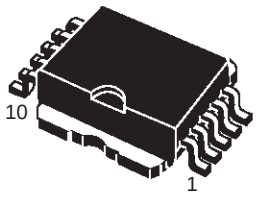
STV160NF03L

N - CHANNEL 30V - 0.0019Ω - 160A PowerSO-10 STripFET™ MOSFET

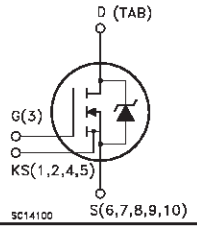
TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STV160NF03L	30 V	< 0.0028 Ω	160 A

- TYPICAL $R_{DS(on)}$ = 0.0019 Ω
- ULTRA LOW ON-RESISTANCE
- ULTRA FAST SWITCHING
- 100% AVALANCHE TESTED
- VERY LOW GATE CHARGE
- LOW THRESHOLD DRIVE
- LOW PROFILE, VERY LOW PARASITIC INDUCTANCE PowerSO-10 PACKAGE

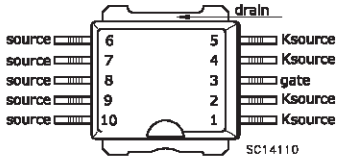


PowerSO-10

INTERNAL SCHEMATIC DIAGRAM



CONNECTION DIAGRAM (TOP VIEW)



DESCRIPTION

The **STV160NF03L** represents the second generation of Application Specific STMicroelectronics well established STripFET™ process based on a very unique strip layout design. The resulting MOSFET shows unrivalled high packing density with ultra low on-resistance and superior switching charactestics. Process simplification also translates into improved manufacturing reproducibility. This device is particularly suitable for high current, low voltage switching application where efficiency is crucial.

APPLICATIONS

- BUCK CONVERTERS IN HIGH PERFORMACE TELECOM AND VRMs DC-DC CONVERTERS

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	± 20	V
I_D(**)	Drain Current (continuous) at T_c = 25 °C	160	A
I_D	Drain Current (continuous) at T_c = 100 °C	113	A
I_{DM}(•)	Drain Current (pulsed)	640	A
P_{tot}	Total Dissipation at T_c = 25 °C	160	W
	Derating Factor	1.07	W/°C
T_{stg}	Storage Temperature	-65 to 175	°C
T_j	Max. Operating Junction Temperature	175	°C

(•) Pulse width limited by safe operating area (**) Limited only maximum junction temperature allowed by PowerSO-10

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resistance Junction-case	Max	0.9375	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-ambient	Max	50	°C/W
T_l	Maximum Lead Temperature For Soldering Purpose		300	°C

ELECTRICAL CHARACTERISTICS (T_J = 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 = 25 °C			1 10	µA µA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ± 15 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 µA T_c = 25 °C	1	1.7	2.5	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10V I_D = 80 A V_{GS} = 8V I_D = 80 A V_{GS} = 4.5V I_D = 40 A V_{GS} = 10V I_D = 80 A T_j = 175 °C V_{GS} = 8V I_D = 80 A T_j = 175 °C V_{GS} = 4.5V I_D = 40 A T_j = 175 °C		1.9 2.0 4.0	2.8 3.8 6.7 6.4 7.8 12.8	mΩ mΩ mΩ mΩ mΩ mΩ
$I_{D(on)}$	On State Drain Current	V_{DS} > $I_{D(on)}$ x $R_{DS(on)max}$ V_{GS} = 10 V	160			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	V_{DS} > $I_{D(on)}$ x $R_{DS(on)max}$ I_D = 80 A		210		S
R_g	Gate resistance	V_{DS} = 15 V f = 1 MHz V_{GS} = 0		0.9		Ω
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 15 V f = 1 MHz V_{GS} = 0		4900 2950 565		pF pF pF
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 0 V f = 1 MHz V_{GS} = 0		7200 13000 4220		pF pF pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	V_{DD} = 15 V I_D = 40 A R_G = 4.7 Ω V_{GS} = 10 V (Resistive Load, see fig. 3)		23 350		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD} = 16 V I_D = 160 A V_{GS} = 10 V		103 38 9		nC nC nC

SWITCHING OFF

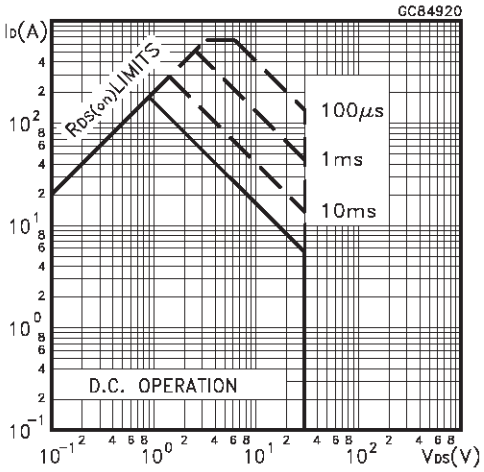
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	V_{DD} = 15 V I_D = 40 A R_G =4.7 Ω V_{GS} = 10 V (Resistive Load, see fig. 3)		105 120		ns ns
$t_{d(off)}$ $t_{r(Voff)}$ t_f t_c	Turn-off Delay Time Off-voltage Rise Time Fall Time Cross-over Time	V_{clamp} = 16 V I_D = 80 A R_G = 4.7 Ω V_{GS} = 10 V (Inductive Load, see fig. 5)		85 46 335 404		ns ns ns ns

SOURCE DRAIN DIODE

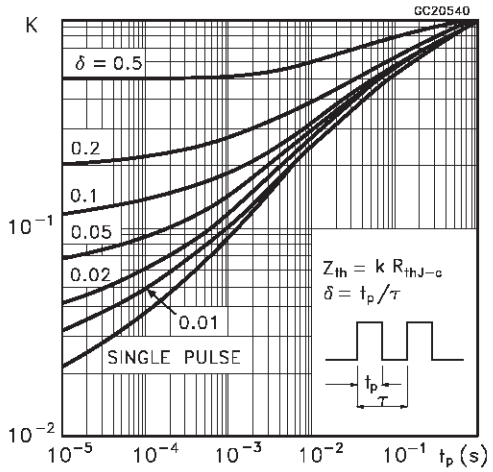
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM}(•)	Source-drain Current Source-drain Current (pulsed)				160 640	A A
V_{SD} (*)	Forward On Voltage	I_{SD} = 160 A V_{GS} = 0			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 80 A di/dt = 100 A/µs V_{DD} = 15 V (see test circuit, fig. 5)		100 0.25 5		ns µC A

(*) Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %
(•) Pulse width limited by safe operating area

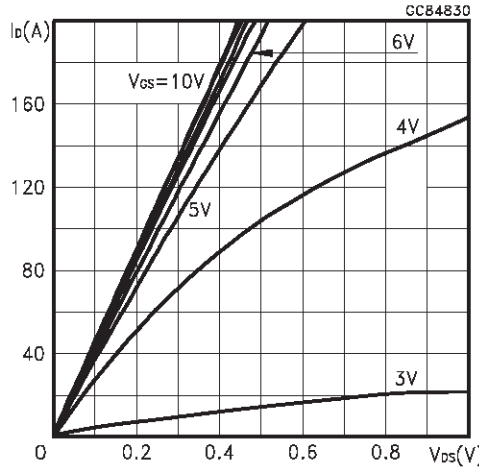
Safe Operating Area



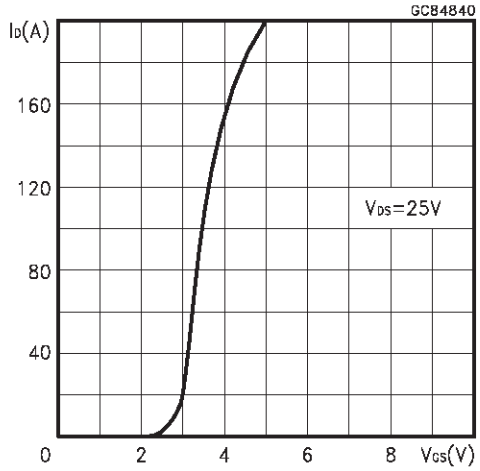
Thermal Impedance



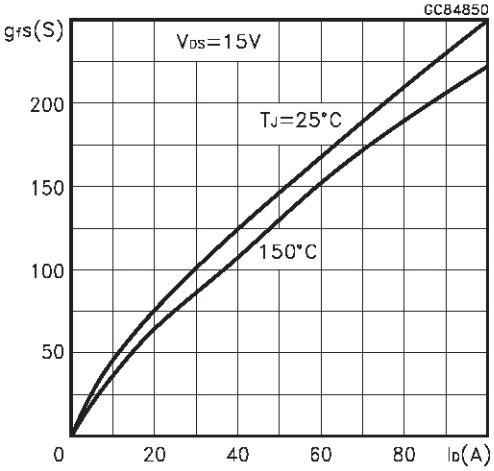
Output Characteristics



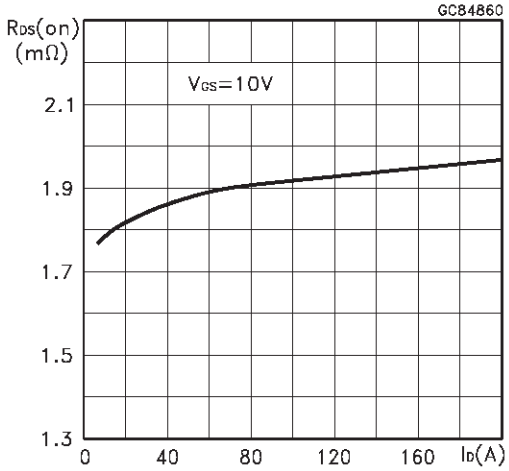
Transfer Characteristics



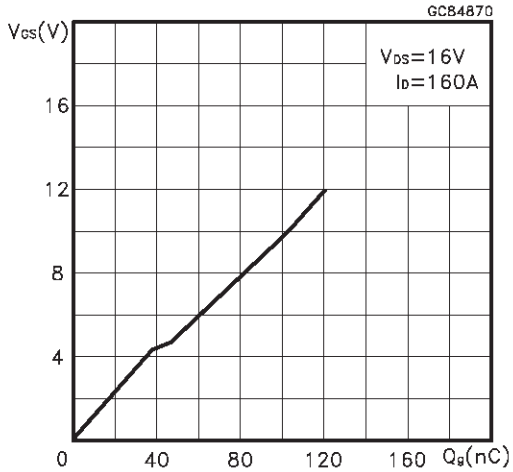
Transconductance



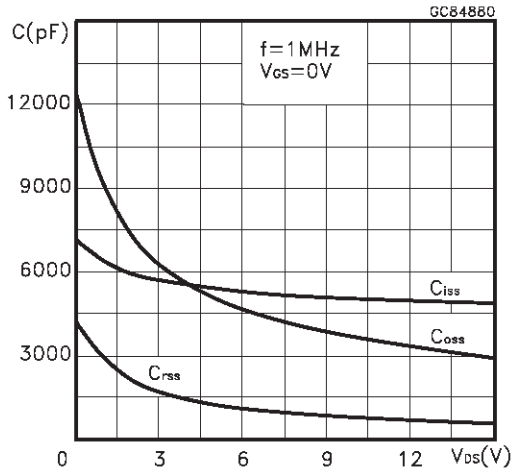
Static Drain-source On Resistance



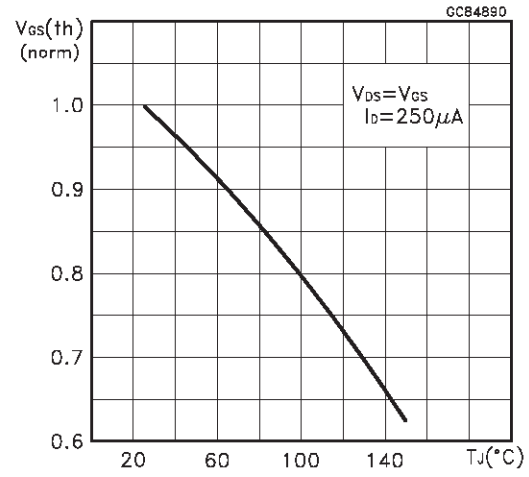
Gate Charge vs Gate-source Voltage



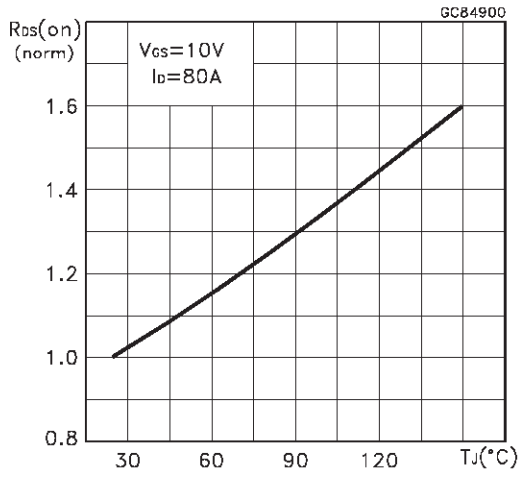
Capacitance Variations



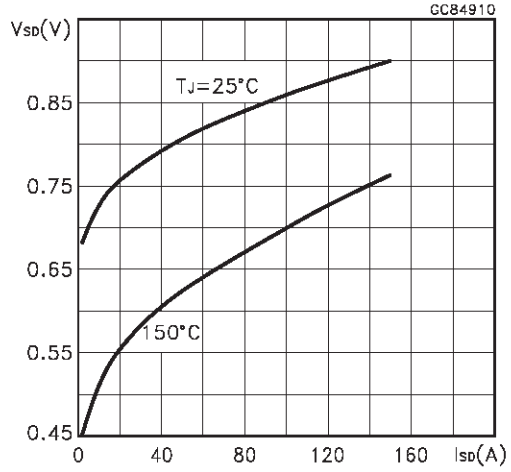
Normalized Gate Threshold Voltage vs Temperature



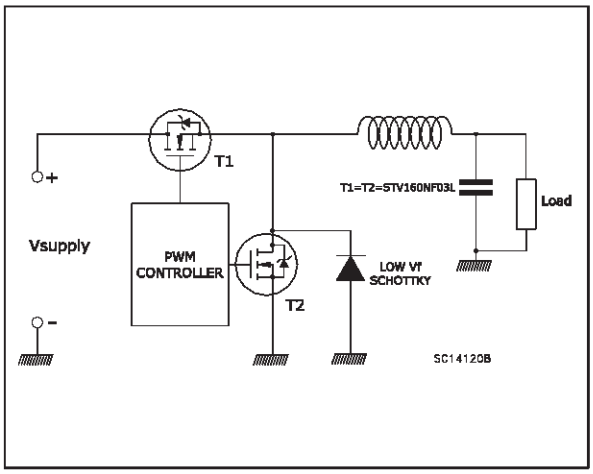
Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics



Basic Schematic For Motherboard VRM Whith Synchronous Rectification



Basic Schematic Mosfet Switch Used In Secondary Side Of a Foward Convert

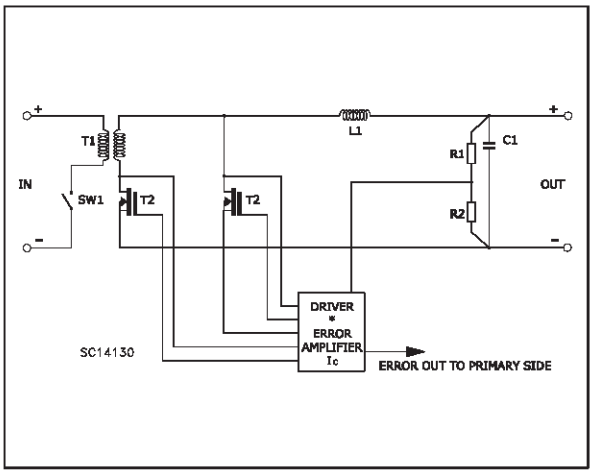


Fig. 1: Unclamped Inductive Load Test Circuit

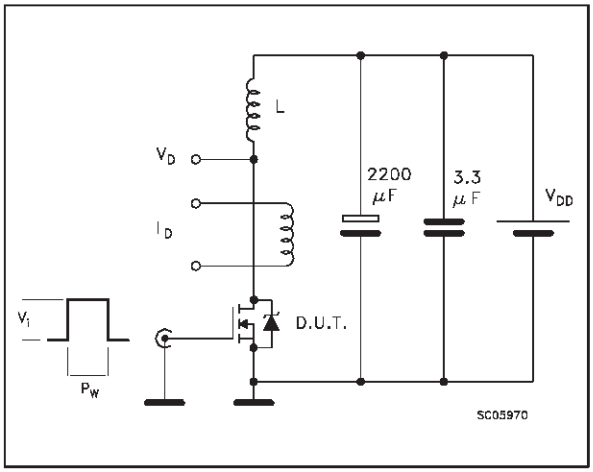


Fig. 2: Unclamped Inductive Waveform

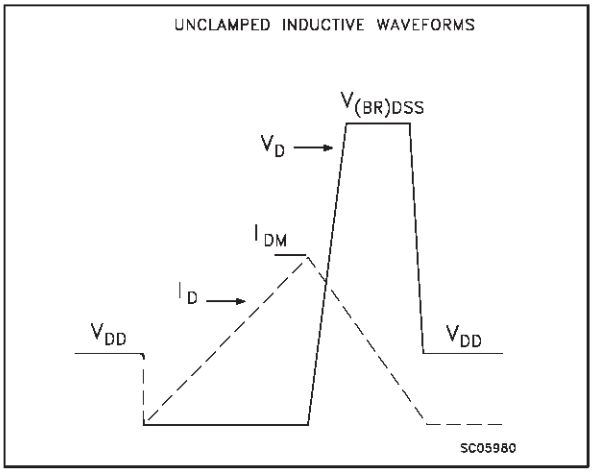


Fig. 3: Switching Times Test Circuits For Resistive Load

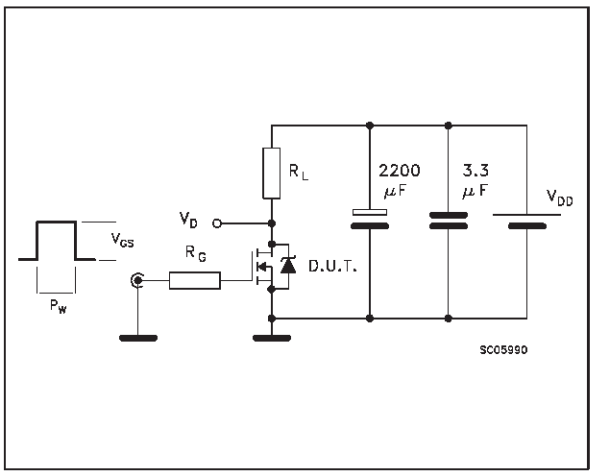


Fig. 4: Gate Charge test Circuit

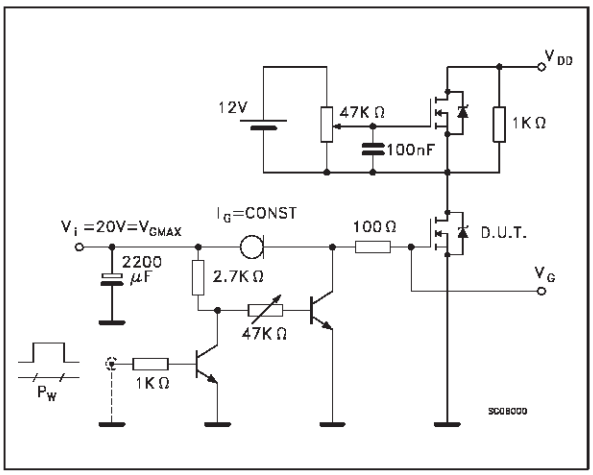
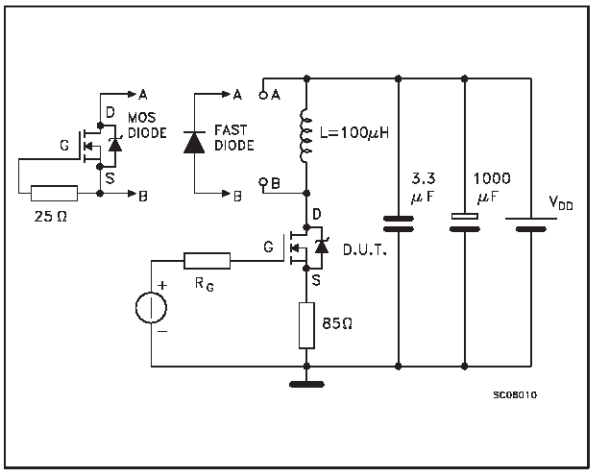
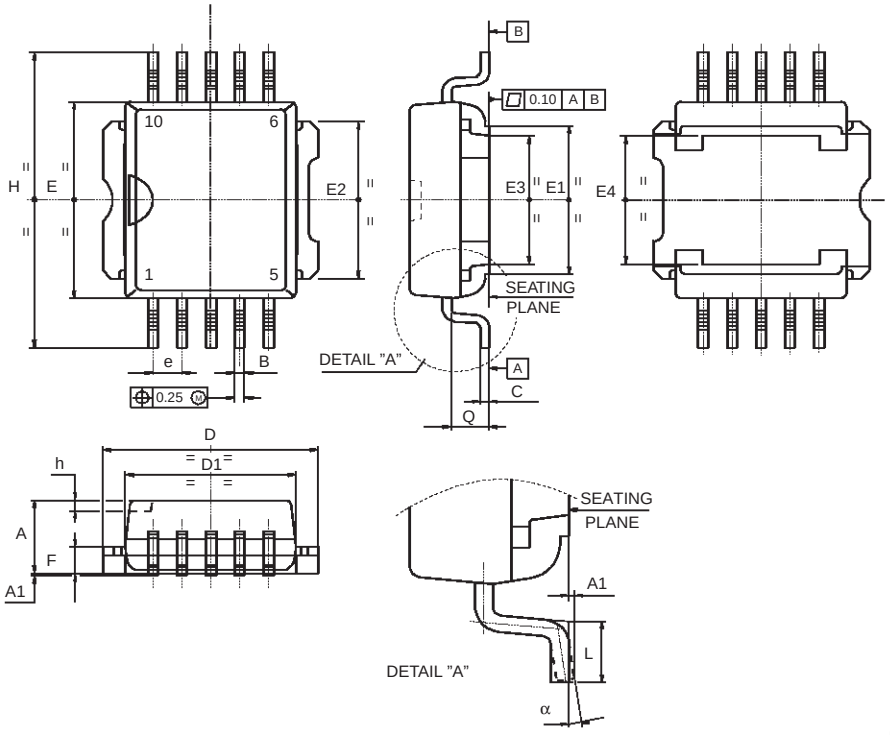


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



PowerSO-10 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	3.35		3.65	0.132		0.144
A1	0.00		0.10	0.000		0.004
B	0.40		0.60	0.016		0.024
c	0.35		0.55	0.013		0.022
D	9.40		9.60	0.370		0.378
D1	7.40		7.60	0.291		0.300
E	9.30		9.50	0.366		0.374
E1	7.20		7.40	0.283		0.291
E2	7.20		7.60	0.283		0.300
E3	6.10		6.35	0.240		0.250
E4	5.90		6.10	0.232		0.240
e		1.27			0.050	
F	1.25		1.35	0.049		0.053
H	13.80		14.40	0.543		0.567
h		0.50			0.002	
L	1.20		1.80	0.047		0.071
q		1.70			0.067	
α	0^o		8^o			



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