

<b>Features</b> <ul style="list-style-type: none"> <li>➤ Split Gate Trench MOSFET technology</li> <li>➤ Excellent package for heat dissipation</li> <li>➤ High density cell design for low <math>R_{DS(ON)}</math></li> </ul>	<b><i>Bvdss</i></b>	<b><i>Rdson</i></b>	<b><i>ID</i></b>
	<b>-60V</b>	<b>5.4mΩ</b>	<b>-110A</b>
<b>Application</b> <ul style="list-style-type: none"> <li>➤ DC-DC Converters</li> <li>➤ Synchronous-rectification applications</li> <li>➤ Power management functions</li> </ul>			
<b>Package</b> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">             Marking and pin assignment         </div> <div style="text-align: center;">             TO-263 top view         </div> <div style="text-align: center;">             Schematic diagram         </div> </div>			

**Package Marking and Ordering Information**

Device Marking	Device	Device Package	Quantity
110P06	S110P06G	TO-263	800

**Absolute Maximum Ratings** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

Parameter	Symbol	Value	Unit	
Drain-Source Voltage	$V_{DS}$	-60	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V	
Continuous Drain Current	$T_C=25^{\circ}\text{C}$	$I_D$	-110	A
	$T_C=100^{\circ}\text{C}$	$I_D$	-70	A
Pulsed Drain Current	$I_{DM}^1$	-440	A	
Single Pulse Avalanche Energy	$E_{AS}^2$	960	mJ	
Power Dissipation	$T_C = 25^{\circ}\text{C}$	$P_D$	180	W
Operating junction and storage temperature	$T_J, T_{STG}$	150, -55 ~ 150	$^{\circ}\text{C}$	
Maximum Temperature for Soldering	$T_L$	260	$^{\circ}\text{C}$	



## Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-Case	$R_{\theta JC}$	0.69	$^{\circ}C/W$
Thermal Resistance, Junction -to-Ambient	$R_{\theta JA}$	60	$^{\circ}C/W$

## Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HLS110P06G	TO-263	1	2	3	Tape Reel

Electrical Characteristics ( $T_j=25^{\circ}C$  unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-60	-	-	V
Gate-body Leakage current	$I_{GSS}$	$V_{GS} = \pm 20V$	-	-	$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -60V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.6	-2.0	-2.4	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -15A$	-	5.4	7.0	m $\Omega$
Input Capacitance	$C_{ISS}$	$V_{DS} = -30V, V_{GS} = 0V,$ $f = 1MHz$	-	5403	-	pF
Output Capacitance	$C_{OSS}$		-	941	-	
Reverse Transfer Capacitance	$C_{RSS}$		-	48	-	
Gate Resistance	$R_g$	$V_{GS} = 0V, V_{DS}$ Open	-	2	-	$\Omega$
Total Gate Charge	$Q_g$	$V_{GS} = -10V, V_{DS} = -30V, I_D = -15A$	-	80.2	-	nC
Gate-Source Charge	$Q_{gs}$		-	15.2	-	
Gate-Drain Charge	$Q_{gd}$		-	11	-	
Turn-On Delay Time	$T_{d(on)}$	$V_{GS} = -10V, V_{DS} = -30V,$ $R_G = 3\Omega, I_D = -15A$ $R_L = 0.75\Omega$	-	4.5	-	ns
Rise Time	$T_R$		-	2.5	-	
Turn-Off Delay Time	$T_{d(off)}$		-	14.5	-	
Fall Time	$T_F$		-	3.5	-	
Diode Forward Current	$I_S$	$T_C = 25^{\circ}C$	-	-	-110	A
Diode Forward Voltage	$V_{SD}$	$I_S = -15A, V_{GS} = 0V$	-	-	-1.2	V
Reverse Recovery time	$T_{rr}$	$I_S = -15A, V_{DD} = -30V$ $di/dt = 100A/\mu s$	-	60	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	105	-	nC



Note :

1.Repetitive rating; pulse width limited by maximum junction temperature

2.V<sub>DD</sub> =30V, L=0.3mH, R<sub>G</sub> =25Ω, Starting T<sub>J</sub>=25°C

### Typical Performance Characteristics

Fig1:Typ. output characteristics

$I_D = f(-V_{DS})$

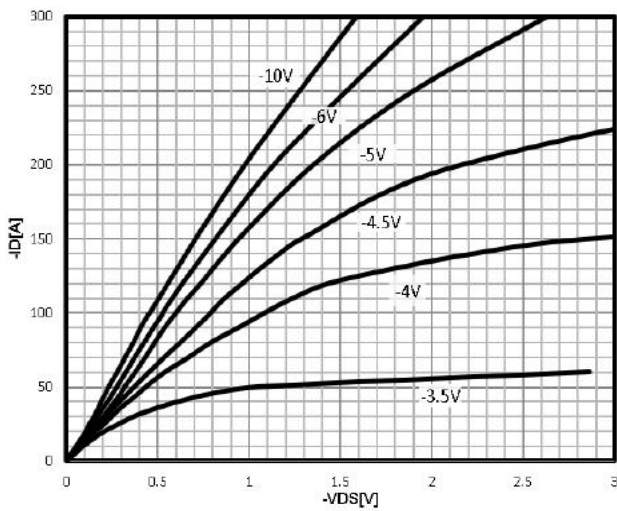


Fig2:Typ. drain-source on resistance

$R_{DS(on)} = f(-I_D)$

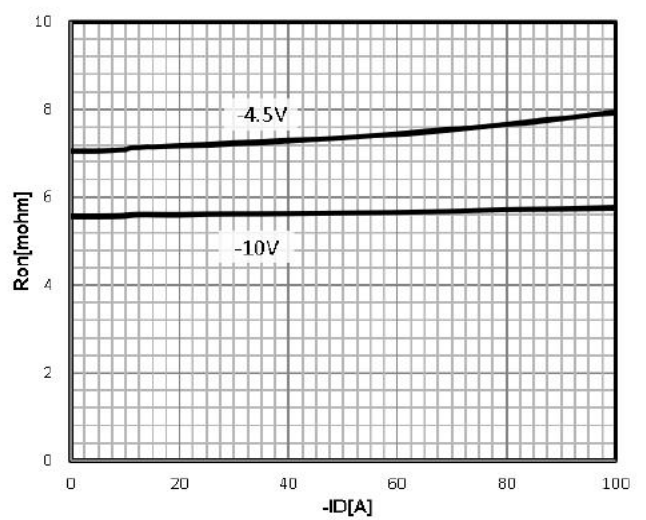


Fig3:

Typ. transfer characteristics

$-I_D = f(-V_{GS})$

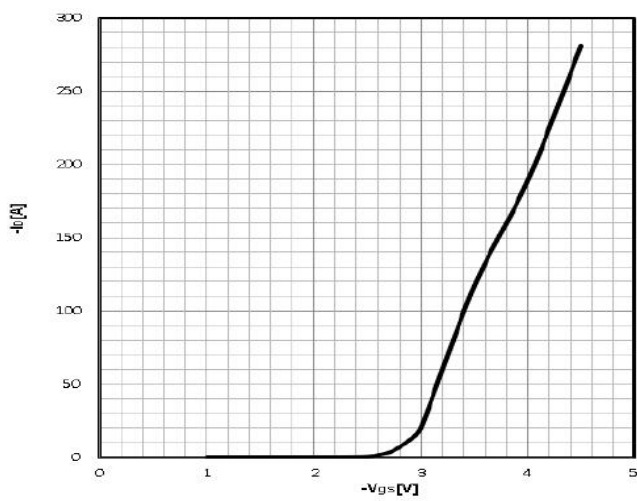


Fig4:Drain-source on-state resistance

$R_{DS(on)} = f(T_J); I_D = -15A; V_{GS} = -10V$

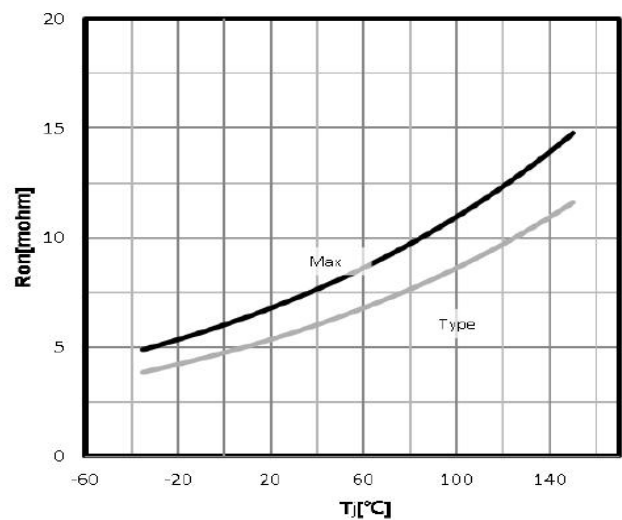




Fig5:Gate Threshold Voltage

$-V_{TH}=f(T_j); I_D=-250\mu A$

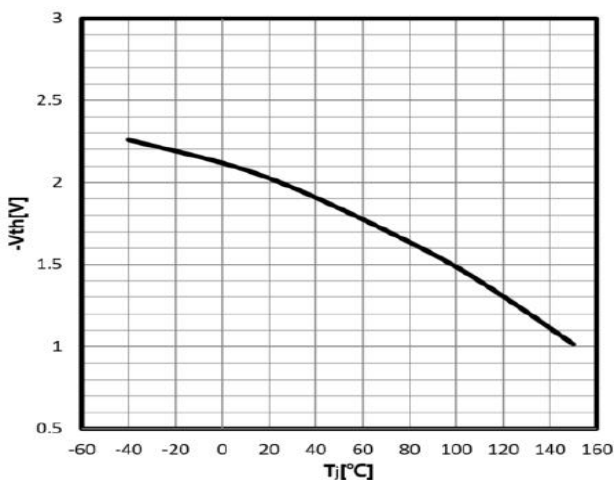


Fig6:Drain-source breakdown voltage

$V_{BR}(DSS)=f(T_j); I_D=-250\mu A$

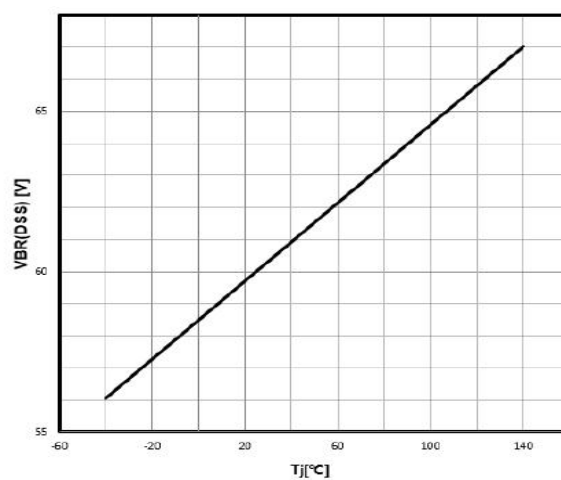


Fig7:Typ. gate charge

$V_{GS}=f(Q_g), I_D=-15A;$

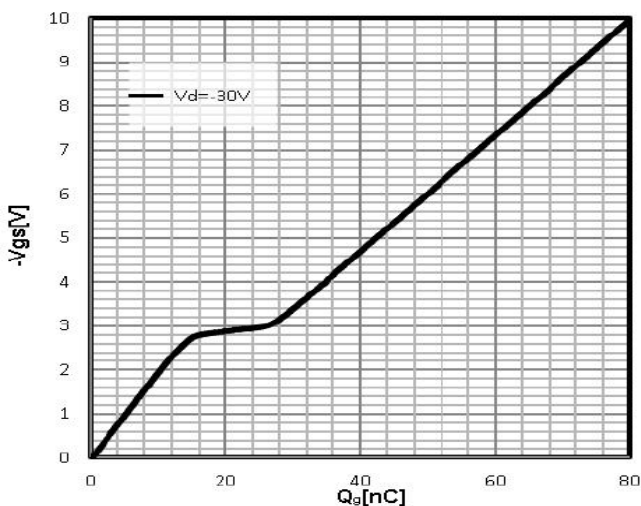


Fig8:Typ. capacitances

$C=f(V_{DS}); V_{GS}=0V; f=1MHz$

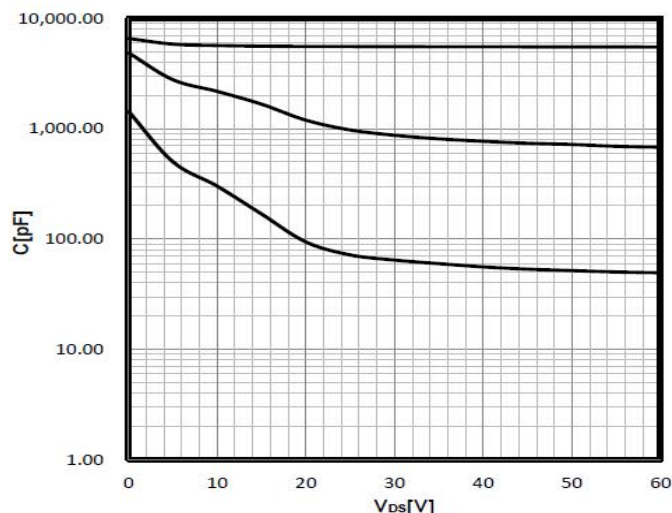


Fig9:Power Dissipation

$P_{tot}=f(T_c)$

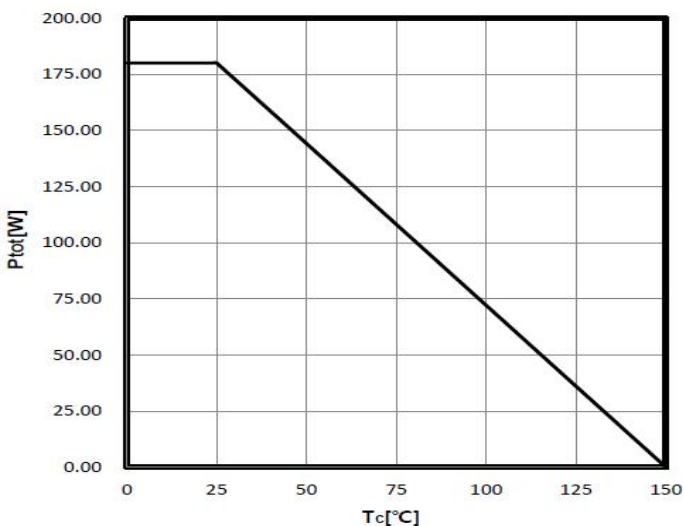


Fig10:Maximum Drain Current

$-I_D=f(T_c)$

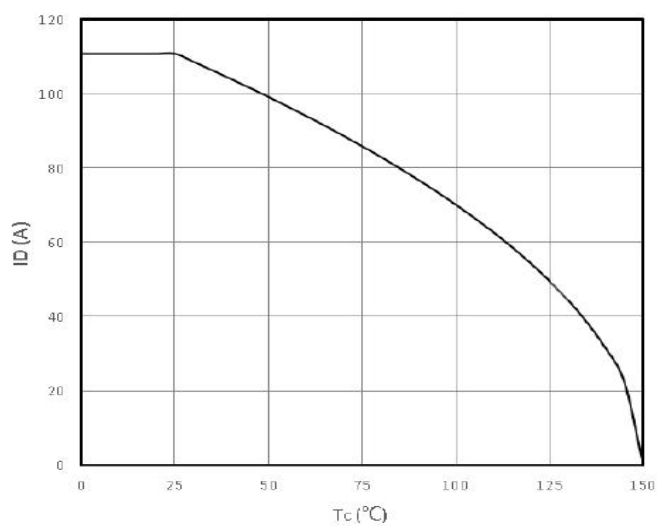


Fig11:Safe operating area

$$I_D = f(V_{DS})$$

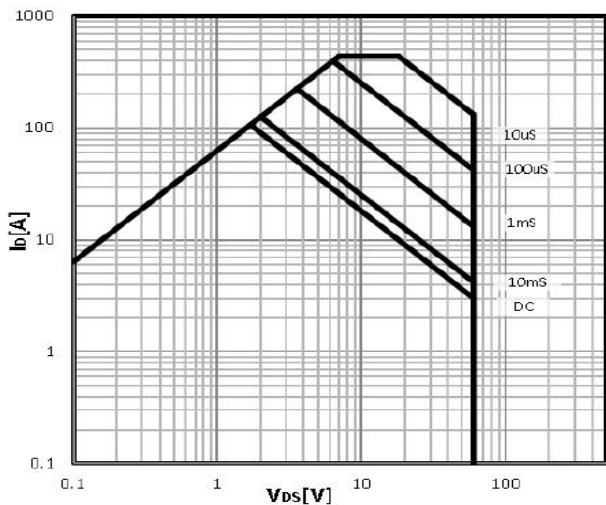


Fig12:Body Diode Forward Voltage Variation

$$-I_F = f(-V_{DS})$$

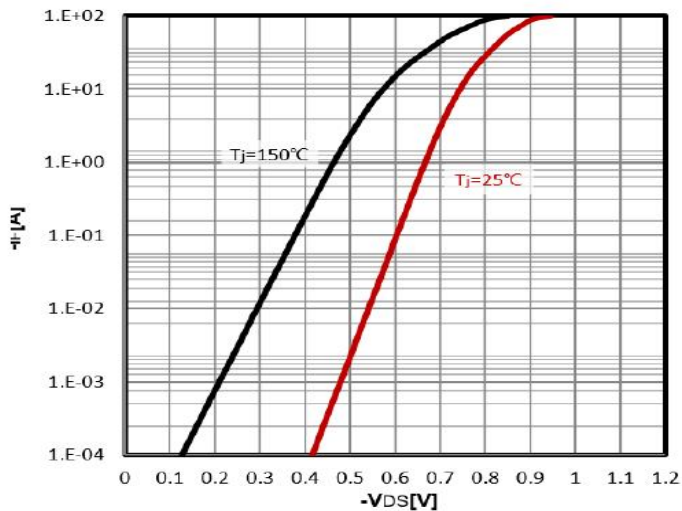
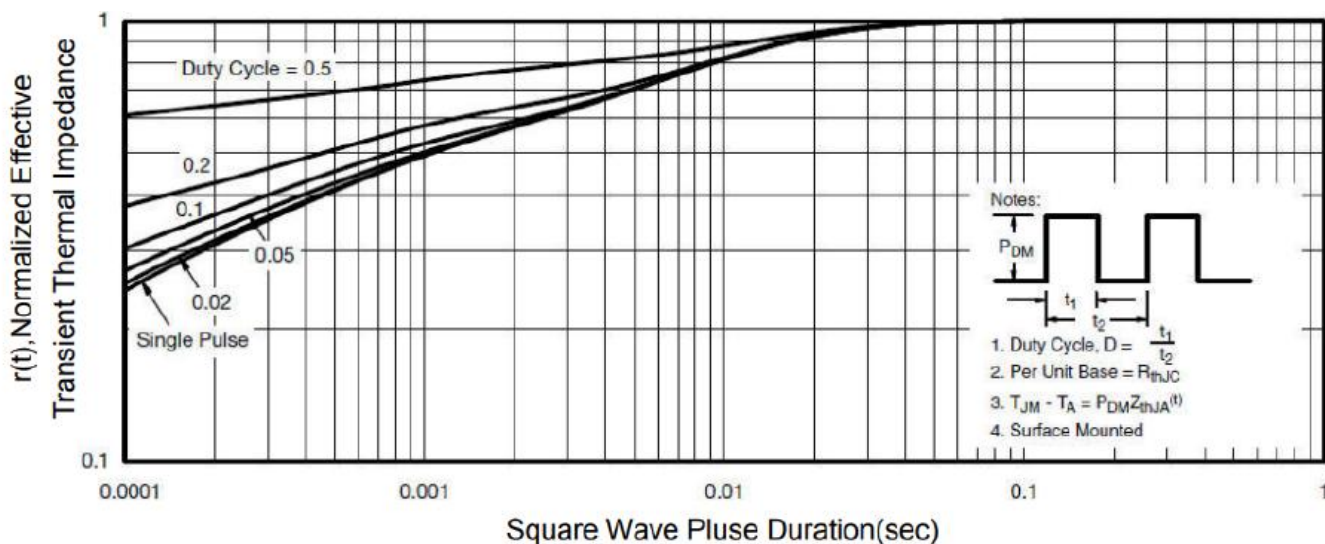


Figure 13: Max. Transient Thermal Impedance

$$Z_{thJC} = f(t_p)$$



Test Circuit and Waveform:

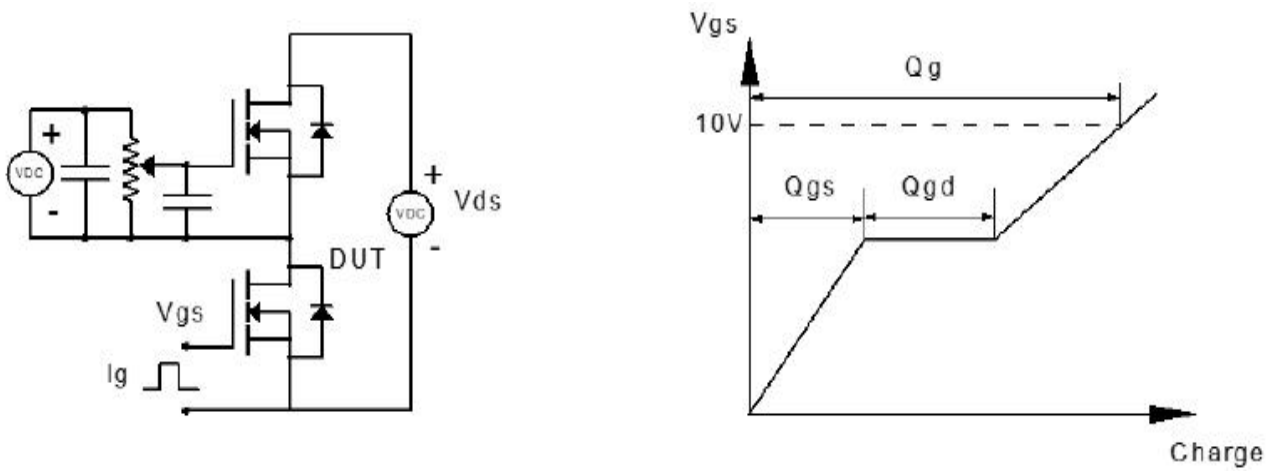


Figure.1: Gate Charge Test Circuit & Waveform

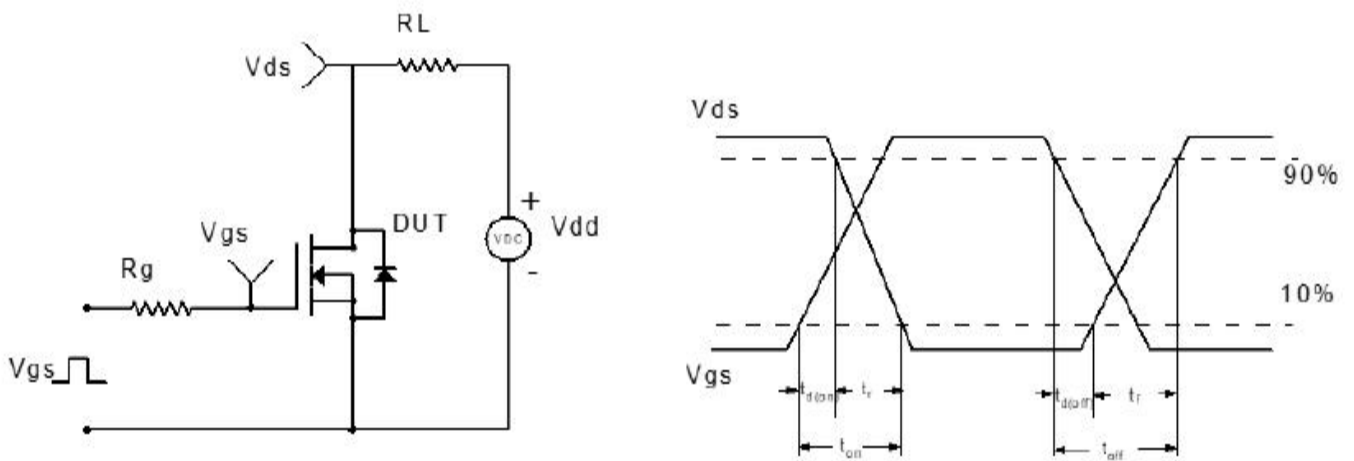


Figure.2: Resistive Switching Test Circuit & Wave forms

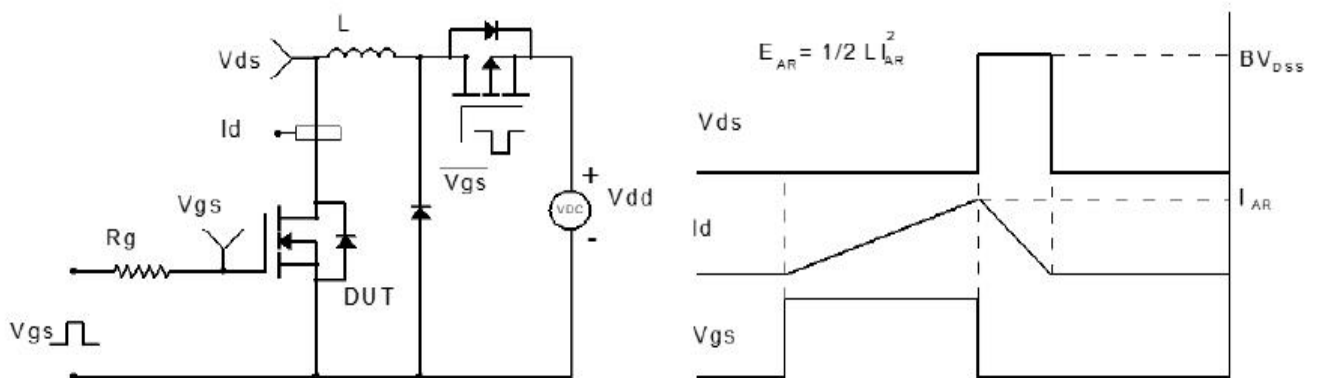


Figure.3: Unclamped inductive Switching Test Circuit & Wave forms

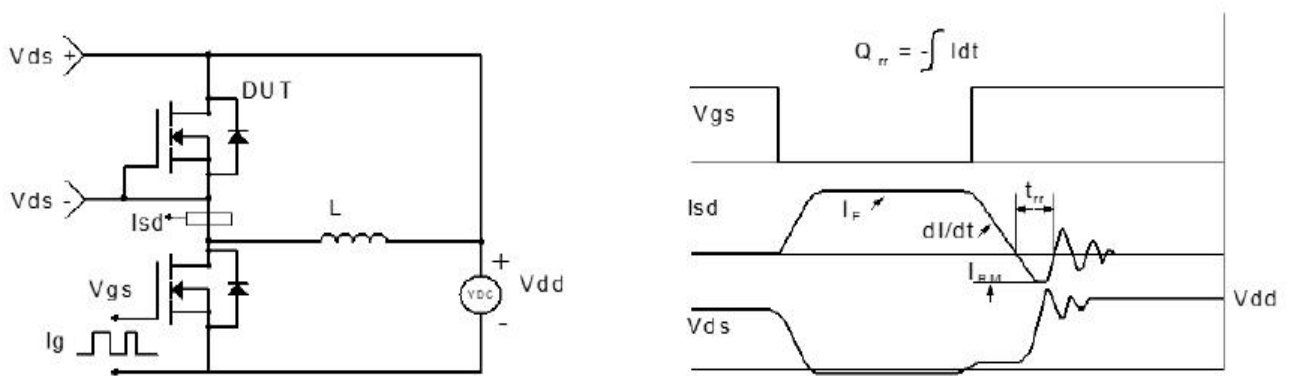
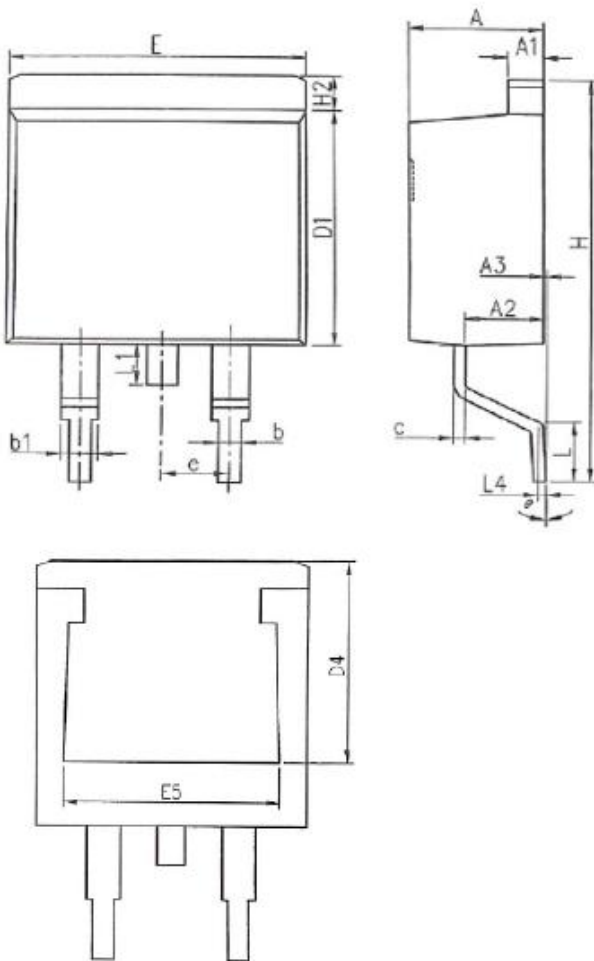


Figure.4: Diode Recovery Test Circuit & Waveform

**Package Dimensions TO263**
**COMMON DIMENSIONS**


SYMBOL	MM	
	MIN	MAX
A	4.37	4.89
A1	1.17	1.42
A2	2.20	2.90
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.28	0.60
D1	8.45	9.30
D4	6.60	-
E	9.80	10.40
E5	7.06	-
e	2.54BSC	
H	14.70	15.70
H2	1.07	1.47
L	2.00	2.80
L1	-	1.75
L4	0.254BSC	
$\theta$	0°	9°





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