

## N-Ch 100V Fast Switching MOSFETs

## Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$

## Product Summary

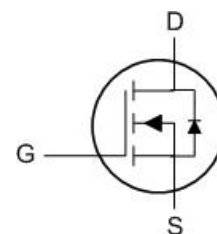
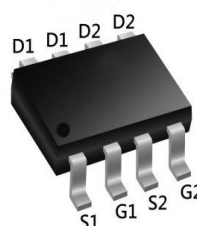


BVDSS	RDSON	ID
100V	61mΩ	15A

## Applications

- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

## GCD, 'D]b'7 cbZ[ i fU]cb'



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	15	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	10.7	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	80	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	22	mJ
$I_{AS}$	Avalanche Current	---	A
$P_D @ T_C = 25^\circ\text{C}$	Total Power Dissipation <sup>4</sup>	46	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

## Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	---	---	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	2.7	$^\circ\text{C/W}$

## N-Ch 100V Fast Switching MOSFETs

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
$\Delta BV_{DSS} / \Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$	---	---	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=5A$	---	61	75	m $\Omega$
		$V_{GS}=4.5V, I_D=4A$	---	77	100	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.3	1.8	2.3	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	$\text{mV}/^\circ\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=100V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=100V, V_{GS}=0V, T_J=100^\circ\text{C}$	---	---	100	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$g_{fs}$	Forward Transconductance	$V_{DS}=10V, I_D=5A$	---	---	---	S
$R_g$	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	---	---	$\Omega$
$Q_g$	Total Gate Charge	$V_{DS}=50V, V_{GS}=10V, I_D=10A$	---	3.7	---	nC
$Q_{gs}$	Gate-Source Charge		---	0.8	---	
$Q_{gd}$	Gate-Drain Charge		---	1	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{GS}=10V, V_{DD}=50V,$ $R_G=3\Omega, I_D=10A$	---	8	---	ns
$T_r$	Rise Time		---	16	---	
$T_{d(off)}$	Turn-Off Delay Time		---	17	---	
$T_f$	Fall Time		---	14	---	
$C_{iss}$	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, f=1\text{MHz}$	---	228	---	pF
$C_{oss}$	Output Capacitance		---	58	---	
$C_{rss}$	Reverse Transfer Capacitance		---	1.9	---	

## Diode Characteristics

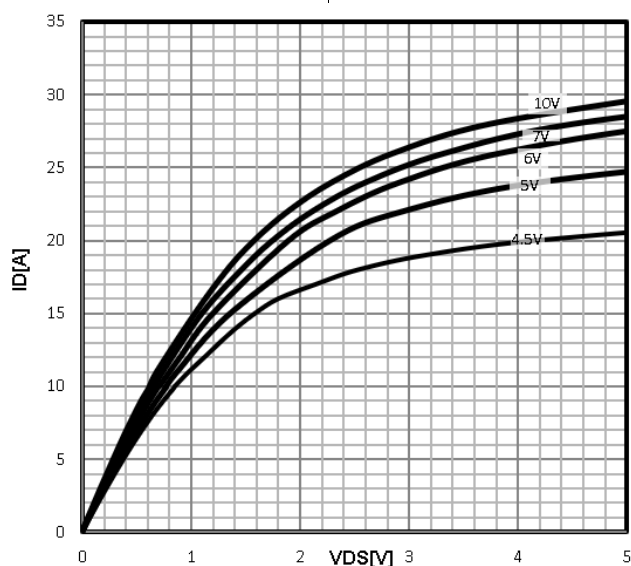
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current <sup>1,4</sup>	$V_G=V_D=0V$ , Force Current	---	---	15	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=20A, T_J=25^\circ\text{C}$	---	---	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=10A, di/dt=100A/\mu s,$ $T_J=25^\circ\text{C}$	---	22	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	18	---	nC

Note :

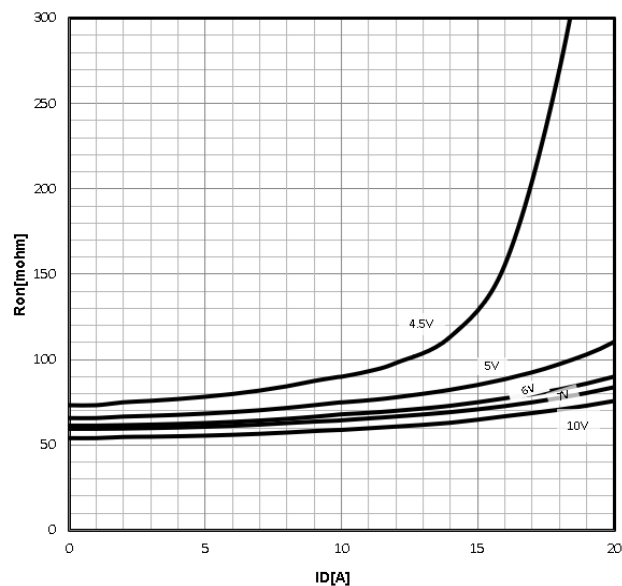
1 The data is tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.2 The data is tested by pulsed pulse width  $\leq 300\mu s$  duty cycle  $\leq 2\%$ 3 The EAS data shows Max. rating. The test condition is  $V_{RMS}=0, V_{DD}=50V, V_{GS}=10V, L=5\text{mH}$ .4 The power dissipation is limited by  $150^\circ\text{C}$  junction temperature5 The data is theoretically the same as  $I_{DPA}$  and  $I_{DPM}$ . In real applications, it should be limited by total power dissipation.

### Characteristics Curve:

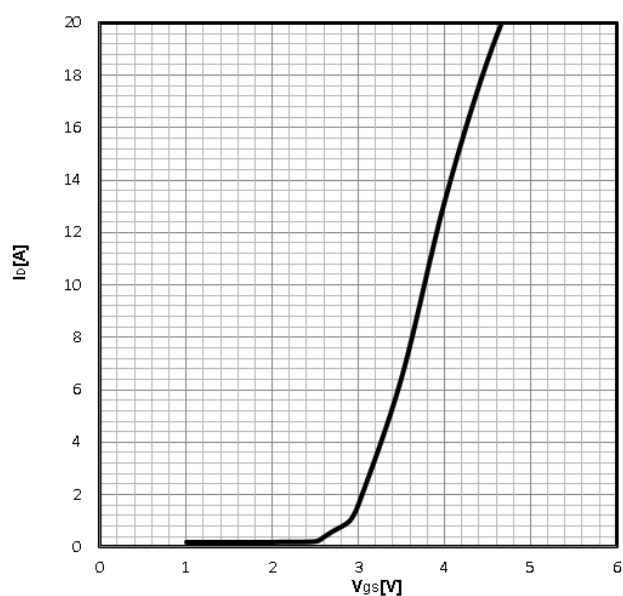
Typ. output characteristics  
 $I_D = f(V_{DS})$



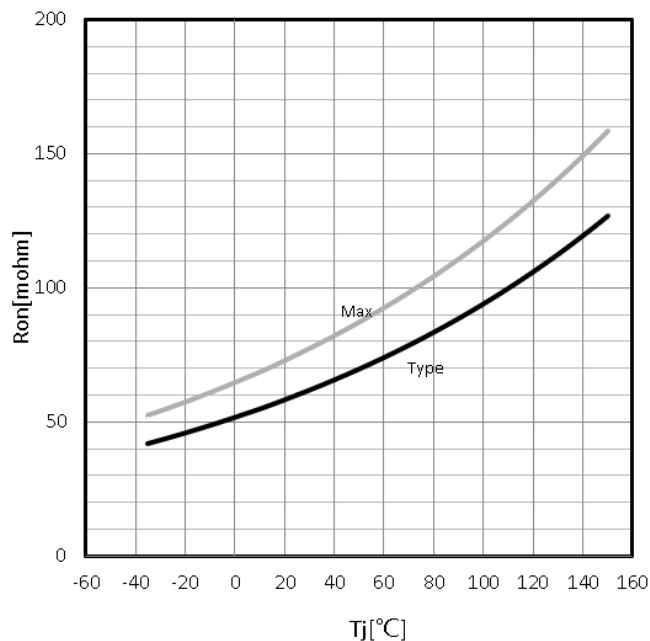
Typ. drain-source on resistance  
 $R_{DS(on)} = f(I_D)$



Typ. transfer characteristics  
 $I_D = f(V_{GS})$

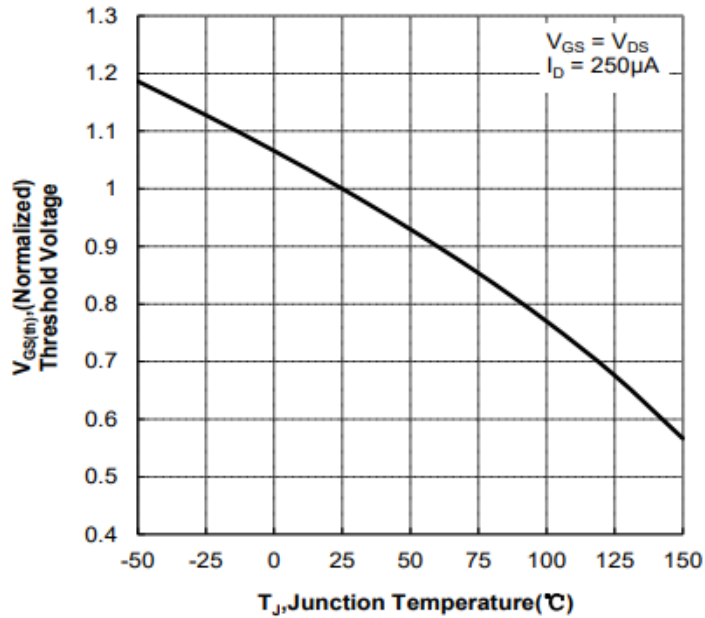


Drain-source on-state resistance  
 $R_{DS(on)} = f(T_j); I_D = 5A; V_{GS} = 10V$



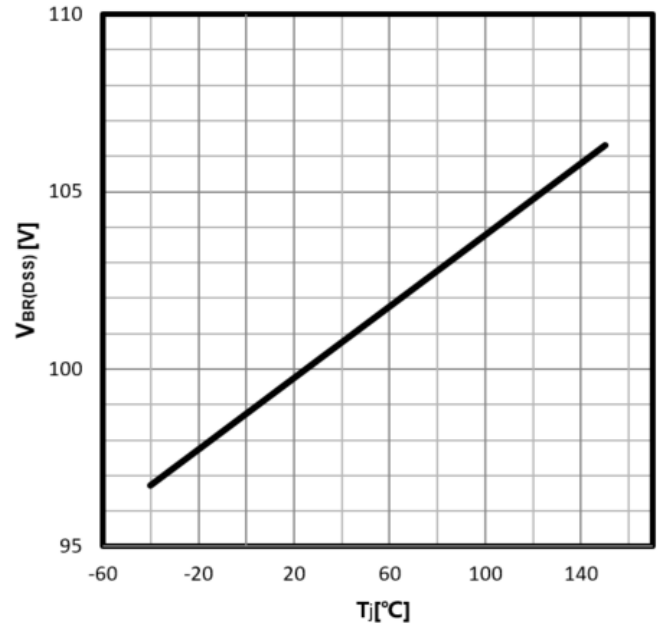
### Gate Threshold Voltage

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



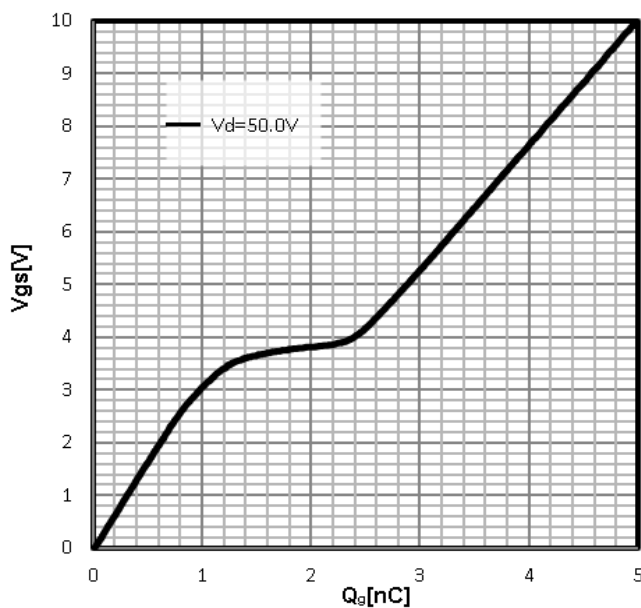
### Drain-source breakdown voltage

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



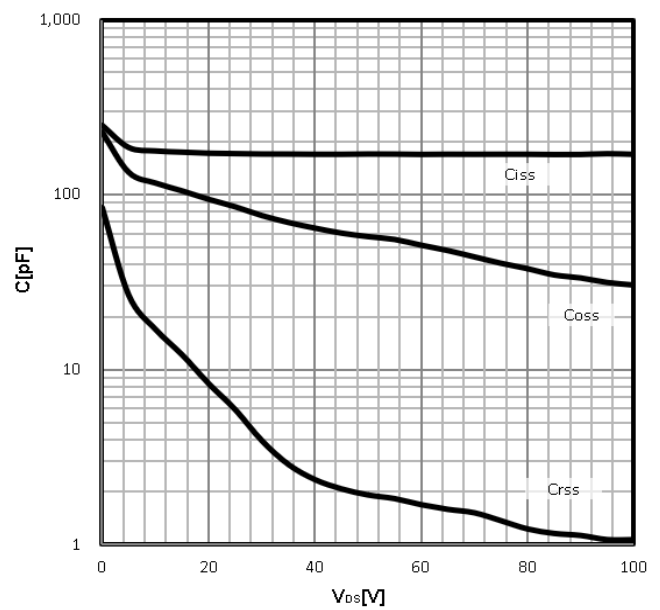
### Typ. gate charge

$$V_{GS}=f(Q_g); I_D=10A$$

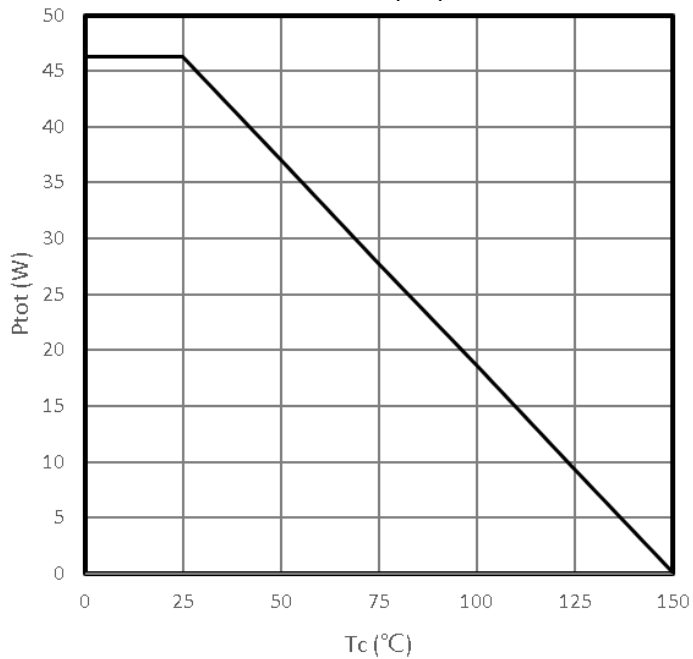


### Typ. capacitances

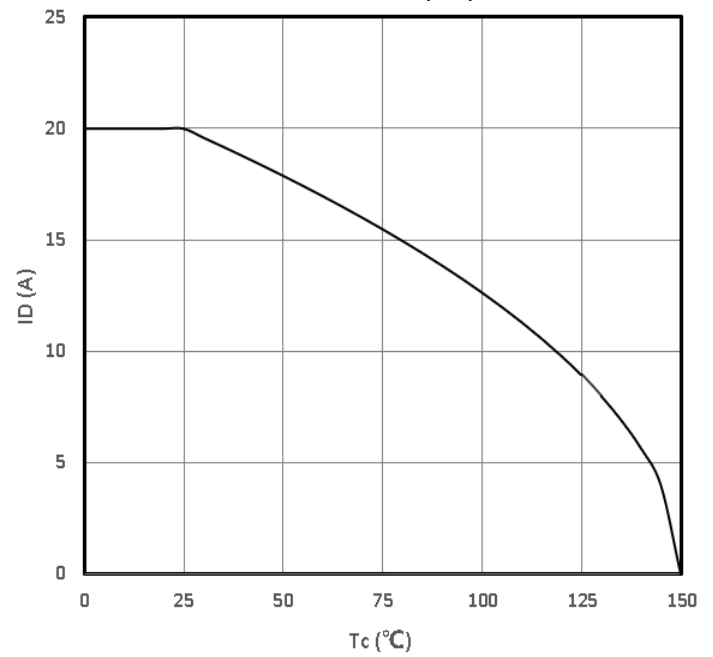
$$C=f(V_{DS}); V_{GS}=0V; f=1MHz$$



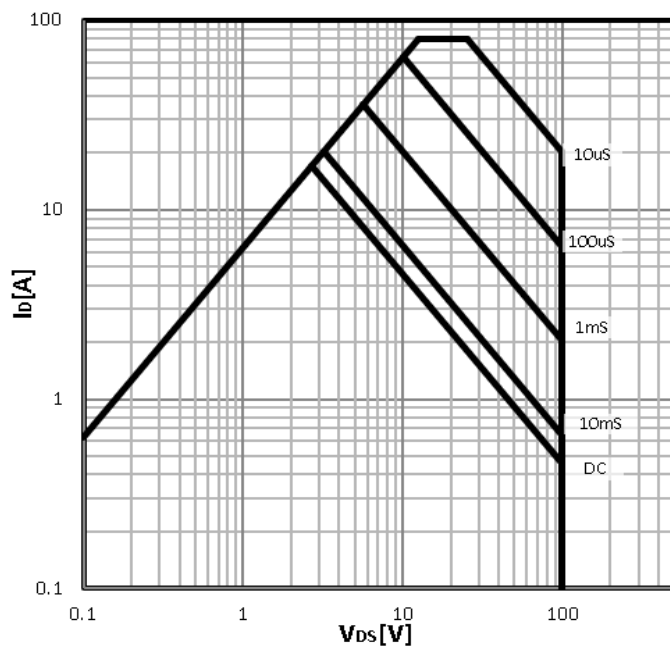
**Power Dissipation**  
 $P_{tot}=f(T_C)$



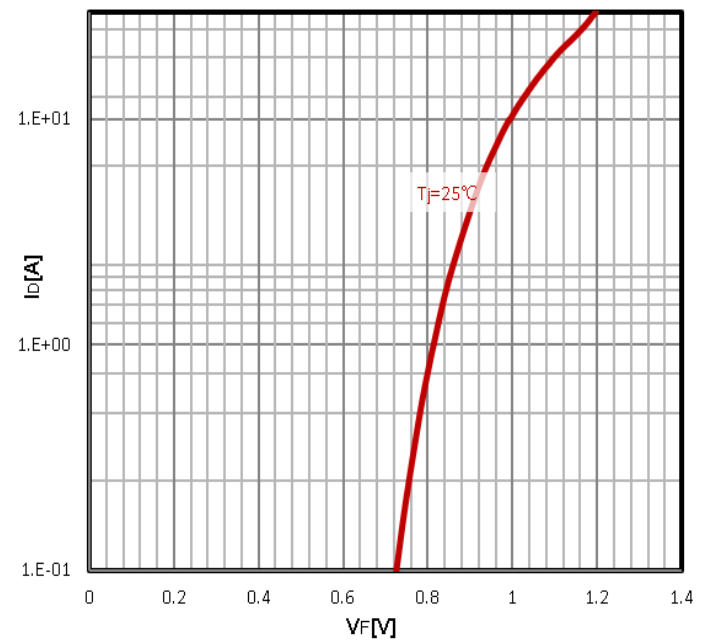
**Maximum Drain Current**  
 $I_D=f(T_C)$



**Safe operating area**  
 $I_D=f(V_{DS})$

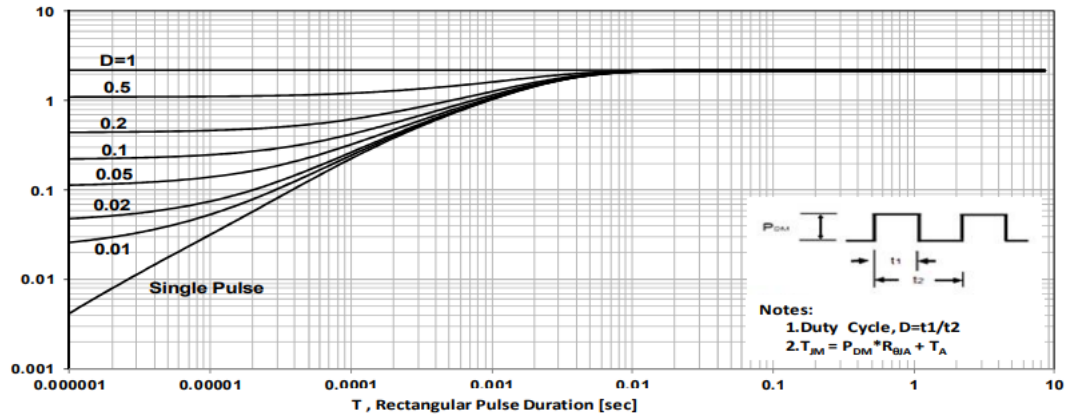


**Body Diode Forward Voltage Variation**  
 $I_F=f(V_{GS})$

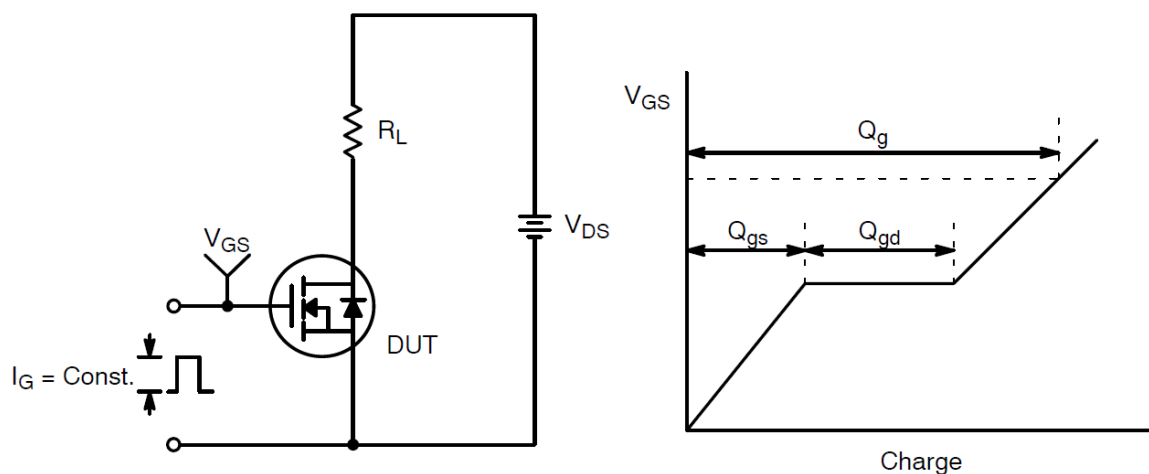


### Max. transient thermal impedance

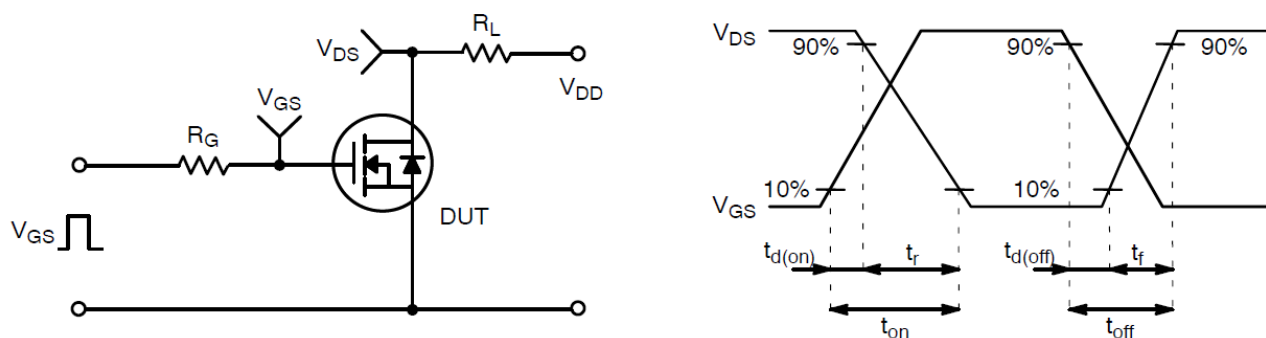
$$Z_{thJC}=f(t_p)$$



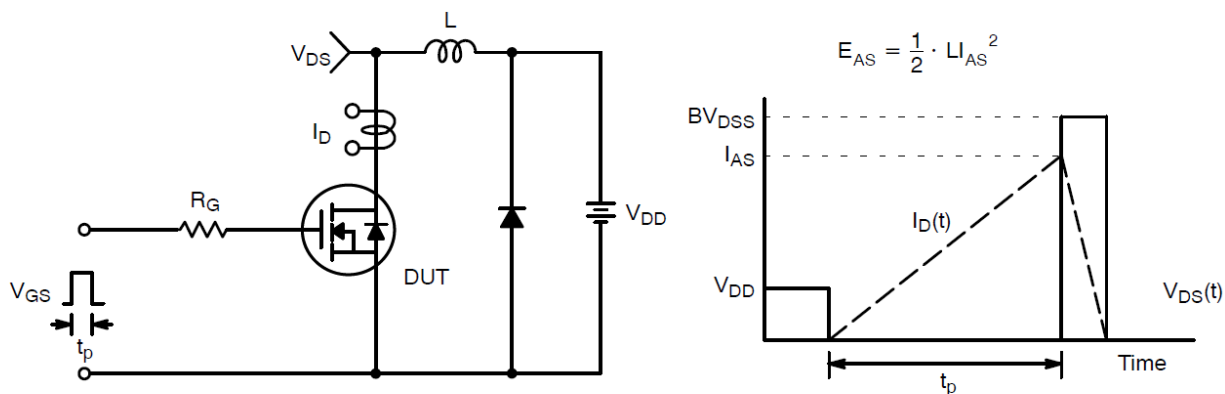
### Test Circuit and Waveform:



**Gate Charge Test Circuit & Waveform**

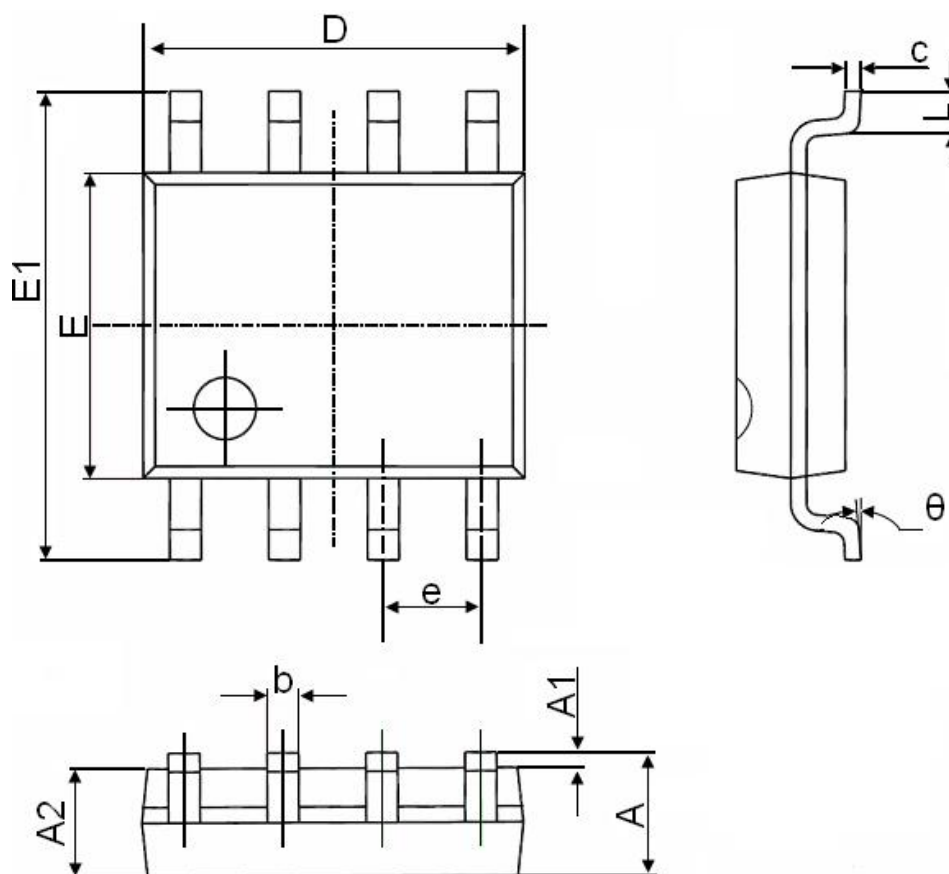


**Resistive Switching Test Circuit & Waveforms**



**Unclamped Inductive Switching Test Circuit & Waveforms**

### SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
$\theta$	0°	8°	0°	8°