



STS6DNF30V

DUAL N-CHANNEL 30V - 0.026Ω - 6A SO-8 2.5V-DRIVE STripFET™ II POWER MOSFET

TYPE	V _{DSS}	R _{DS(on)}	I _D
STS6DNF30V	30 V	<0.030Ω (@4.5V) <0.038Ω (@2.5V)	6 A

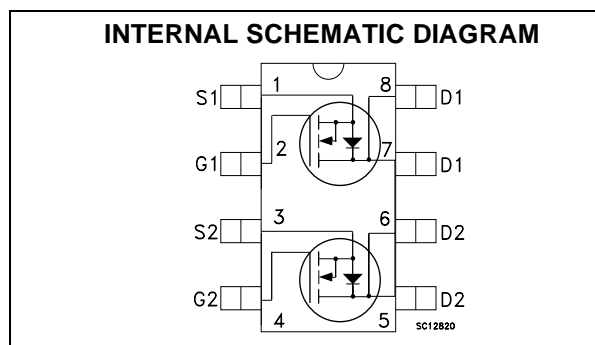
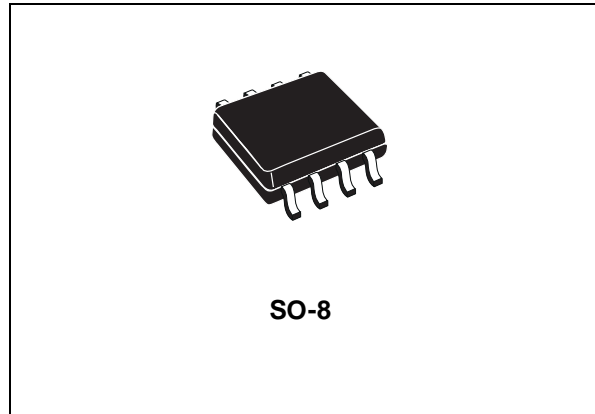
- TYPICAL R_{DS(on)} = 0.026Ω (@4.5V)
- TYPICAL R_{DS(on)} = 0.030Ω (@2.5V)
- ULTRA LOW THRESHOLD GATE DRIVE (2.5V)
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY

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

- BATTERY SAFETY UNIT IN NOMADIC EQUIPMENT
- DC-DC CONVERTERS
- POWER MANAGEMENT IN PORTABLE/ DESKTOP PCs



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	±12	V
I _D	Drain Current (continuous) at T _C = 25°C Single Operation	6	A
	Drain Current (continuous) at T _C = 100°C Single Operation	3.8	A
I _{DM} (●)	Drain Current (pulsed)	24	A
P _{TOT}	Total Dissipation at T _C = 25°C Dual Operation	2	W
	Total Dissipation at T _C = 25°C Single Operation	1.6	W

(●) Pulse width limited by safe operating area

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THERMAL DATA

Rthj-amb	Thermal Resistance Junction-ambient Max Single Operation Thermal Resistance Junction-ambient Max Dual Operation	78 62.5	°C/W °C/W
T _j	Max. Operating Junction Temperature	150	°C
T _{stg}	Storage Temperature	-65 to 150	°C

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	30			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} = ±12V			±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	0.6			V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 4.5 V, I _D = 3 A V _{GS} = 2.5 V, I _D = 3 A		0.026 0.030	0.030 0.038	Ω Ω

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 = 3 A		15		S
C _{iss}	Input Capacitance	V _{DS} = 25 V, f = 1 MHz, V _{GS} = 0		800		pF
C _{oss}	Output Capacitance			180		pF
C _{rss}	Reverse Transfer Capacitance			32		pF

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 15\text{ V}, I_D = 3\text{ A}$		20		ns
t_r	Rise Time	$R_G = 4.7\Omega, V_{GS} = 2.5\text{ V}$ (see test circuit, Figure 3)		25		ns
Q_g	Total Gate Charge	$V_{DD} = 15\text{ V}, I_D = 6\text{ A},$		6.8	9.5	nC
Q_{gs}	Gate-Source Charge	$V_{GS} = 2.5\text{ V}$		2		nC
Q_{gd}	Gate-Drain Charge			3.4		nC

SWITCHING OFF

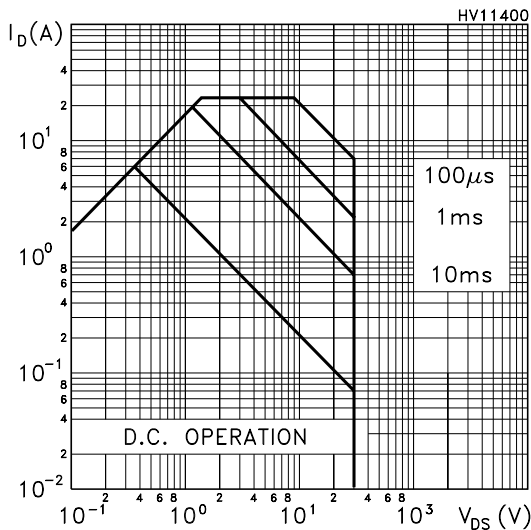
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	$V_{DD} = 10\text{ V}, I_D = 3\text{ A},$		32		ns
t_f	Fall Time	$R_G = 4.7\Omega, V_{GS} = 2.5\text{ V}$ (see test circuit, Figure 3)		13		ns

SOURCE DRAIN DIODE

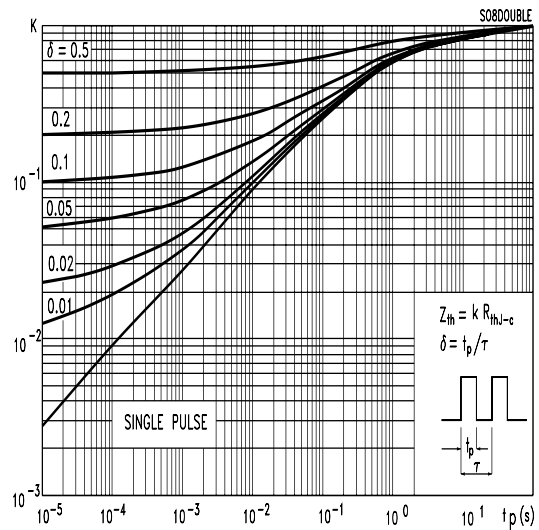
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				6	A
$I_{SDM(2)}$	Source-drain Current (pulsed)				24	A
$V_{SD(1)}$	Forward On Voltage	$I_{SD} = 6\text{ A}, V_{GS} = 0$			1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 6\text{ A}, di/dt = 100\text{ A}/\mu\text{s},$		25		ns
Q_{rr}	Reverse Recovery Charge	$V_{DD} = 15\text{ V}, T_j = 150^\circ\text{C}$		21		nC
I_{RRM}	Reverse Recovery Current	(see test circuit, Figure 5)		1.7		A

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

Safe Operating Area

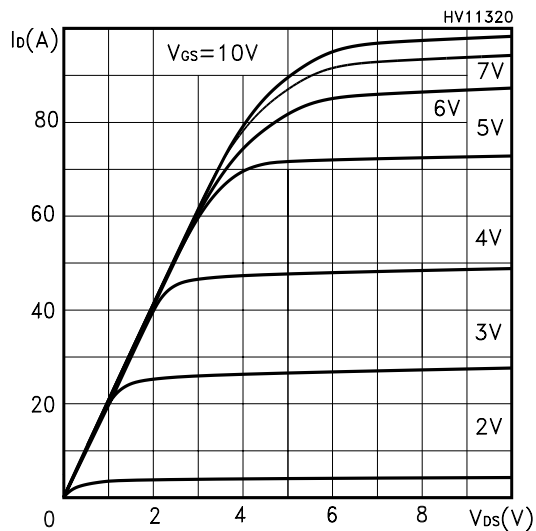


Thermal Impedance

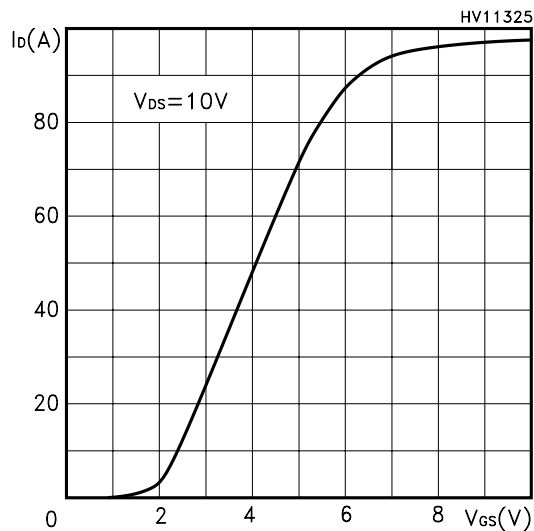


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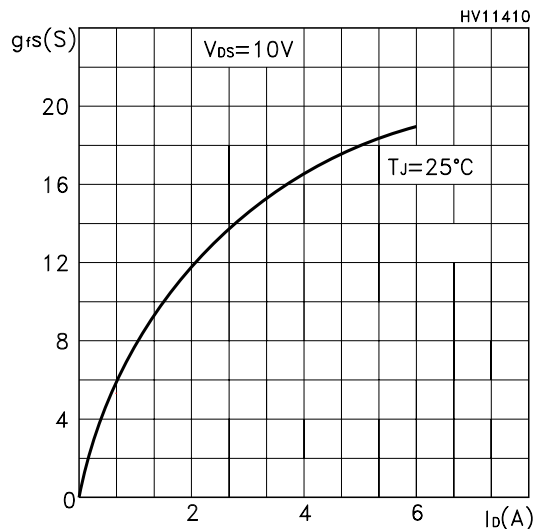
Output Characteristics



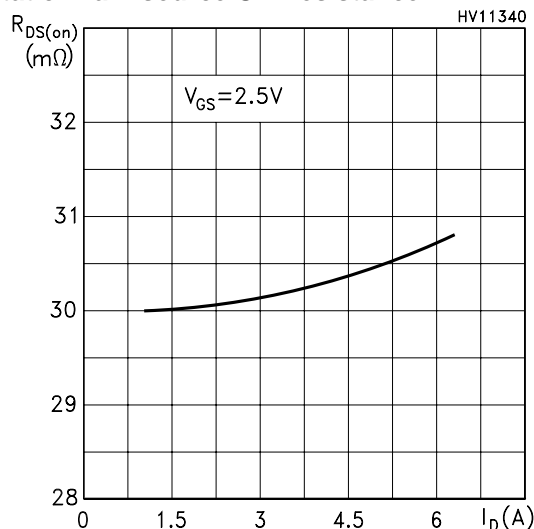
Transfer Characteristics



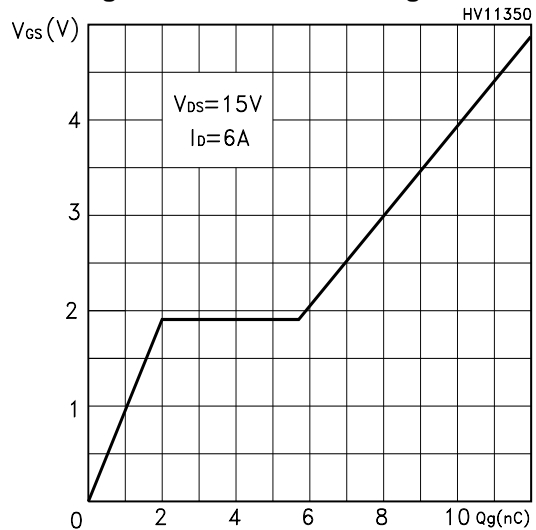
Transconductance



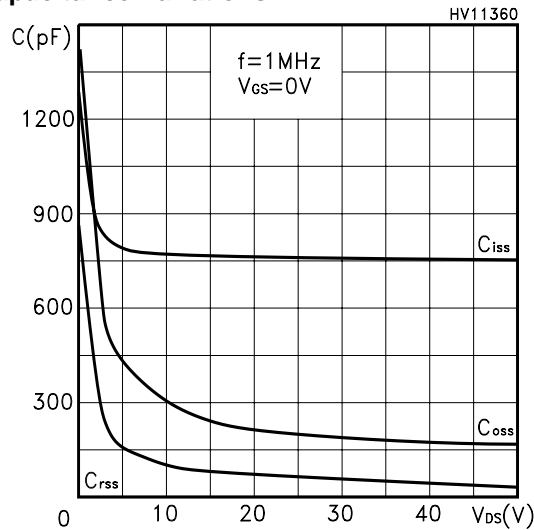
Static Drain-source On Resistance



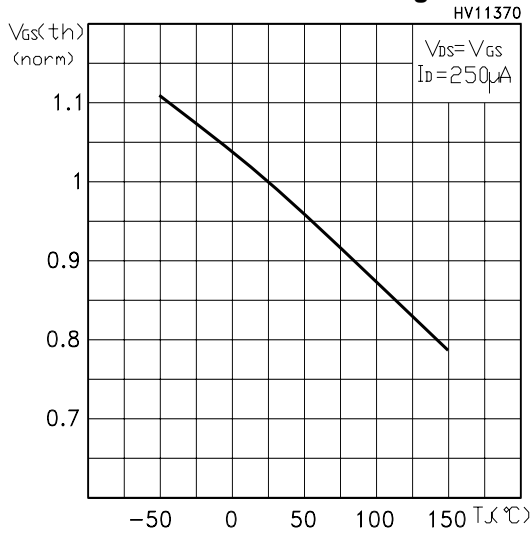
Gate Charge vs Gate-source Voltage



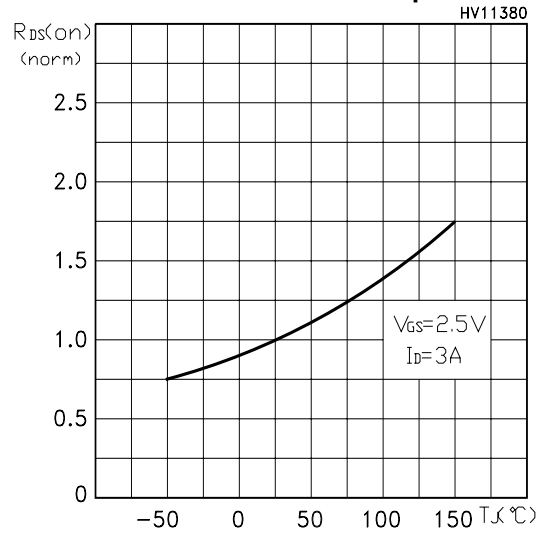
Capacitance Variations



Normalized Gate Thershold Voltage vs Temp.



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics

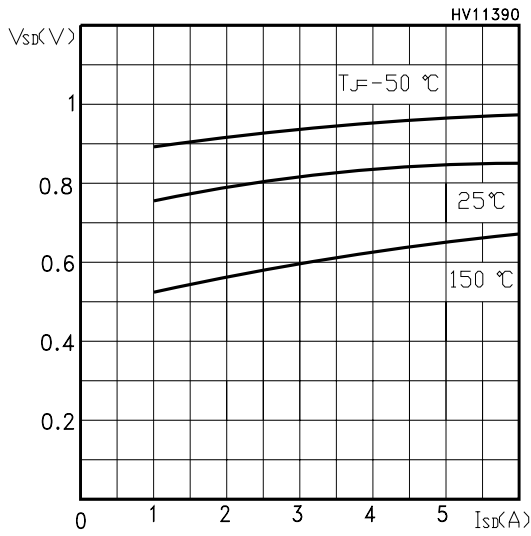


Fig. 1: Unclamped Inductive Load Test Circuit



Fig. 2: Unclamped Inductive Waveform



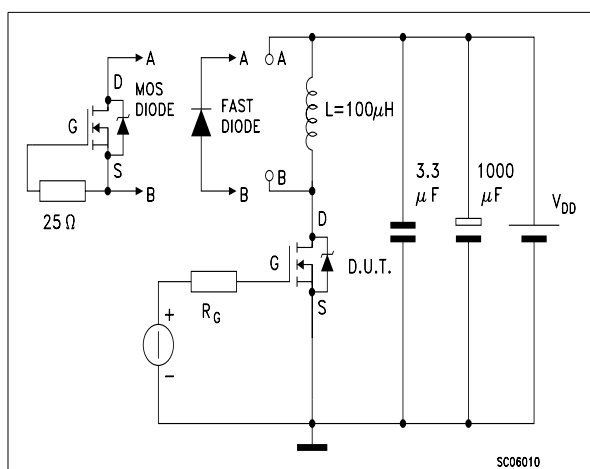
Fig. 3: Switching Times Test Circuit For Resistive Load



Fig. 4: Gate Charge test Circuit

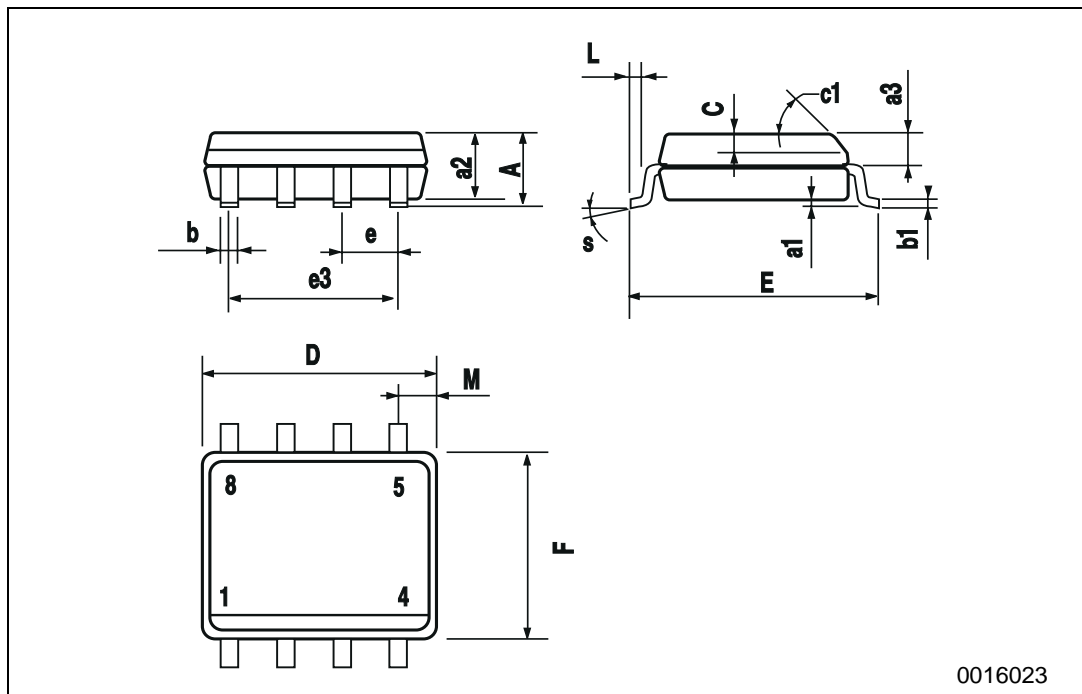


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



SO-8 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.25	0.003		0.009
a2			1.65			0.064
a3	0.65		0.85	0.025		0.033
b	0.35		0.48	0.013		0.018
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.019
c1	45 (typ.)					
D	4.8		5.0	0.188		0.196
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.14		0.157
L	0.4		1.27	0.015		0.050
M			0.6			0.023
S	8 (max.)					



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