

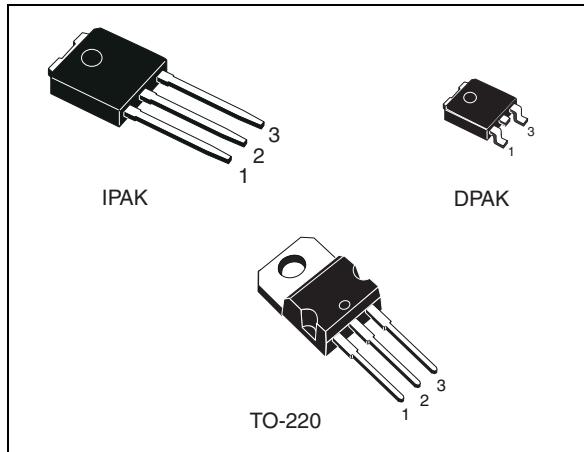
STD27N3LH5, STP27N3LH5 STU27N3LH5

N-channel 30 V, 0.014 Ω , 27 A, DPAK, IPAK, TO-220
STripFET™ V Power MOSFET

Features

Type	V _{DSS}	R _{DS(on)} max	I _D
STD27N3LH5	30 V	0.019 Ω	27 A
STP27N3LH5	30 V	0.020 Ω	27 A
STU27N3LH5	30 V	0.020 Ω	27 A

- R_{DS(on)} * Q_g industry benchmark
- Extremely low on-resistance R_{DS(on)}
- Very low switching gate charge
- High avalanche ruggedness
- Low gate drive power losses



Application

- Switching applications

Description

This STripFET™V Power MOSFET technology is among the latest improvements, which have been especially tailored to achieve very low on-state resistance providing also one of the best-in-class figure of merit (FOM).

Figure 1. Internal schematic diagram

Table 1. Device summary

Order codes	Marking	Package	Packaging
STD27N3LH5	27N3LH5	DPAK	Tape and reel
STU27N3LH5	27N3LH5	IPAK	Tube
STP27N3LH5	27N3LH5	TO-220	Tube

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value		Unit
		DPAK, IPAK	TO-220	
V_{DS}	Drain-source voltage ($V_{GS} = 0$)	30		V
V_{GS}	Gate-Source voltage	± 22		V
$I_D^{(1)}$	Drain current (continuous) at $T_C = 25^\circ\text{C}$	27		A
I_D	Drain current (continuous) at $T_C = 100^\circ\text{C}$	19		A
$I_{DM}^{(2)}$	Drain current (pulsed)	108		A
P_{TOT}	Total dissipation at $T_C = 25^\circ\text{C}$	30	45	W
	Derating factor	0.2		$\text{W}/^\circ\text{C}$
$E_{AS}^{(3)}$	Single pulse avalanche energy	50		mJ
T_J T_{stg}	Operating junction temperature Storage temperature	- 55 to 175		$^\circ\text{C}$

1. Limited by wire bonding
2. Pulse width limited by safe operating area
3. Starting $T_J = 25^\circ\text{C}$, $I_D = 21\text{ A}$, $L = 0.2\text{ mH}$

Table 3. Thermal resistance

Symbol	Parameter	Value		Unit
		DPAK, IPAK	TO-220	
R_{thJC}	Thermal resistance junction-case max	5	3.33	$^\circ\text{C}/\text{W}$
R_{thJA}	Thermal resistance junction-case max	100		$^\circ\text{C}/\text{W}$
T_J	Maximum lead temperature for soldering purpose	275		$^\circ\text{C}$

2 Electrical characteristics

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

Table 4. Static

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown Voltage	$I_D = 250 \mu\text{A}, V_{GS} = 0$	30			V
I_{DSS}	Zero gate voltage drain current ($V_{GS} = 0$)	$V_{DS} = 30 \text{ V}$ $V_{DS} = 30 \text{ V}, T_c = 125^\circ\text{C}$			1 10	μA μA
I_{GSS}	Gate body leakage current ($V_{DS} = 0$)	$V_{GS} = \pm 22 \text{ V}$			± 100	nA
$V_{GS(\text{th})}$	Gate threshold voltage	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	1		2.5	V
$R_{DS(\text{on})}$	Static drain-source on resistance	$V_{GS} = 10 \text{ V}, I_D = 13.5 \text{ A}$ SMD version		0.015 0.014	0.020 0.019	Ω Ω
		$V_{GS} = 4.5 \text{ V}, I_D = 13.5 \text{ A}$ SMD version		0.021 0.020	0.028 0.027	Ω Ω

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min	Typ.	Max.	Unit
C_{iss}	Input capacitance			475		pF
C_{oss}	Output capacitance	$V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}, V_{GS} = 0$	-	97	-	pF
C_{rss}	Reverse transfer capacitance			19		pF
Q_g	Total gate charge			4.6		nC
Q_{gs}	Gate-source charge	$V_{DD} = 15 \text{ V}, I_D = 27 \text{ A}$	-	1.7	-	nC
Q_{gd}	Gate-drain charge	$V_{GS} = 5 \text{ V}$		1.9		nC
Q_{gs1}	Pre V_{th} gate-to-source charge	$V_{DD} = 15 \text{ V}, I_D = 27 \text{ A}$		0.67		nC
	Post V_{th} gate-to-source charge	$V_{GS} = 5 \text{ V}$	-	0.84	-	nC
R_G	Gate input resistance	$f = 1 \text{ MHz}$ gate bias = 0 test signal level = 20 mV open drain	-	2.5	-	Ω

Table 6. Switching on/off (resistive load)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on delay time Rise time	$V_{DD} = 15 \text{ V}$, $I_D = 13.5 \text{ A}$, $R_G = 4.7 \Omega$, $V_{GS} = 10 \text{ V}$	-	4 22	-	ns ns
$t_{d(off)}$ t_f	Turn-off delay time Fall time	$V_{DD} = 15 \text{ V}$, $I_D = 13.5 \text{ A}$, $R_G = 4.7 \Omega$, $V_{GS} = 10 \text{ V}$	-	13 2.8	-	ns ns

Table 7. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{SD} $I_{SDM}^{(1)}$	Source-drain current Source-drain current (pulsed)		-		27 108	A A
V_{SD}	Forward on voltage	$I_{SD} = 13.5 \text{ A}$, $V_{GS} = 0$	-		1.1	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	$I_{SD} = 27 \text{ A}$, $dI/dt = 100 \text{ A}/\mu\text{s}$, $V_{DD} = 25 \text{ V}$	-	16.2 7.8 1		ns nC A

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

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area for TO-220

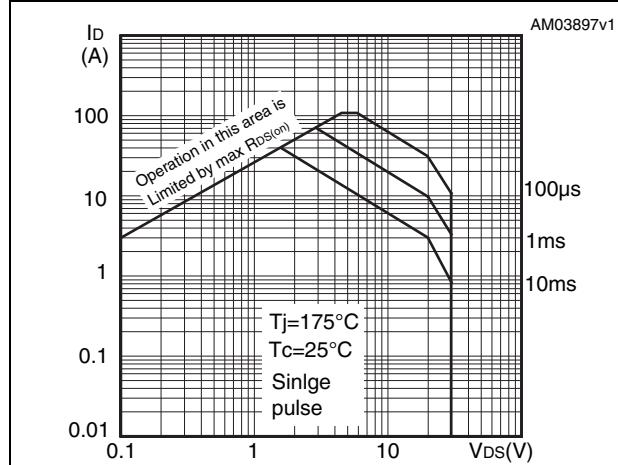


Figure 3. Thermal impedance for TO-220

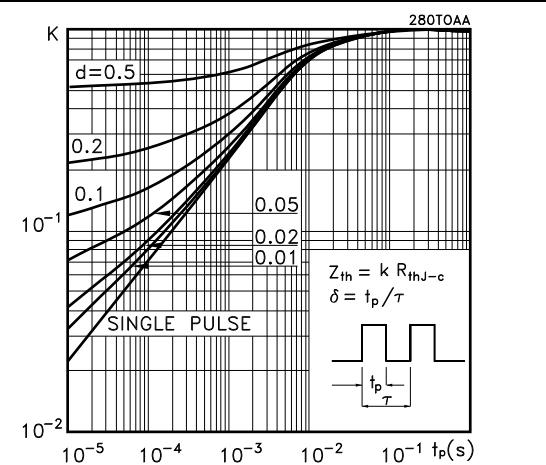


Figure 4. Safe operating area for DPAK, IPAK

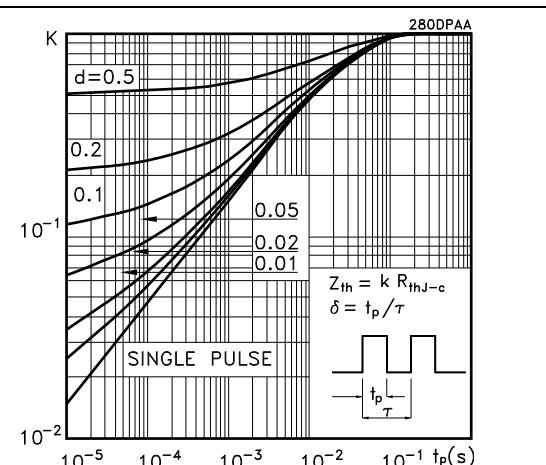
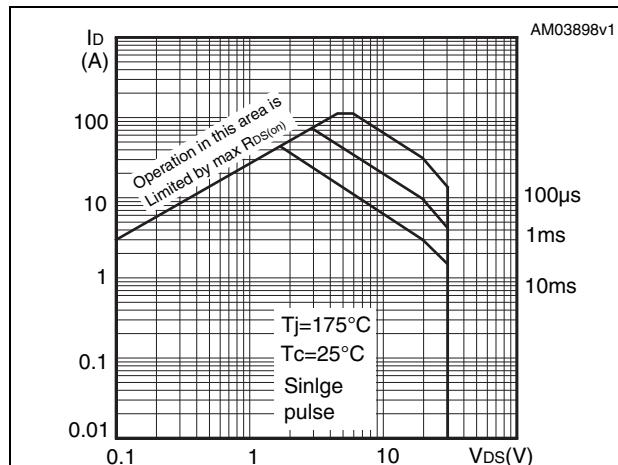


Figure 6. Output characteristics

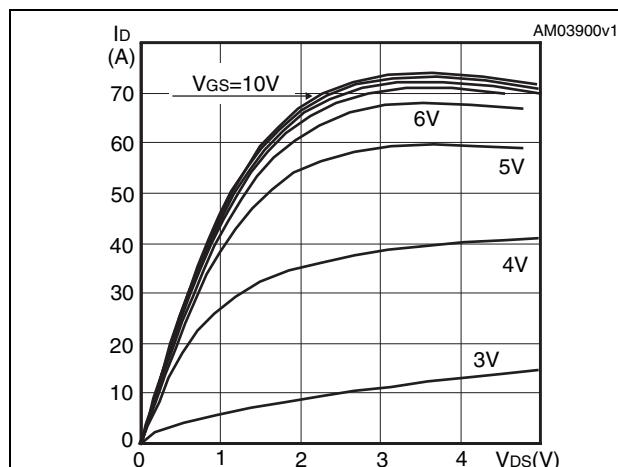


Figure 7. Transfer characteristics

