr</i>	Ir. Pola Risma., M.T NIP. 19630328 199003 2 001	20/7/17	<i>[Signature]</i>
2.		Amperawan, S.T., M.T NIP. 19670523 199303 1 002		
3.	<i>JK.</i>	Sabilal Rasyad, S.T., M.Kom NIP. 19740902 200501 1 003	28/7/17	<i>[Signature]</i>
4.	<i>Sudah d'revisi.</i>	Niksen Alfarizal, S.T., M.Kom. NIP. 19750816 200112 1 001	16/8/17	<i>[Signature]</i>
5.	<i>Acc → k.</i>	Selamat Muslimin, S.T., M.Kom NIP. 19790722 200801 1 007	21/8/2017	<i>[Signature]</i>
6.	<i>SDH D'REVSI</i>	Johansyah Al Rasyid, S.T., M.Kom. NIP. 19780319 200604 1 001	12/9/2017	<i>[Signature]</i>

Palembang, September 2017
Mengetahui,
Ketua Penilai

[Signature]
Ir. Pola Risma, M.T
NIP. 19630328 199003 2 001

Catatan:

*) Dosen penilai yang memberikan revisi saat Sidang Skripsi.

**) Dosen penilai yang ditugaskan sebagai Ketua Penilai saat Sidang Skripsi.

Lembaran pelaksanaan revisi ini harus dilampirkan dalam Laporan Skripsi