

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

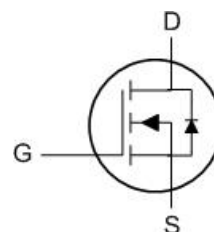
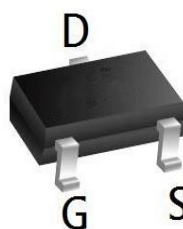


BVDSS	RDSON	ID
100V	63mΩ	8A

Applications

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

SOT23-3L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	8	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	5	A
I_{DM}	Pulsed Drain Current ²	50	A
EAS	Single Pulse Avalanche Energy ³	22	mJ
I_{AS}	Avalanche Current	---	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	8	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 ¹	---	---	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	---	$^\circ\text{C/W}$

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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°C , $I_D=1\text{mA}$	---	---	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=5A$	---	63	78	m Ω
		$V_{GS}=4.5V$, $I_D=4A$	---	79	98	
$V_{GS(th)}$	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	μA
		$V_{DS}=100V$, $V_{GS}=0V$, $T_J=100^\circ\text{C}$	---	---	100	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=10V$, $I_D=5A$	---	---	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	---	---	Ω
Q_g	Total Gate Charge	$V_{DS}=50V$, $V_{GS}=10V$, $I_D=5A$	---	3.7	---	nC
Q_{gs}	Gate-Source Charge		---	0.8	---	
Q_{gd}	Gate-Drain Charge		---	1	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{GS}=10V$, $V_{DD}=50V$, $R_G=3\Omega$, $I_D=5A$	---	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

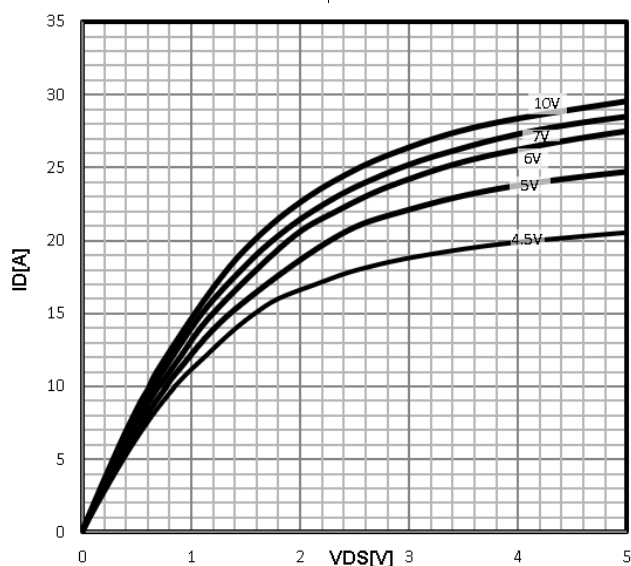
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	8	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=8A$, $T_J=25^\circ\text{C}$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=8A$, $di/dt=100A/\mu s$, $T_J=25^\circ\text{C}$	---	22	---	nS
Q_{rr}	Reverse Recovery Charge		---	18	---	nC

Note :

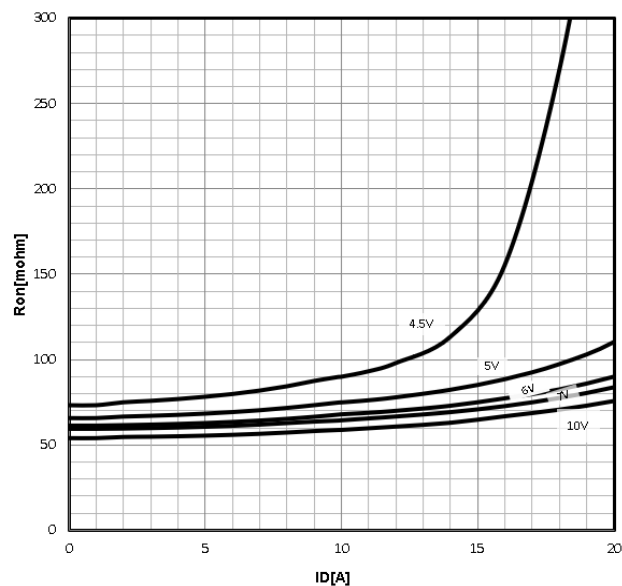
1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$ 3. The EAS data shows Max. rating. The test condition is $T_J = 25^\circ\text{C}$, $V_{DD}=50V$, $V_{GS}=10V$, $L=5\text{mH}$.4. The power dissipation is limited by 150°C junction temperature5. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Characteristics Curve:

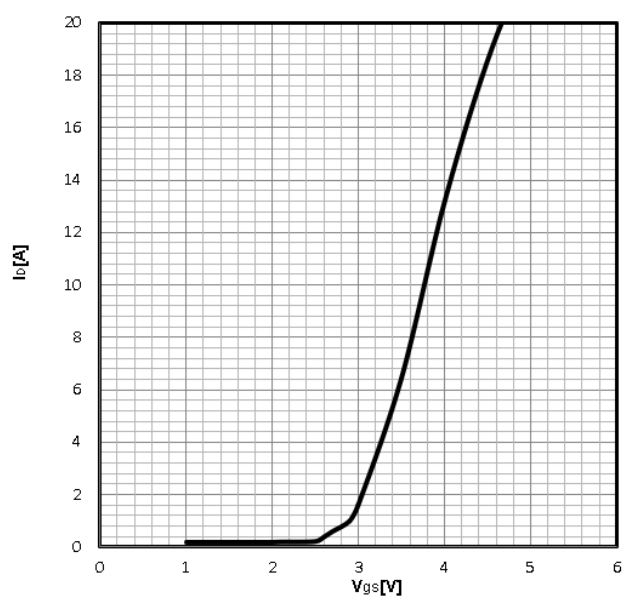
Typ. output characteristics
 $I_D = f(V_{DS})$



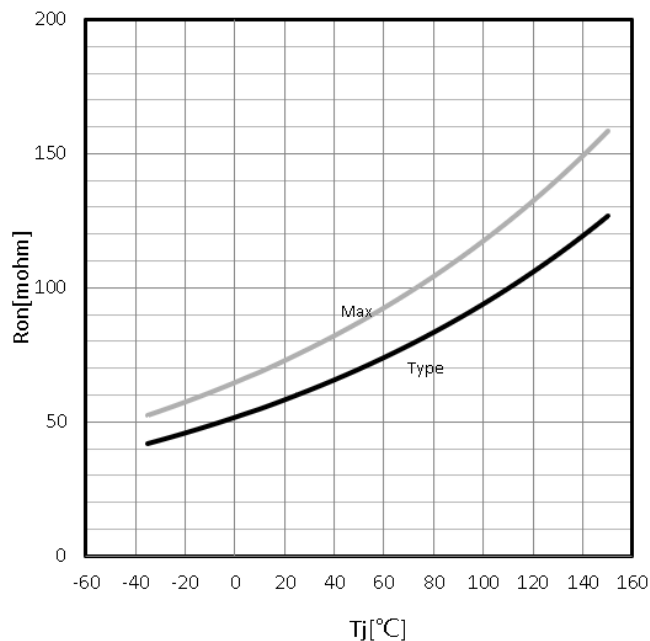
Typ. drain-source on resistance
 $R_{DS(on)} = f(I_D)$



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

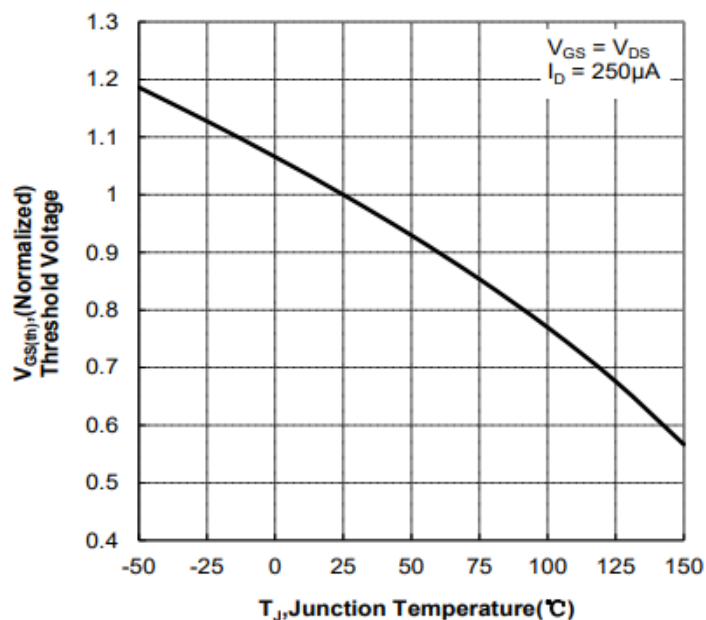


Drain-source on-state resistance
 $R_{DS(on)} = f(T_J); I_D = 5A; V_{GS} = 10V$



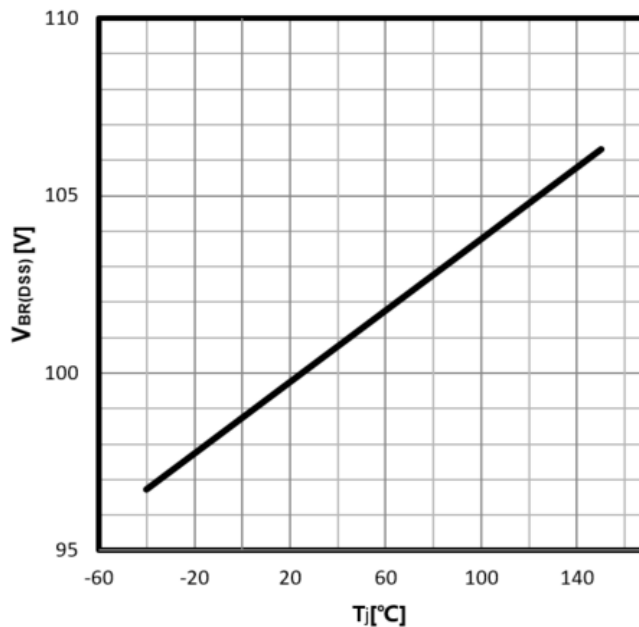
Gate Threshold Voltage

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



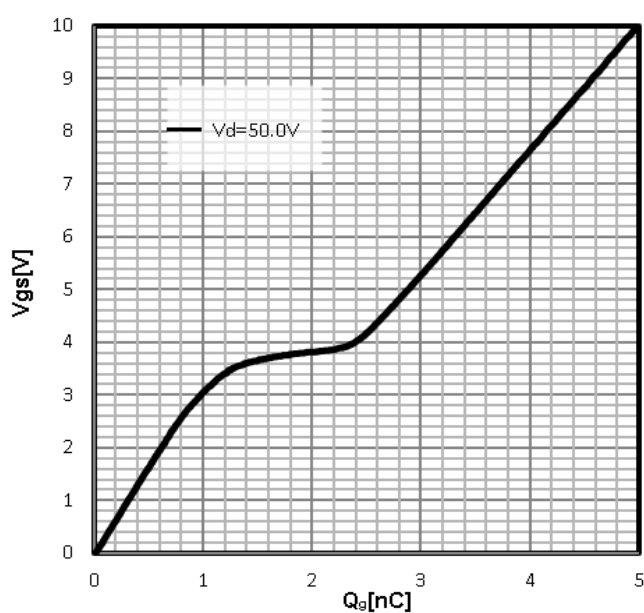
Drain-source breakdown voltage

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



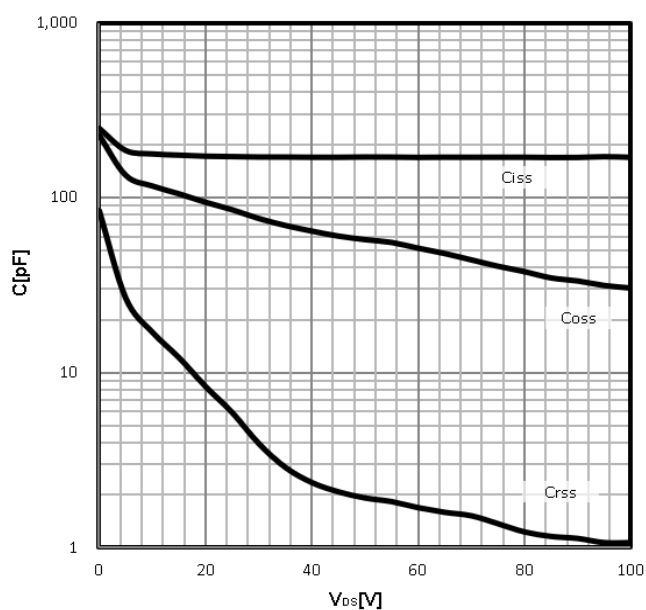
Typ. gate charge

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

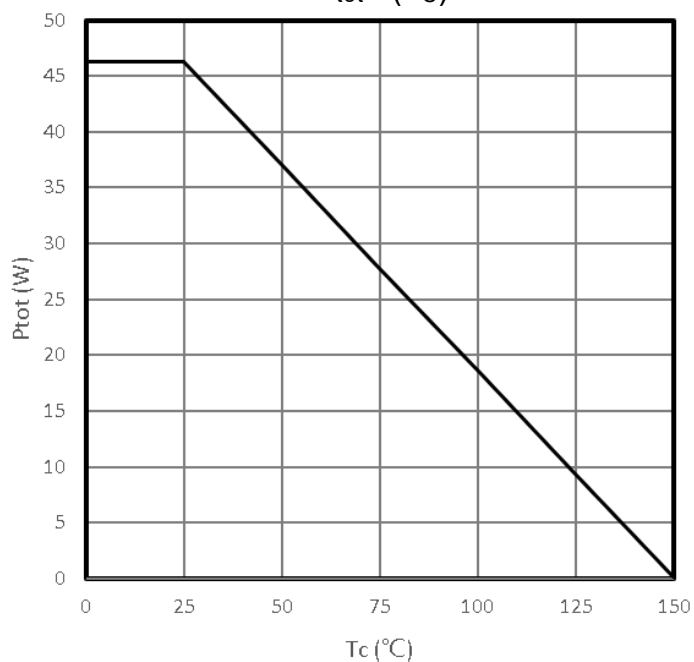


Typ. capacitances

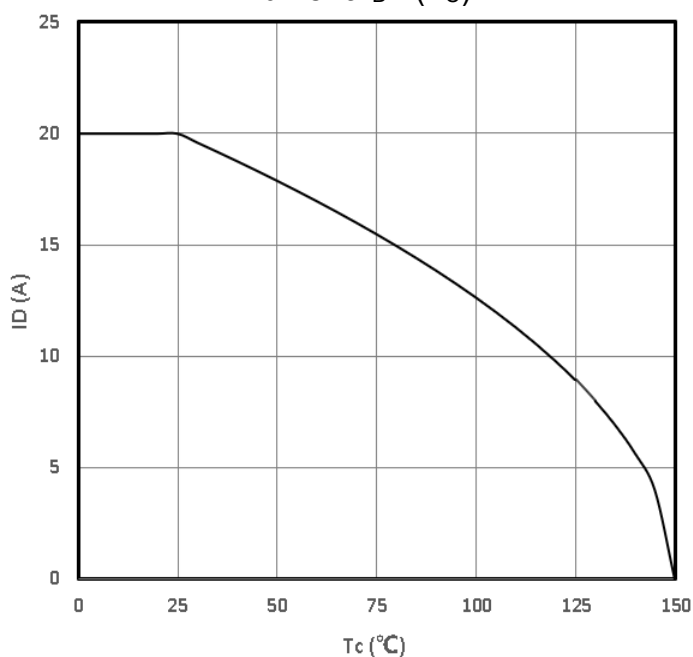
$$C=f(V_{DS}); V_{GS}=0V; f=1MHz$$



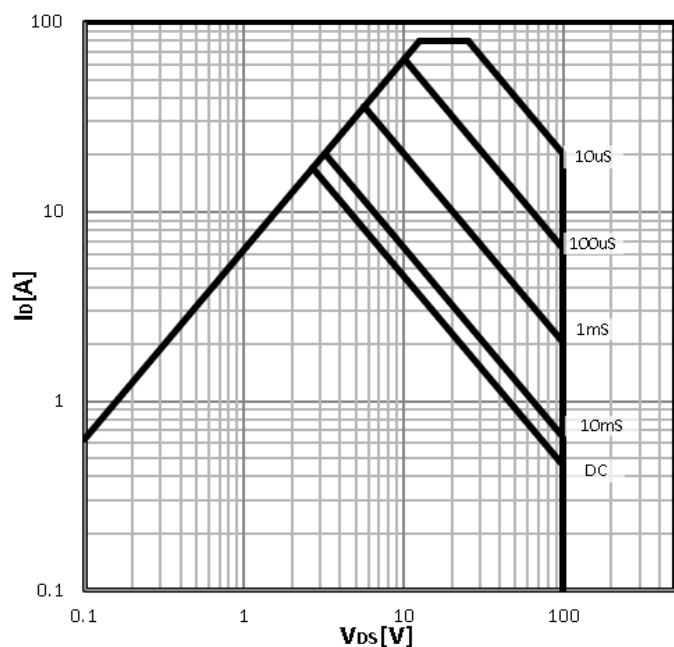
Power Dissipation
 $P_{tot}=f(T_C)$



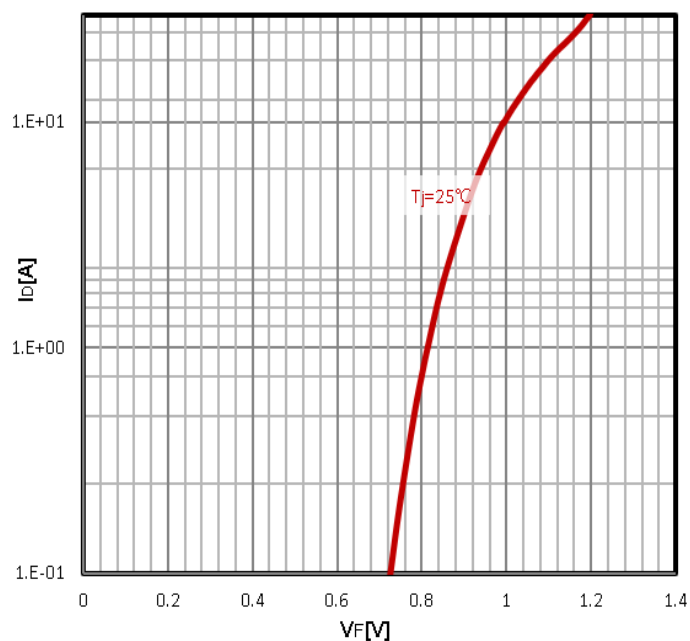
Maximum Drain Current
 $I_D=f(T_C)$



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

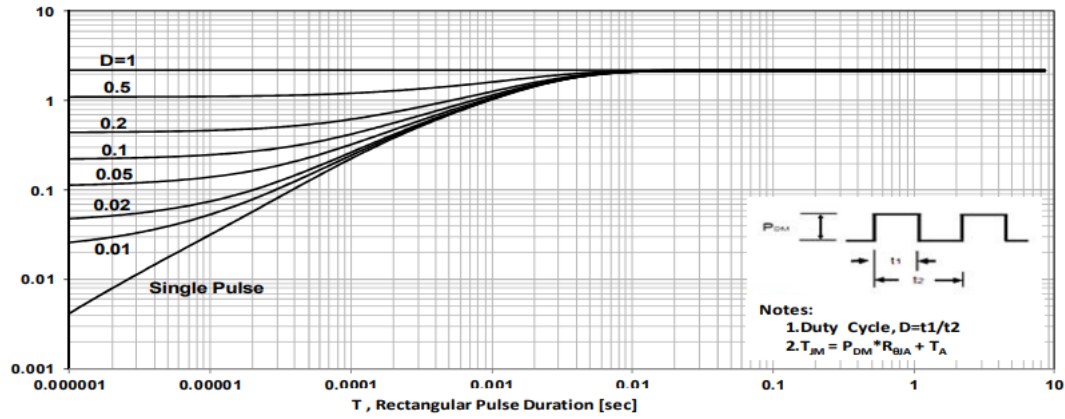


Body Diode Forward Voltage Variation
 $I_F=f(V_{GS})$

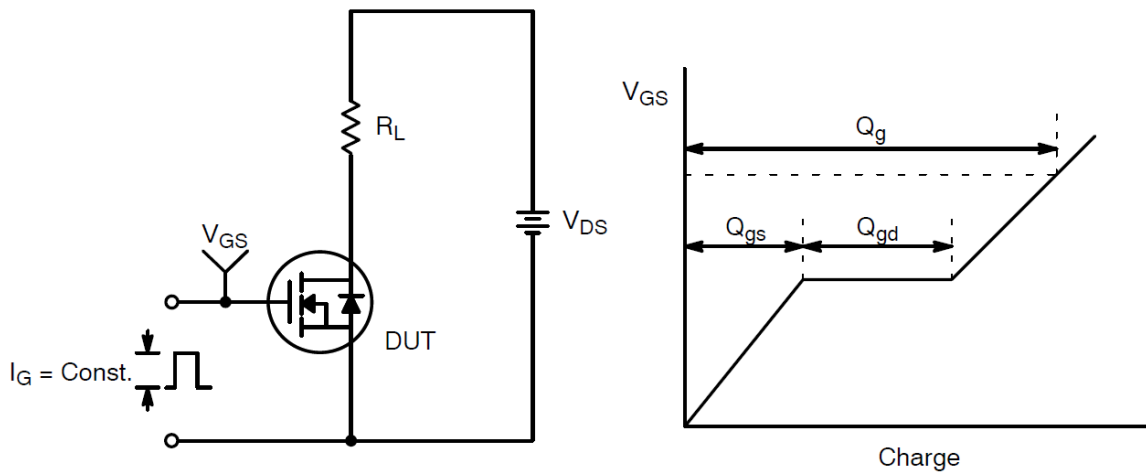


Max. transient thermal impedance

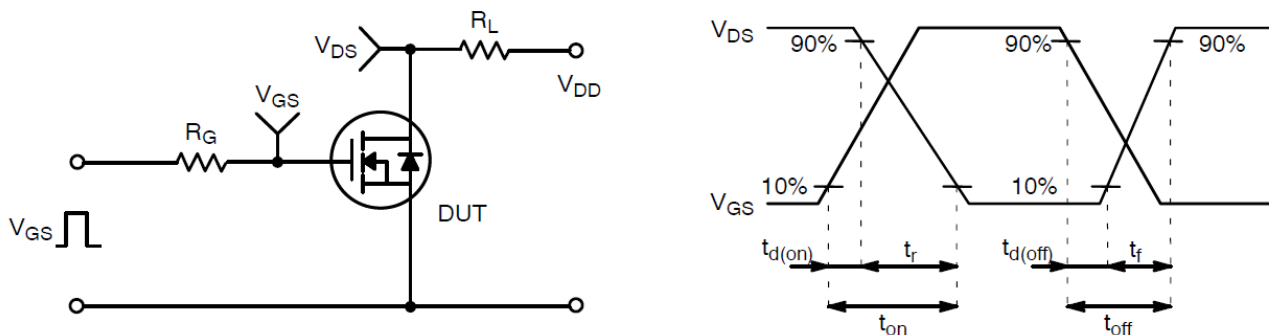
$$Z_{thJC}=f(t_p)$$



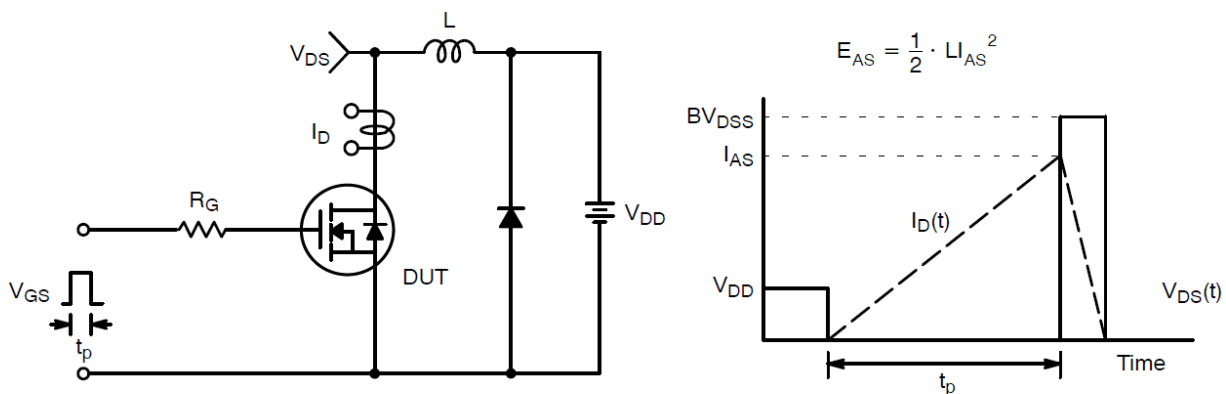
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

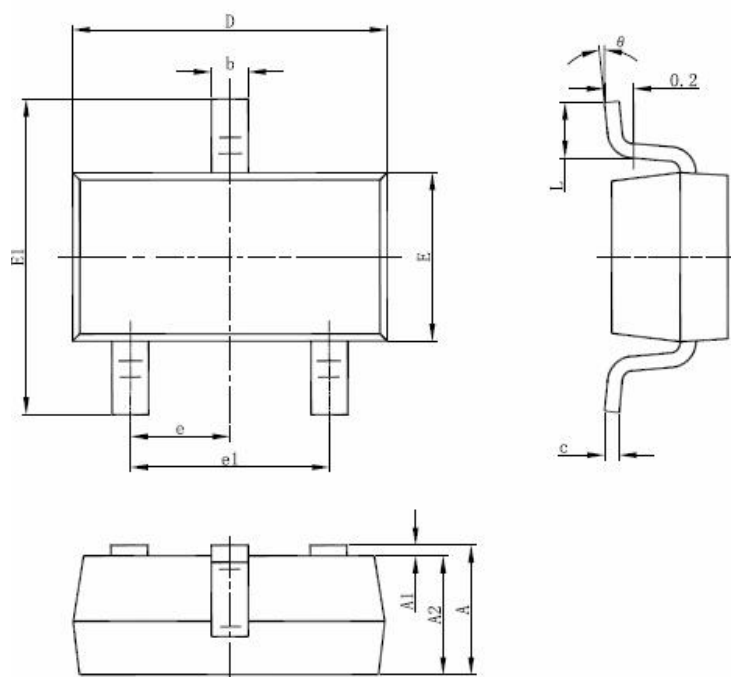


Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

SOT-23-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°