



STD16NE06L

N-CHANNEL 60V - 0.06Ω - 16A TO-252

STripFET™ POWER MOSFET

PRELIMINARY DATA

TYPE	V _{DSS}	R _{DS(on)}	I _D
STD16NE06L	60 V	< 0.07Ω	16 A

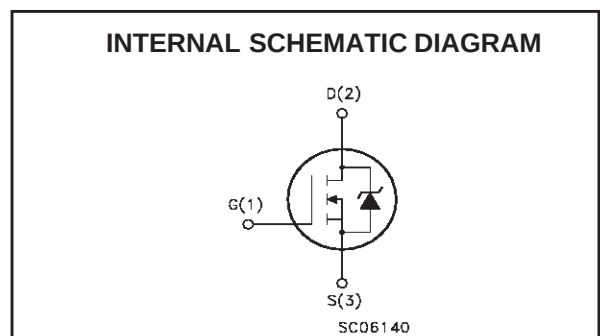
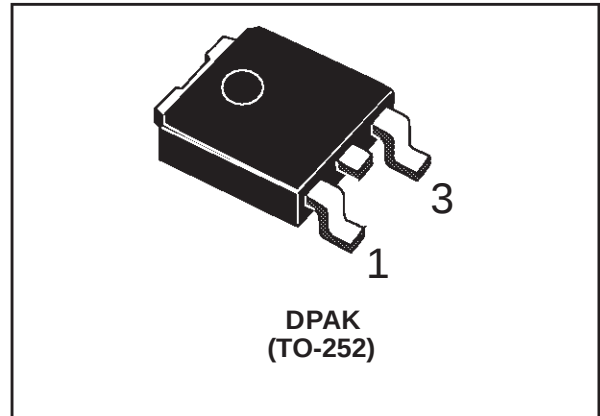
- TYPICAL R_{DS(on)} = 0.06Ω
- EXCEPTIONAL dv/dt CAPABILITY
- 100% AVALANCHE TESTED
- LOW GATE CHARGE
- APPLICATION ORIENTED CHARACTERIZATION
- SURFACE-MOUNTING DPAK (TO-252)
POWER PACKAGE IN TAPE & REEL (SUFFIX "T4")

DESCRIPTION

This Power MOSFET is the latest development of STMicroelectronics unique "Single Feature Size™" strip-based process. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility.

APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SOLENOID AND RELAY DRIVERS
- MOTOR CONTROL, AUDIO AMPLIFIERS
- DC-DC & DC-AC CONVERTERS



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	60	V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kΩ)	60	V
V _{GS}	Gate- source Voltage	±20	V
I _D	Drain Current (continuous) at T _C = 25°C	16	A
I _D	Drain Current (continuous) at T _C = 100°C	11	A
I _{DM} (●)	Drain Current (pulsed)	64	A
P _{TOT}	Total Dissipation at T _C = 25°C	40	W
	Derating Factor	0.3	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	7	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

(1) I_{SD} ≤ 16A, di/dt ≤ 300A/μs, V_{DD} ≤ V(BR)DSS, T_j ≤ T_{JMAX}.

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THERMAL DATA

Rthj-case	Thermal Resistance Junction-case Max	3.75	°C/W
Rthj-amb	Thermal Resistance Junction-ambient Max	100	°C/W
Rthc-sink	Thermal Resistance Case-sink Typ	1.5	°C/W
T _l	Maximum Lead Temperature For Soldering Purpose	275	°C

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T _j max)	16	A
E _{AS}	Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 50 V)	60	mJ

ELECTRICAL CHARACTERISTICS (TCASE = 25 °C UNLESS OTHERWISE SPECIFIED)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{(BR)DSS}	Drain-source Breakdown Voltage	I _D = 250 µA, V _{GS} = 0	60			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating, T _C = 125 °C			1 10	µA µA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ±20V			±100	nA

ON (1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250µA	1	1.7	2.5	V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10V, I _D = 8 A V _{GS} = 5 V, I _D = 8 A		0.06 0.07	0.07 0.085	Ω Ω
I _{D(on)}	On State Drain Current	V _{DS} > I _{D(on)} × R _{DS(on)} max, V _{GS} = 10V	16			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (1)	Forward Transconductance	V _{DS} > I _{D(on)} × R _{DS(on)} max, I _D = 8A		9		S
C _{iss}	Input Capacitance	V _{DS} = 25V, f = 1 MHz, V _{GS} = 0		800		pF
C _{oss}	Output Capacitance			125		pF
C _{rss}	Reverse Transfer Capacitance			50		pF

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 30V, I_D = 10A$ $R_G = 4.7\Omega, V_{GS} = 5V$ (see test circuit, Figure 3)		20		ns
t_r	Rise Time			45		ns
Q_g	Total Gate Charge	$V_{DD} = 48V, I_D = 20A,$ $V_{GS} = 5V$		14	20	nC
Q_{gs}	Gate-Source Charge			8		nC
Q_{gd}	Gate-Drain Charge			4		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	$V_{DD} = 48V, I_D = 20A,$ $R_G = 4.7\Omega, V_{GS} = 5V$ (see test circuit, Figure 5)		10		ns
t_f	Fall Time			25		ns
t_c	Cross-over Time			42		ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				20	A
$I_{SDM(1)}$	Source-drain Current (pulsed)				80	A
$V_{SD(2)}$	Forward On Voltage	$I_{SD} = 16A, V_{GS} = 0$			1.5	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 20A, di/dt = 100A/\mu s,$ $V_{DD} = 100V, T_j = 150^\circ C$ (see test circuit, Figure 5)		65		ns
Q_{rr}	Reverse Recovery Charge			130		nC
I_{RRM}	Reverse Recovery Current			4		A

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

Fig. 1: Unclamped Inductive Load Test Circuit

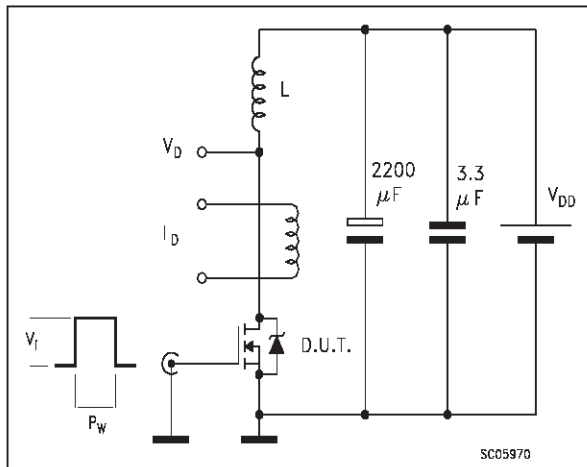


Fig. 2: Unclamped Inductive Waveform

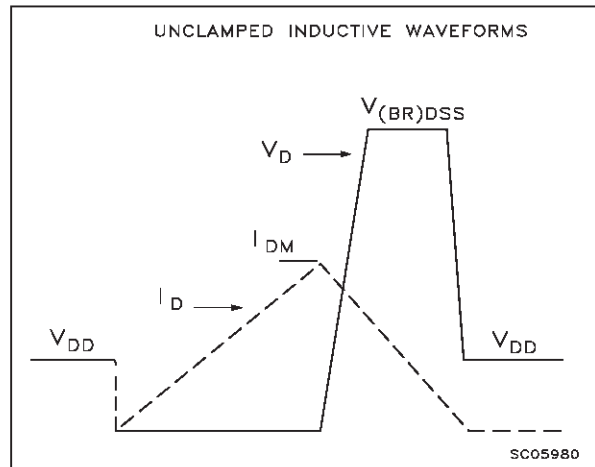


Fig. 3: Switching Times Test Circuit For Resistive Load

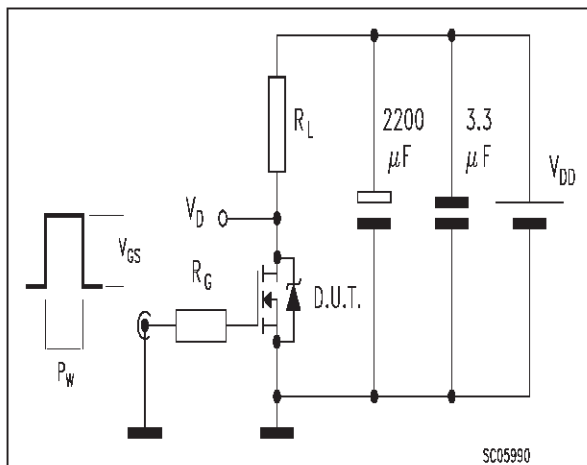


Fig. 4: Gate Charge test Circuit

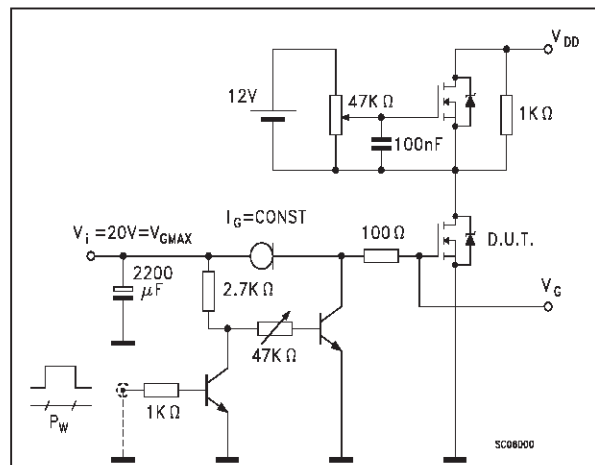
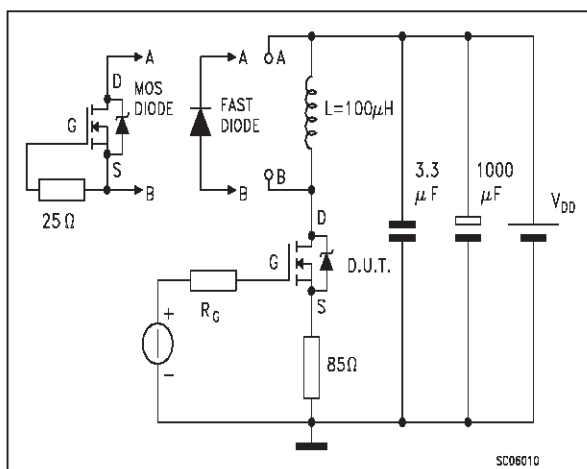
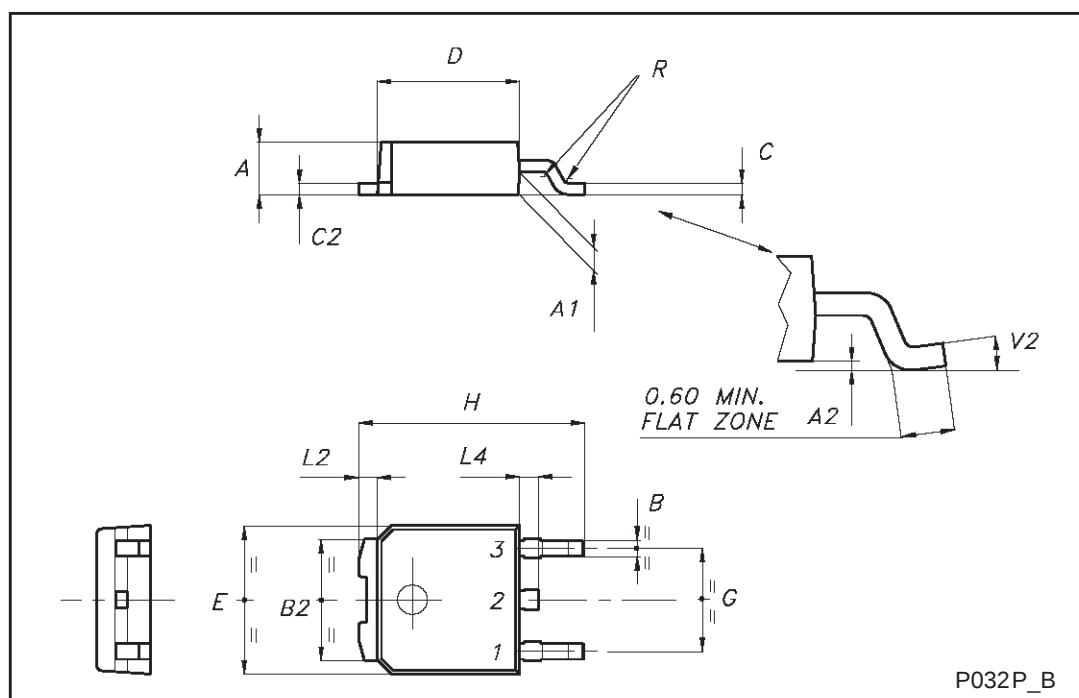


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



TO-252 (DPAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.20		2.40	0.087		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.90	0.025		0.035
B2	5.20		5.40	0.204		0.213
C	0.45		0.60	0.018		0.024
C2	0.48		0.60	0.019		0.024
D	6.00		6.20	0.236		0.244
E	6.40		6.60	0.252		0.260
G	4.40		4.60	0.173		0.181
H	9.35		10.10	0.368		0.398
L2		0.8			0.031	
L4	0.60		1.00	0.024		0.039
V2	0°		8°	0°		0°



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