

N - CHANNEL ENHANCEMENT MODE "ULTRA HIGH DENSITY" POWER MOS TRANSISTOR

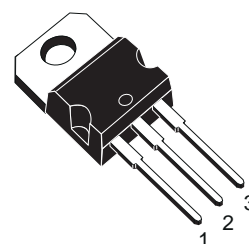
TENTATIVE DATA

TYPE	V _{DS}	R _{DS(on)}	I _D
STP80N03L-06	30 V	< 0.006 Ω	80 A (*)

- TYPICAL R_{DS(on)} = 0.005 Ω
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- HIGH CURRENT CAPABILITY
- 175°C OPERATING TEMPERATURE
- HIGH dV/dt RUGGEDNESS
- APPLICATION ORIENTED CHARACTERIZATION

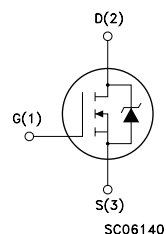
APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- POWER MOTOR CONTROL
- DC-DC & DC-AC CONVERTERS
- SYNCHRONOUS RECTIFICATION



TO-220

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	30	V
V _{DGR}	Drain- gate Voltage (R _{GS} = 20 kΩ)	30	V
V _{GS}	Gate-source Voltage	± 15	V
I _D	Drain Current (continuous) at T _c = 25 °C	80	A
I _D	Drain Current (continuous) at T _c = 100 °C	60	A
I _{DM} (•)	Drain Current (pulsed)	320	A
P _{tot}	Total Dissipation at T _c = 25 °C	150	W
	Derating Factor	1	W/°C
dV/dt(1)	Peak Diode Recovery voltage slope	5	V/ns
T _{stg}	Storage Temperature	-65 to 175	°C
T _j	Max. Operating Junction Temperature	175	°C

(•) Pulse width limited by safe operating area

THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	1	$^{\circ}\text{C/W}$
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	62.5	$^{\circ}\text{C/W}$
$R_{thc-sink}$	Thermal Resistance Case-sink	Typ	0.5	$^{\circ}\text{C/W}$
T_l	Maximum Lead Temperature For Soldering Purpose		300	$^{\circ}\text{C}$

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max, $\delta < 1\%$)	60	A
E_{AS}	Single Pulse Avalanche Energy (starting $T_j = 25^{\circ}\text{C}$, $I_D = I_{AR}$, $V_{DD} = 25\text{ V}$)	600	mJ
E_{AR}	Repetitive Avalanche Energy (pulse width limited by T_j max, $\delta < 1\%$)	150	mJ
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive ($T_c = 100^{\circ}\text{C}$, pulse width limited by T_j max, $\delta < 1\%$)	60	A

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

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250\text{ }\mu\text{A}$ $V_{GS} = 0$	30			V
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0$)	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating} \times 0.8$ $T_c = 125^{\circ}\text{C}$			250 1000	μA μA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 15\text{ V}$			± 100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250\text{ }\mu\text{A}$	1		2.5	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10\text{ V}$ $I_D = 40\text{ A}$ $V_{GS} = 10\text{ V}$ $I_D = 40\text{ A}$ $T_c = 100^{\circ}\text{C}$ $V_{GS} = 5\text{ V}$ $I_D = 40\text{ A}$ $V_{GS} = 5\text{ V}$ $I_D = 40\text{ A}$ $T_c = 100^{\circ}\text{C}$		0.005 0.006	0.006 0.012 0.009 0.018	Ω Ω Ω Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10\text{ V}$	80			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (*)$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 10\text{ A}$		35		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	$V_{DS} = 25\text{ V}$ $f = 1\text{ MHz}$ $V_{GS} = 0$		6000 1000 250		pF pF pF

ELECTRICAL CHARACTERISTICS (continued)**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	$V_{DD} = V$ $I_D = A$				ns
t_r	Rise Time	$R_G = \Omega$ $V_{GS} = V$ (see test circuit, figure 3)				ns
$(di/dt)_{on}$	Turn-on Current Slope	$V_{DD} = V$ $I_D = A$ $R_G = \Omega$ $V_{GS} = V$ (see test circuit, figure 5)				A/ μ s
Q_g	Total Gate Charge	$V_{DD} = V$ $I_D = A$ $V_{GS} = V$				nC
Q_{gs}	Gate-Source Charge					nC
Q_{gd}	Gate-Drain Charge					nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$	Off-voltage Rise Time	$V_{DD} = V$ $I_D = A$				ns
t_f	Fall Time	$R_G = \Omega$ $V_{GS} = V$				ns
t_c	Cross-over Time	(see test circuit, figure 5)				ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				80	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				320	A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = A$ $V_{GS} = 0$			1.5	V
t_{rr}	Reverse Recovery Time	$I_{SD} = A$ $di/dt = A/\mu s$ $V_{DD} = V$ $T_j = ^\circ C$ (see test circuit, figure 5)				ns
Q_{rr}	Reverse Recovery Charge					μC
I_{RRM}	Reverse Recovery Current					A

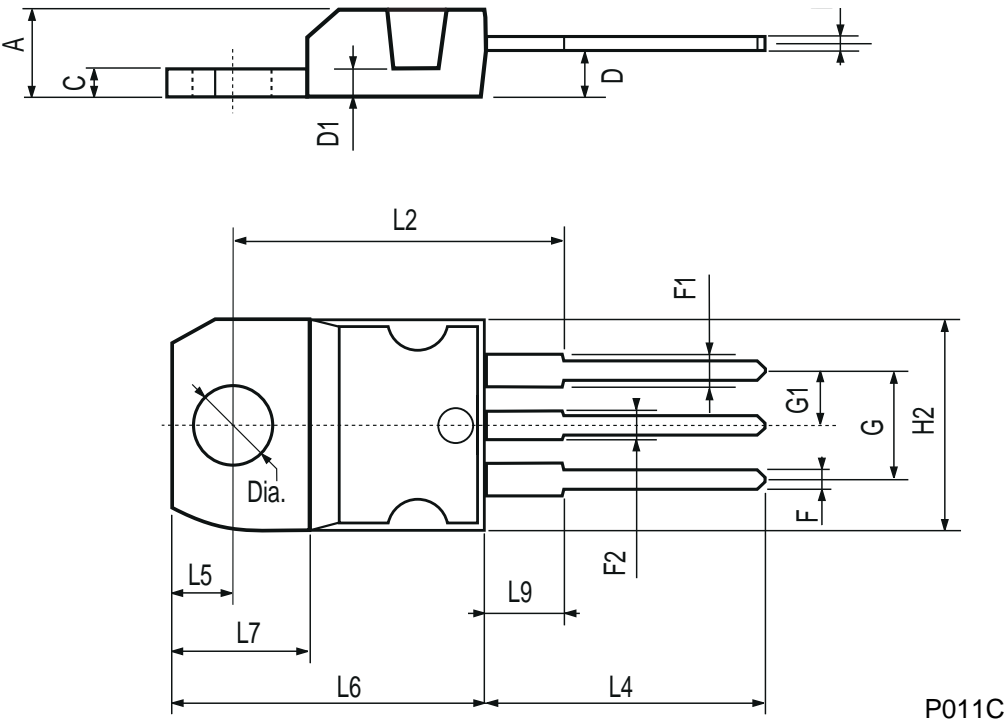
(*) Pulsed: Pulse duration = 300 μ s, duty cycle 1.5 %

(\bullet) Pulse width limited by safe operating area

(1) $I_{SD} \leq 60 A$, $di/dt \leq 200 A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_j \leq T_{JMAX}$

TO-220 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



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