



# STB55NE06L

## N-CHANNEL 60V - 0.18 Ω - 55A D<sup>2</sup>PAK STripFET™ POWER MOSFET

TYPE	V <sub>DSS</sub>	R <sub>DS(on)</sub>	I <sub>D</sub>
STB55NE06L	60 V	<0.022 Ω	55 A

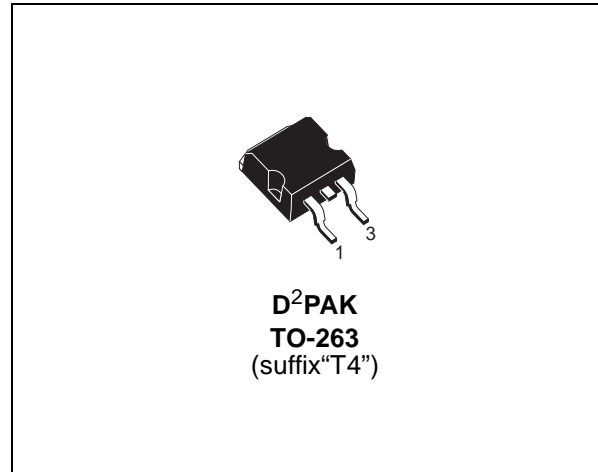
- TYPICAL R<sub>DS(on)</sub> = 0.018Ω
- EXCEPTIONAL dv/dt CAPABILITY
- 100% AVALANCHE TESTED
- LOW GATE CHARGE 100 °C
- HIGH dv/dt CAPABILITY
- LOW THRESHOLD DRIVE
- FOR THROUGH-HOLE VERSION CONTACT SALES OFFICE

### DESCRIPTION

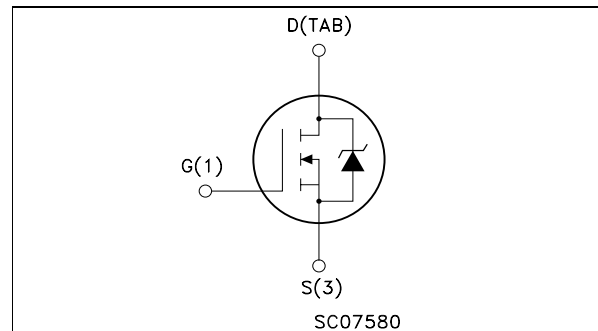
This Power Mosfet is the latest development of STMicroelectronis unique "Single Feature Size™" strip-based process. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing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

### APPLICATIONS

- DC MOTOR CONTROL
- DC-DC & DC-AC CONVERTERS
- SYNCHRONOUS RECTIFICATION



### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>DS</sub>	Drain-source Voltage (V <sub>GS</sub> = 0)	60	V
V <sub>DGR</sub>	Drain-gate Voltage (R <sub>GS</sub> = 20 kΩ)	60	V
V <sub>GS</sub>	Gate- source Voltage	±15	V
I <sub>D</sub>	Drain Current (continuos) at T <sub>C</sub> = 25°C	55	A
I <sub>D</sub>	Drain Current (continuos) at T <sub>C</sub> = 100°C	39	A
I <sub>DM</sub> (●)	Drain Current (pulsed)	220	A
P <sub>tot</sub>	Total Dissipation at T <sub>C</sub> = 25°C	130	W
	Derating Factor	0.86	W/°C
dv/dt <sup>(2)</sup>	Peak Diode Recovery voltage slope	7	V/ns
T <sub>stg</sub>	Storage Temperature	-60 to 175	°C
T <sub>j</sub>	Max. Operating Junction Temperature	175	°C

(●)Pulse width limited by safe operating area.

I<sub>SD</sub> ≤ 55A, di/dt ≤ 300A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>j</sub> ≤ T<sub>JMAX</sub>.

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### THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	1.15	°C/W
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	62.5	°C/W
$R_{thc-sink}$	Thermal Resistance Case-sink	Typ	0.5	°C/W
$T_j$	Maximum Lead Temperature For Soldering Purpose		300	°C

### AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
$I_{AR}$	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by $T_j$ max)	55	A
$E_{AS}$	Single Pulse Avalanche Energy (starting $T_j = 25\text{ °C}$ , $I_D = I_{AR}$ , $V_{DD} = 15\text{ V}$ )	200	mJ

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

#### OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 25\text{ }\mu\text{A}$ , $V_{GS} = 0$	60			V
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{GS} = 0$ )	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating}$ , $T_C = 125\text{ °C}$			1 10	$\mu\text{A}$ $\mu\text{A}$
$I_{GSS}$	Gate-body Leakage Current ( $V_{DS} = 0$ )	$V_{GS} = \pm 15\text{ V}$			$\pm 100$	nA

#### ON (1)

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	1.7	2.5	V
$I_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 5\text{ V}$ $I_D = 27.5\text{ A}$ $V_{GS} = 10\text{ V}$ $I_D = 27.5\text{ A}$		0.022 0.019	0.028 0.022	$\Omega$ $\Omega$
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10\text{ V}$	55			A

### DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs}^{(1)}$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ , $I_D = 27.5\text{ A}$	20	30		S
$C_{iss}$	Input Capacitance	$V_{DS} = 25\text{ V}$ $f = 1\text{ MHz}$ $V_{GS} = 0$		2800	3750	pF
$C_{oss}$	Output Capacitance			375	500	pF
$C_{rss}$	Reverse Transfer Capacitances			100	140	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	$V_{DD} = 30V$ $I_D = 27.5 A$ $R_G = 4.7 \Omega$ $V_{GS} = 5 V$ (see test circuit, Figure 3)		40 100	55 140	ns ns
$Q_g$	Total Gate Charge	$V_{DD}=48V$ $I_D=55A$ $V_{GS}=5V$		40	55	nC
$Q_{gs}$	Gate-Source Charge			13		nC
$Q_{gd}$	Gate-Drain Charge			20		nC

**SWITCHING OFF**

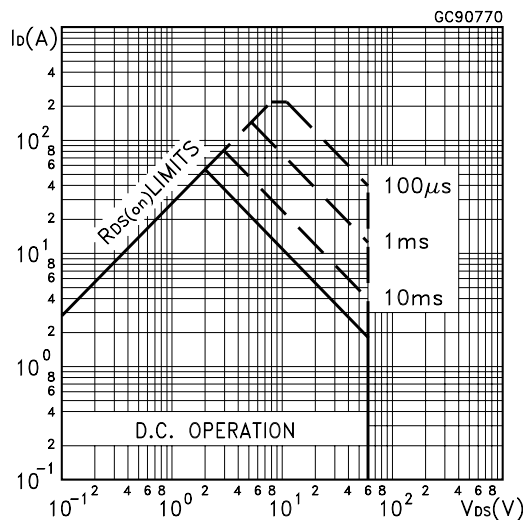
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time Rise Time	$V_{DD} = 48 V$ $I_D = 55 A$ $R_G = 4.7 \Omega$ $V_{GS} = 5 V$ (see test circuit, Figure 5)		25	35	ns
$t_r$	Fall Time			40	55	ns
$t_c$	Cross-over Time			65	90	ns

**SOURCE DRAIN DIODE**

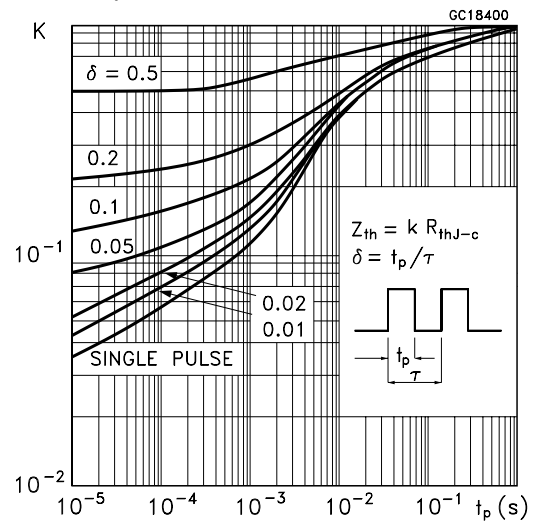
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$	Source-drain Current				55	A
$I_{SDM} (\bullet)$	Source-drain Current (pulsed)				220	A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 55 A$ $V_{GS} = 0$			1.5	V
$t_{rr}$ $Q_{rr}$ $I_{RRM}$	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 55 A$ $di/dt = 100 A/\mu s$ $V_{DD} = 30V$ $T_j = 150^\circ C$ (see test circuit, Figure 3)		65 180 5.5		ns $\mu C$ A

(\*) Pulsed: Pulse duration = 300  $\mu s$ , duty cycle 1.5 %.  
 (•) Pulse width limited by safe operating area.

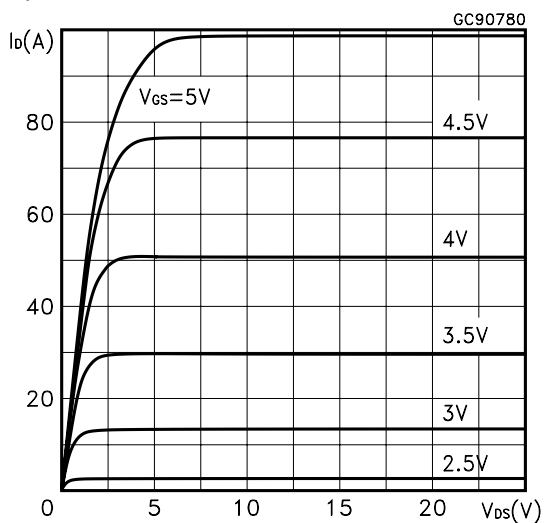
**Safe Operating Area**



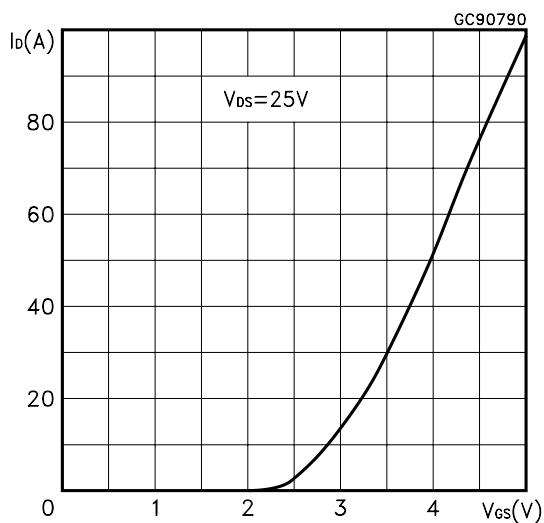
**Thermal Impedance**



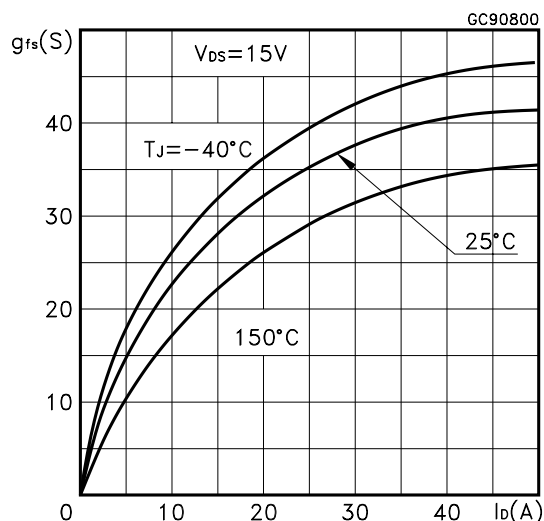
**Output Characteristics**



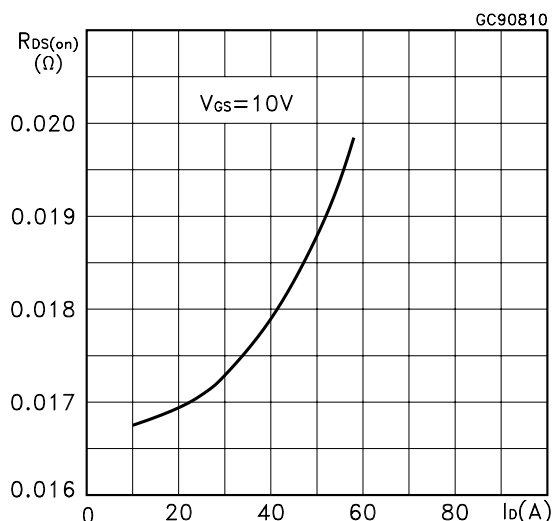
**Transfer Characteristics**



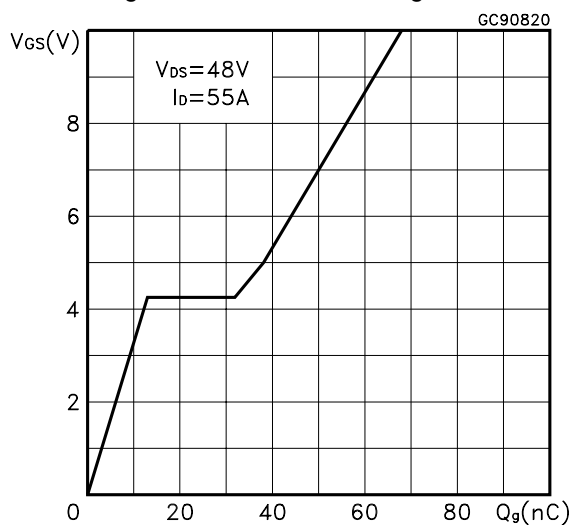
**Transconductance**



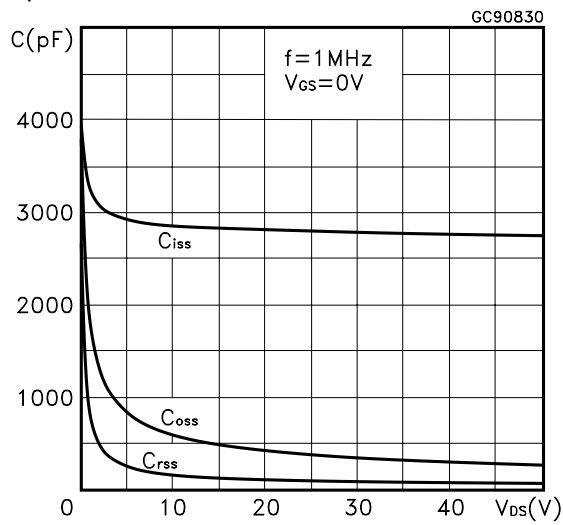
**Static Drain-source On Resistance**



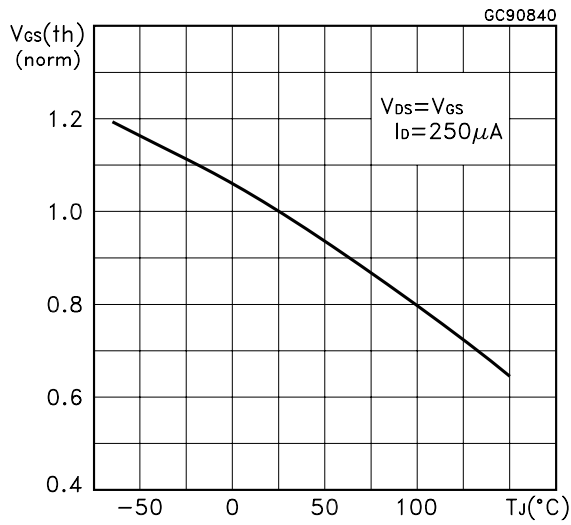
**Gate Charge vs Gate-source Voltage**



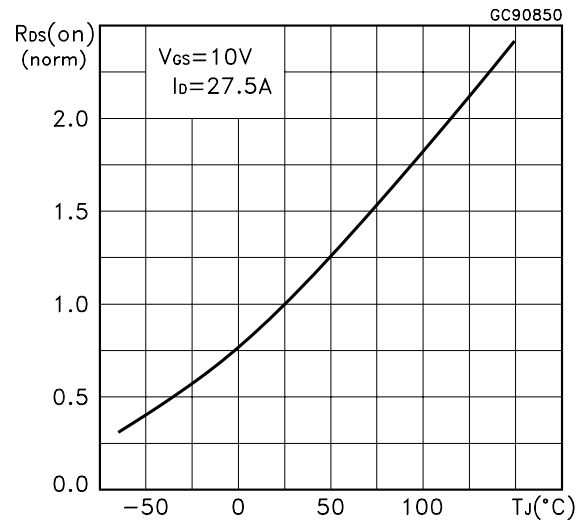
**Capacitance Variations**



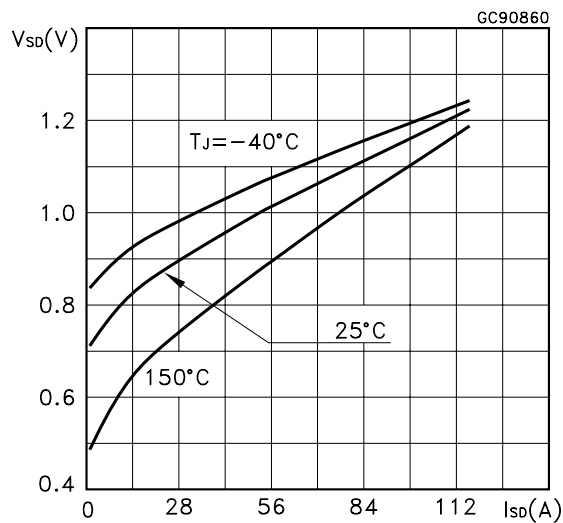
Normalized Gate Threshold Voltage vs Temperature



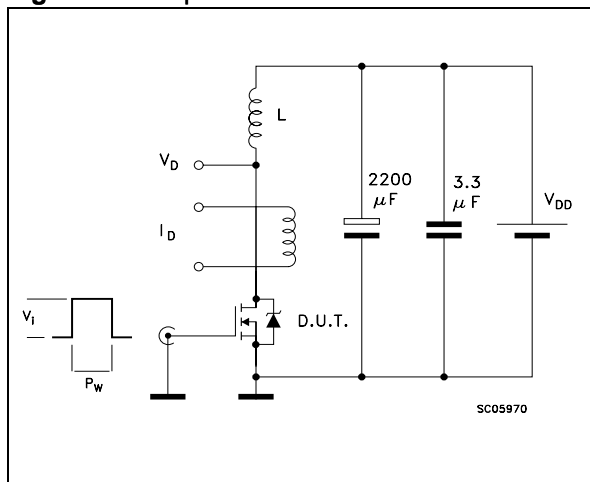
Normalized On Resistance vs Temperature



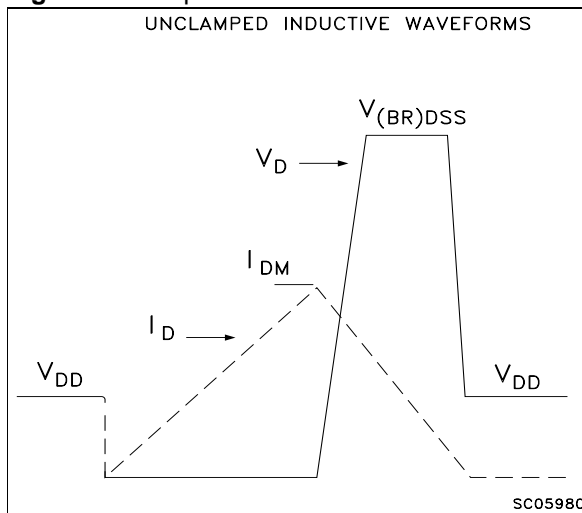
Source-drain Diode Forward Characteristics



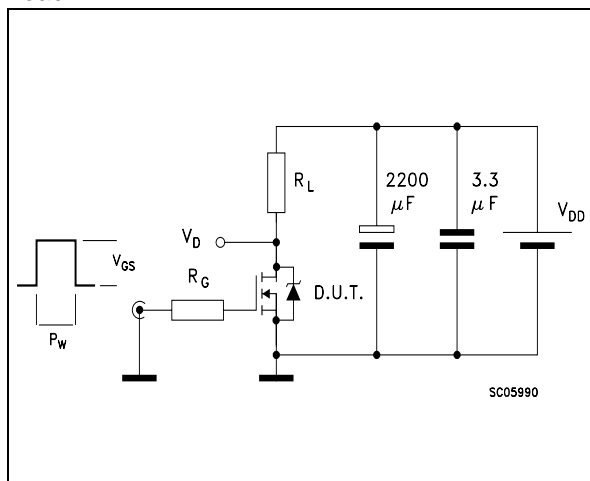
**Fig. 1: Unclamped Inductive Load Test Circuit**



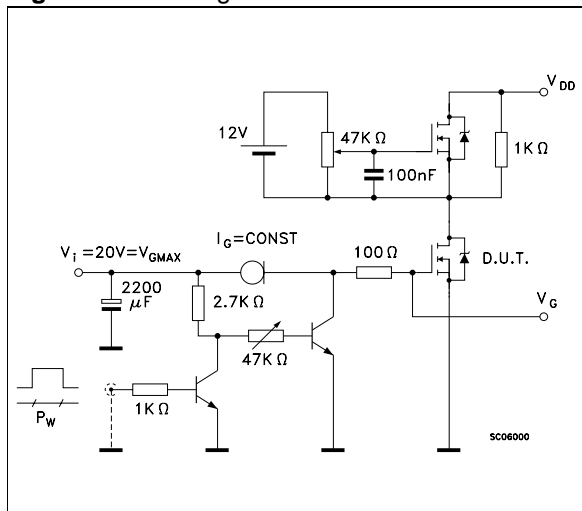
**Fig. 2: Unclamped Inductive Waveform**



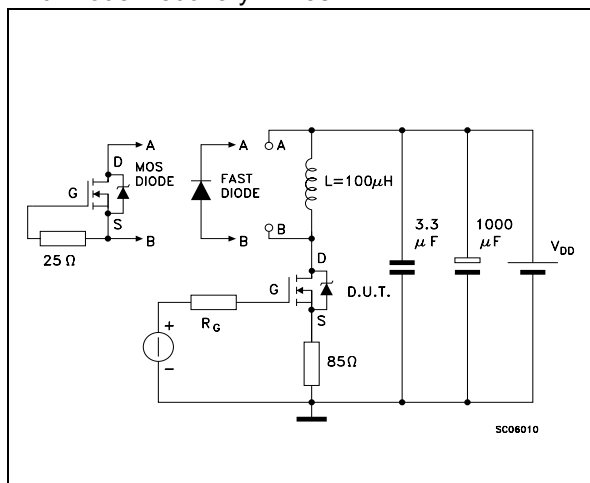
**Fig. 3: Switching Times Test Circuits For Resistive Load**



**Fig. 4: Gate Charge test Circuit**

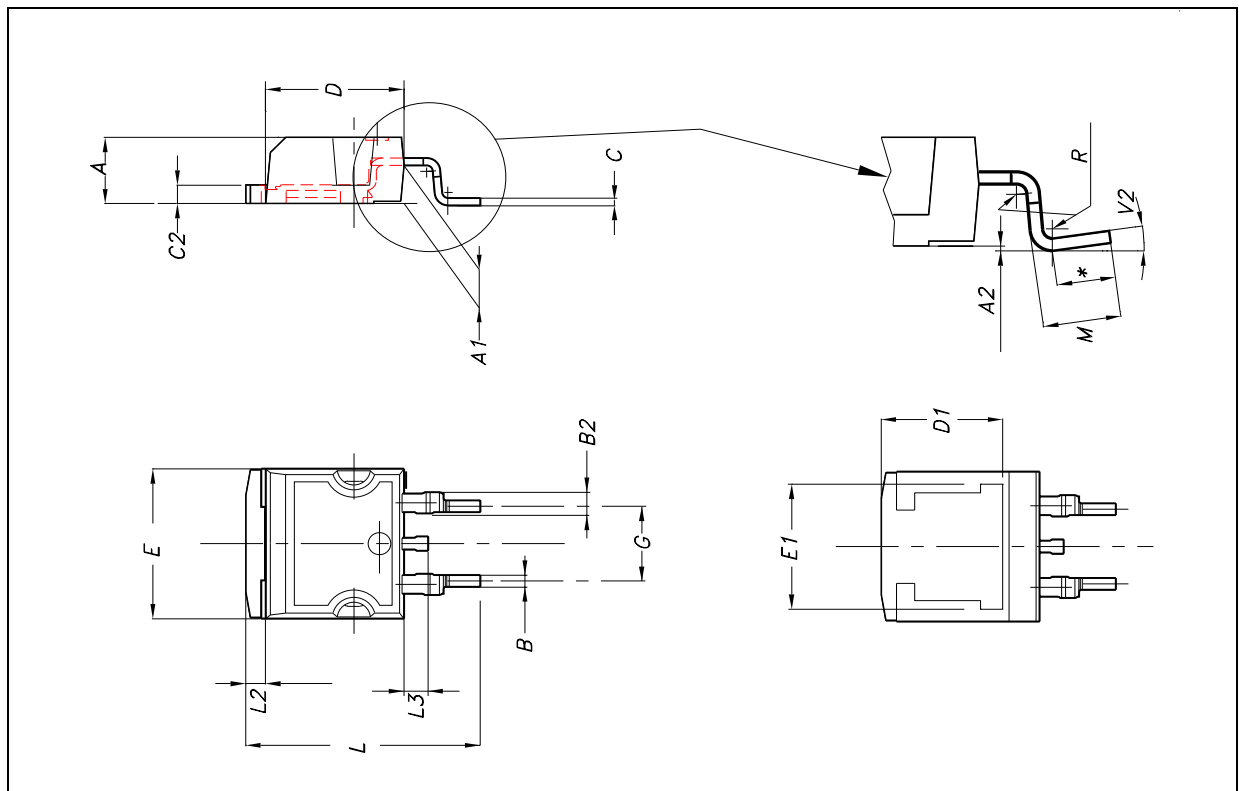


**Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times**



D<sup>2</sup>PAK MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.7		0.93	0.027		0.036
B2	1.14		1.7	0.044		0.067
C	0.45		0.6	0.017		0.023
C2	1.23		1.36	0.048		0.053
D	8.95		9.35	0.352		0.368
D1		8			0.315	
E	10		10.4	0.393		
E1		8.5			0.334	
G	4.88		5.28	0.192		0.208
L	15		15.85	0.590		0.625
L2	1.27		1.4	0.050		0.055
L3	1.4		1.75	0.055		0.068
M	2.4		3.2	0.094		0.126
R		0.4			0.015	
V2	0°		8°			



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