

Features

Type	V_{DSS}	$R_{DS(on)max}$	I_D
STD60N10	100 V	<0.0195 Ω	60 A
STP70N10	100 V	<0.0195 Ω	65 A

- Exceptional dv/dt capability
- Extremely low on-resistance $R_{DS(on)}$
- 100% avalanche tested

Application

- Switching applications

Description

This Power MOSFET is designed to minimize the $R_{DS(on)}$, making it suitable for the most applications where high power density is required.

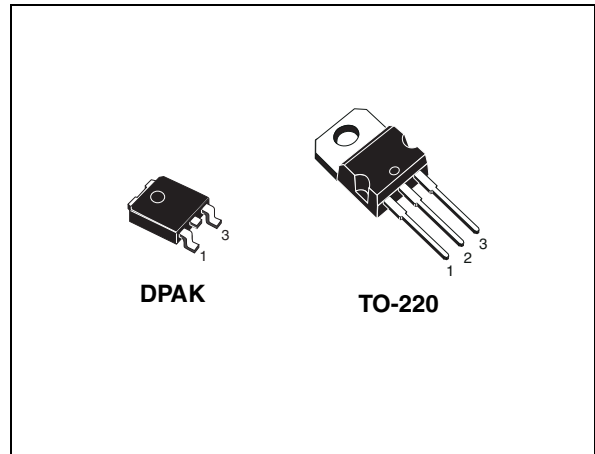


Figure 1. Internal schematic diagram

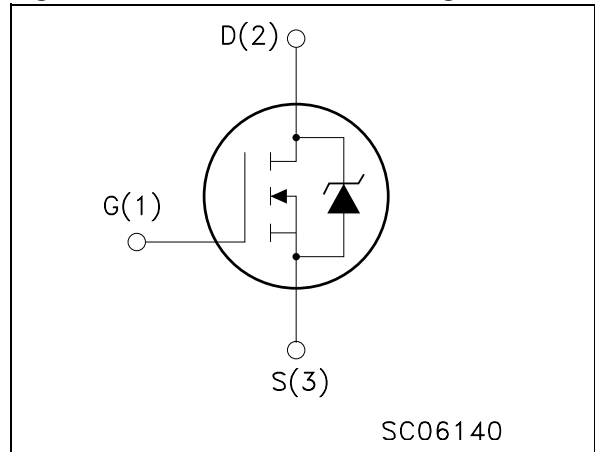


Table 1. Device summary

Order codes	Marking	Package	Packaging
STP70N10	70N10	TO-220	Tube
STD60N10	60N10	DPAK	Tape and reel

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value		Unit
		TO-220	DPAK	
V_{DS}	Drain-source voltage ($v_{GS} = 0$)	100		V
V_{GS}	Gate- source voltage	± 20		V
I_D	Drain current (continuous) at $T_C = 25\text{ }^\circ\text{C}$	65	60	A
I_D	Drain current (continuous) at $T_C = 100\text{ }^\circ\text{C}$	46	43	A
$I_{DM}^{(1)}$	Drain current (pulsed)	260	240	A
P_{TOT}	Total dissipation at $T_C = 25\text{ }^\circ\text{C}$	150	125	W
	Derating factor	1	0.83	W/ $^\circ\text{C}$
$dv/dt^{(2)}$	Peak diode recovery voltage slope	TBD		V/ns
$E_{AS}^{(3)}$	Single pulse avalanche energy	TBD		mJ
T_{stg}	Storage temperature	- 55 to 175		$^\circ\text{C}$
T_j	Max. operating junction temperature			

1. Pulse width limited by safe operating area
2. $I_{SD} \leq 50\text{ A}$, $di/dt \leq 600\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_j \leq T_{JMAX}$.
3. Starting $T_j = 25\text{ }^\circ\text{C}$, $I_D = 50\text{ A}$, $V_{DD} = 25\text{ V}$

Table 3. Thermal data

Symbol	Parameter	Value		Unit
		TO-220	DPAK	
$R_{thj-case}$	Thermal resistance junction-case max	1	1.2	$^\circ\text{C}/\text{W}$
R_{thj-a}	Thermal resistance junction-ambient max	62.5	50 ⁽¹⁾	$^\circ\text{C}/\text{W}$
T_l	Maximum lead temperature for soldering purpose	300		$^\circ\text{C}$

1. When mounted on FR-4 board of 1 inch², 2 oz Cu

2 Electrical characteristics

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

Table 4. On/off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown voltage	$I_D = 250 \mu A, V_{GS} = 0$	100			V
I_{DSS}	Zero gate voltage Drain current ($V_{GS} = 0$)	$V_{DS} = \text{max rating}$ $V_{DS} = \text{max rating}, T_C = 125^{\circ}C$			1 100	μA μA
I_{GSS}	Gate-body leakage current ($V_{DS} = 0$)	$V_{GS} = \pm 20 V$			100	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}, I_D = 250 \mu A$	2		4	V
$R_{DS(on)}$	Static drain-source on resistance	$V_{GS} = 10 V, I_D = 30 A$		0.016	0.0195	Ω

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance			5800		pF
C_{oss}	Output capacitance	$V_{DS} = 25 V, f = 1 \text{ MHz},$ $V_{GS} = 0$		300		pF
C_{rss}	Reverse transfer capacitance			190		pF
Q_g	Total gate charge	$V_{DD} = 80 V, I_D = 60 A,$ $V_{GS} = 10 V$		80		nC
Q_{gs}	Gate-source charge			20		nC
Q_{gd}	Gate-drain charge			25		nC

Table 6. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on delay time Rise time	$V_{DD} = 50 V, I_D = 30 A,$ $R_G = 4.7 \Omega, V_{GS} = 10 V$		125 20		ns ns
$t_{d(off)}$ t_f	Turn-off-delay time Fall time	$V_{DD} = 50 V, I_D = 30 A,$ $R_G = 4.7 \Omega, V_{GS} = 10 V$		60 150		ns ns

Table 7. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max	Unit
I_{SD}	Source-drain current				60	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)				240	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 60 \text{ A}, V_{GS} = 0$			TBD	V
t_{rr}	Reverse recovery time	$I_{SD} = 60 \text{ A}, V_{DD} = 25 \text{ V}$ $di/dt = 100 \text{ A}/\mu\text{s},$ $T_j = 150 \text{ }^\circ\text{C}$		85		ns
Q_{rr}	Reverse recovery charge			280		nC
I_{RRM}	Reverse recovery current			6.7		A

1. Pulse width limited by safe operating area.

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