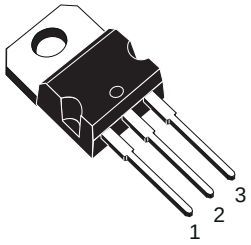
STP60N05-14
STP60N06-14

N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTOR

PRELIMINARY DATA

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STP60N05-14	50 V	< 0.014 Ω	60 A
STP60N06-14	60 V	< 0.014 Ω	60 A

- TYPICAL $R_{DS(on)}$ = 0.012 Ω
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- LOW GATE CHARGE
- HIGH CURRENT CAPABILITY
- 175 °C OPERATING TEMPERATURE
- VERY LOW $R_{DS\ (on)}$
- APPLICATION ORIENTED CHARACTERIZATION

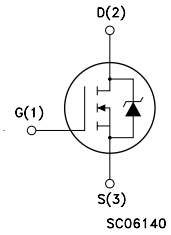


TO-220

APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SOLENOID AND RELAY DRIVERS
- REGULATORS
- DC-DC & DC-AC CONVERTERS
- MOTOR CONTROL, AUDIO AMPLIFIERS
- AUTOMOTIVE ENVIRONMENT (INJECTION, ABS, AIR-BAG, LAMPDRIVERS, Etc.)

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		STP60N05-14	STP60N06-14	
V_{DS}	Drain-Source Voltage (V_{gs} = 0)	50	60	V
V_{DGR}	Drain-Gate Voltage (R_{gs} = 20 KΩ)	50	60	V
V_{GS}	Gate-Source Voltage	± 20		V
I_D	Drain-Current (continuous) at T_c = 25°C	60		A
I_D	Drain-Current (continuous) at T_c = 100°C	50		A
I_{DM}(•)	Drain-Current (Pulsed)	240		A
P_{tot}	Total Dissipation at T_c = 25°C	150		W/°C
	Derating Factor	1		°C
V_{ISO}	Insulation Withstand Voltage (DC)	-		V
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	$^oC/W$
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	62.5	$^oC/W$
$R_{thj-amb}$	Thermal Resistance Case-sink	Typ	0.5	$^oC/W$
T_l	Maximum Lead Temperature For Soldering Purpose		300	^oC

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 $T_j = 25\ ^oC$, $I_D = I_{AR}$, $V_{DD} = 25$ 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 ($T_c = 100\ ^oC$, pulse width limited by T_j max, $\delta < 1\%$)	50	A

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

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250\ \mu A$ $V_{GS} = 0$	60			V
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0$)	V_{DS} = Max Rating V_{DS} = Max Rating x 0.8 $T_c = 125\ ^oC$			250 1000	µA µA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 20$ V			100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250\ \mu A$	2	3	4	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10$ V $I_D = 30$ A $V_{GS} = 10$ V $I_D = 30$ A $T_c = 100^oC$		0.012	0.014 0.028	Ω Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10$ V	60			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 30$ A	20	30		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	$V_{DS} = 25$ V f = 1 MHz $V_{GS} = 0$		3900 950 250	4800 1200 320	pF pF pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Time Rise Time	V_{DD} = 25 V I_D = 30 A R_G = 4.7 Ω V_{GS} = 10 V		30 180	50 250	ns ns
$(di/dt)_{on}$	Turn-on Current Slope	V_{DD} = 40 V I_D = 60 A R_G = 47 Ω V_{GS} = 10 V		210		A/µs
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD} = 40 V I_D = 60 A V_{GS} = 10 V		130 26 55	170	nC nC nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$ t_f t_c	Off-voltage Rise Time Fall Time Cross-over Time	V_{DD} = 40 V I_D = 60 A R_G = 4.7 Ω V_{GS} = 10 V		35 135 180	50 190 250	ns ns ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM}(•)	Source-drain Current Source-drain Current (pulsed)				60 240	A A
V_{SD} (∗)	Forward On Voltage	I_{SD} = 60 A V_{GS} = 0			1.6	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 60 A di/dt = 100 A/µs V_{DD} = 30 V T_j = 150 °C		150 0.56 9		ns µC A

(∗) Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %

(•) Pulse width limited by safe operating area