N-Ch 120V Fast Switching MOSFETs

Features

- Fast Switching
- Low Gate Charge and $R_{DS(on)}$
- Low Reverse transfer capacitances

Green

Product Summary

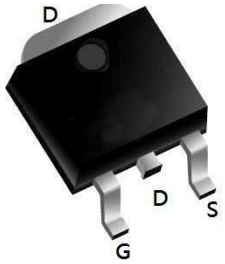
BVDSS	RDSON	ID
120V	10mΩ	70A

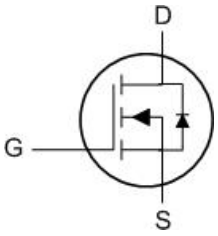
Applications

- DC-DC converter
- Portable Equipment
- Power management

100% DVDS Tested
100% Avalanche Tested

TO252-3L Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	120	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25°C	Continuous Drain Current, V_{GS} @ 10V[1,6]	70	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ 10V[1,6]	35	A
I_{DM}	Pulsed Drain Current[2]	220	A
EAS	Single Pulse Avalanche Energy[3]	210	mJ
I_{AS}	Avalanche Current	---	A
P_D@T_C=25°C	Total Power Dissipation[4]	85	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	---	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	1.47	°C/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	120	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	---	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10 V, I_D=84A	---	10	12.5	mΩ
		V_{GS}=4.5V , I_D=84A	---	11.5	15	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.4	1.8	2.2	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=120V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=120V, V_{GS}=0V , T_J=125℃	---	---	100	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=84A	---	---	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	---	---	Ω
Q_g	Total Gate Charge	V_{DS}=60V , V_{GS}=10V , I_D=20A	---	31	---	nC
Q_{gs}	Gate-Source Charge		---	9.4	---	
Q_{gd}	Gate-Drain Charge		---	7.5	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD} =60V, R_{G_ext} = 5Ω, V_{GS}=10V, ID =20A	---	15	---	ns
T_r	Rise Time		---	10	---	
$T_{d(off)}$	Turn-Off Delay Time		---	32	---	
T_f	Fall Time		---	9	---	
C_{iss}	Input Capacitance	V_{DS}=60V , V_{GS}=0V , f=1MHz	---	1807	---	pF
C_{oss}	Output Capacitance		---	212	---	
C_{rss}	Reverse Transfer Capacitance		---	6	---	

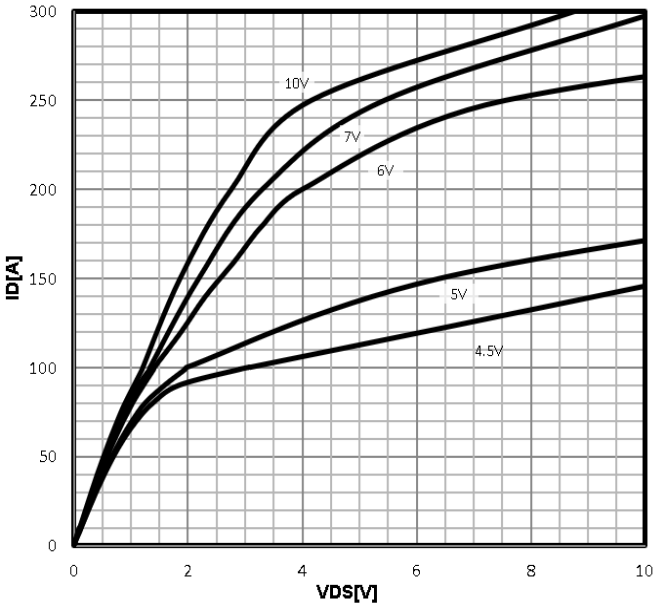
Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	60	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=84A , T_J=25℃	---	---	1.4	V
t_{rr}	Reverse Recovery Time	IF=40A ,di/dt=100A / μs , T_J= 25 ℃	---	60	---	nS
Q_{rr}	Reverse Recovery Charge		---	100	---	nC

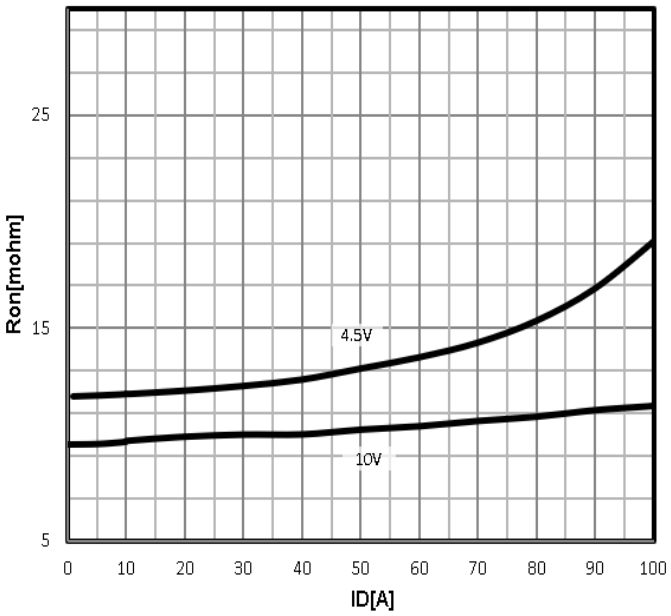
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.5mH,
4.The power dissipation is limited by 150℃ junction temperature
5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Characteristics Curve:

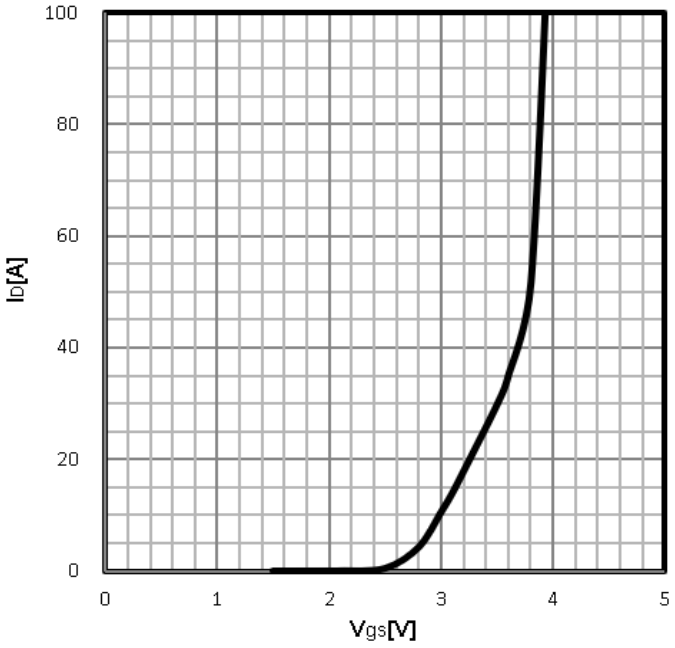
Typ. output characteristics
$I_D=f(V_{DS})$



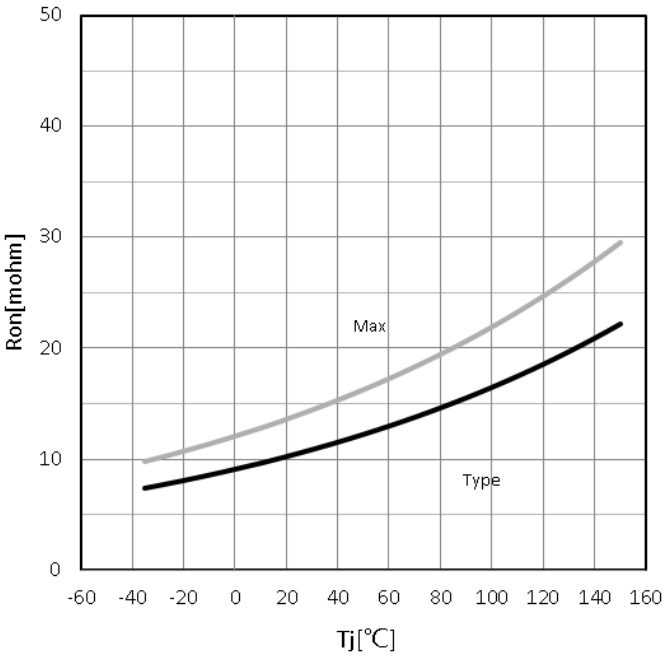
Typ. drain-source on resistance
$R_{DS(on)}=f(I_D)$



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

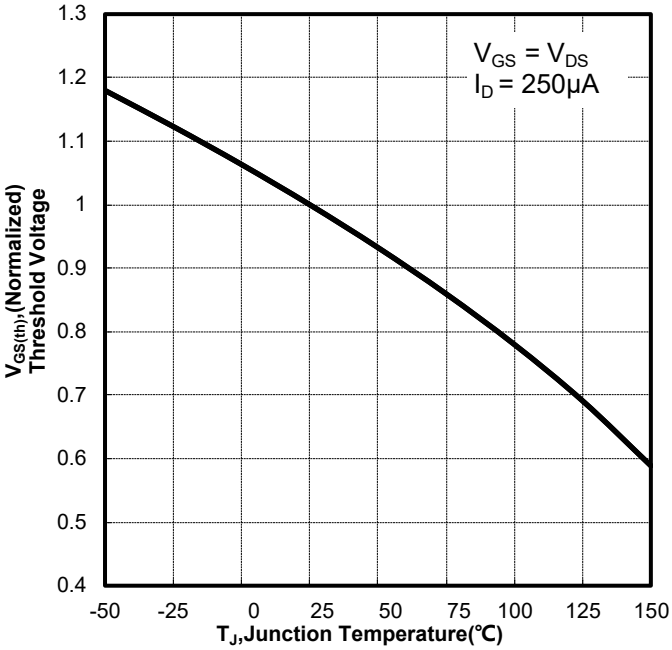


Drain-source on-state resistance
$R_{DS(on)}=f(T_j)$; $I_D=20A$; $V_{GS}=10V$



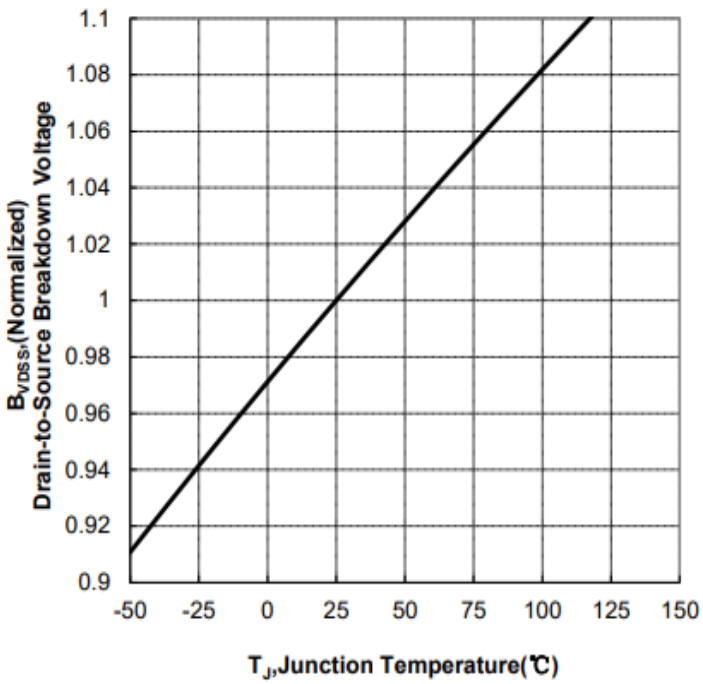
Gate Threshold Voltage

$V_{TH}=f(T_j)$; I_D=250uA



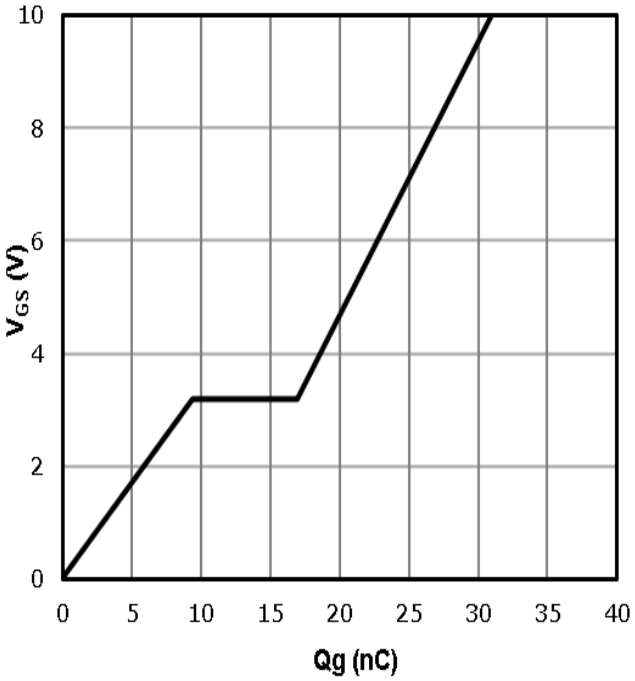
Drain-source breakdown voltage

$V_{BR(DSS)}=f(T_j)$; I_D=250uA



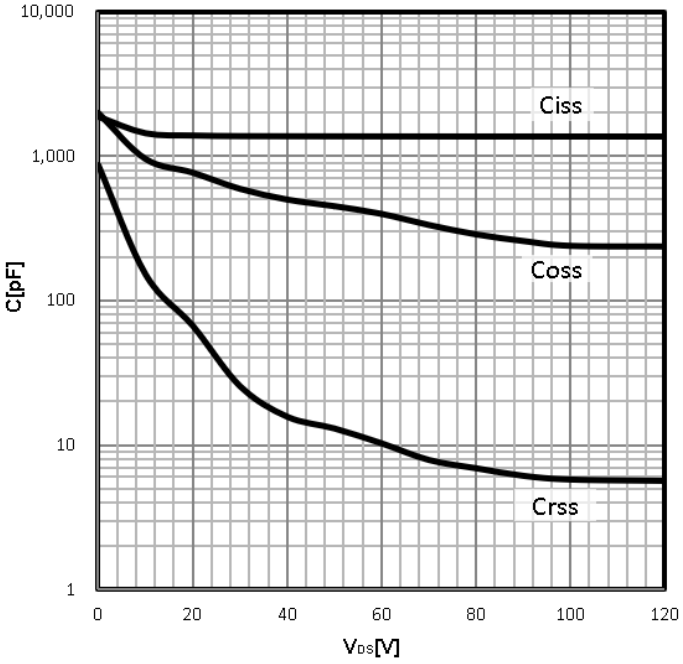
Typ. gate charge

$V_{GS}=f(Q_{gate})$

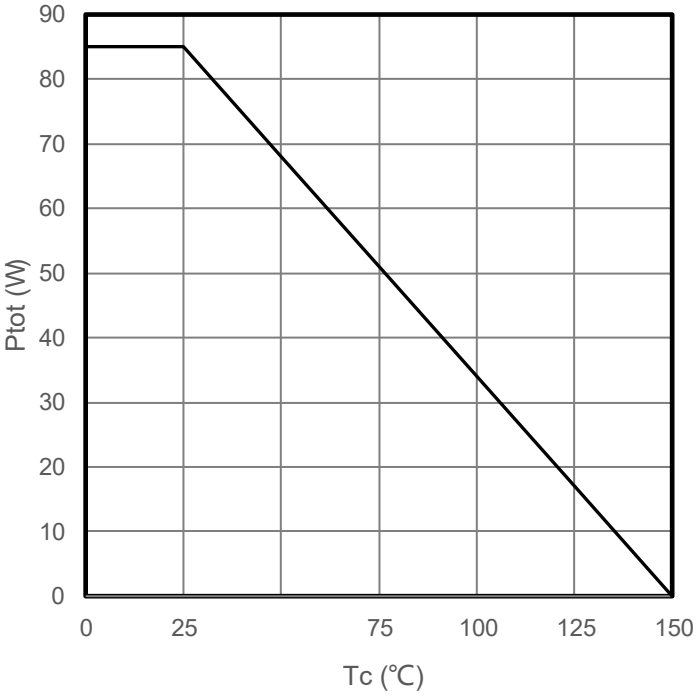


Typ. capacitances

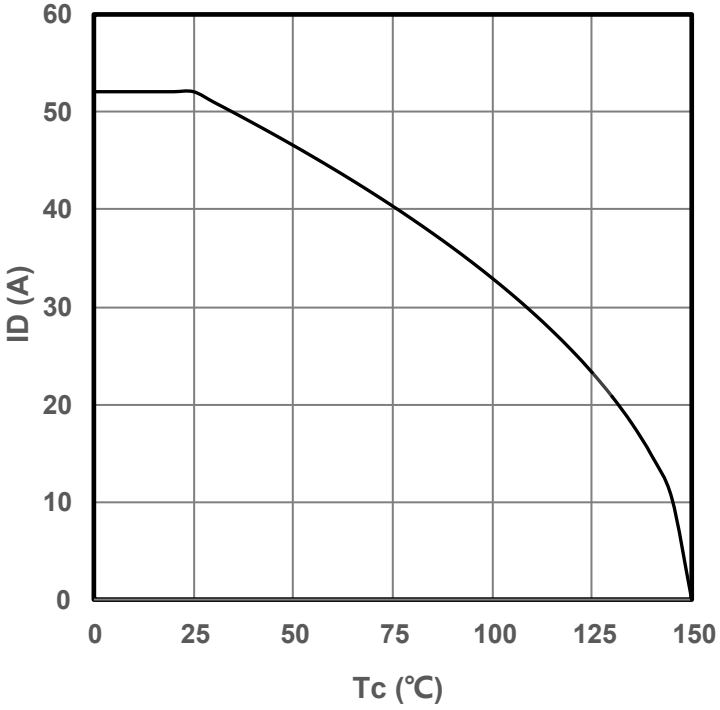
C =f(V_{DS}); V_{GS}=0V; f



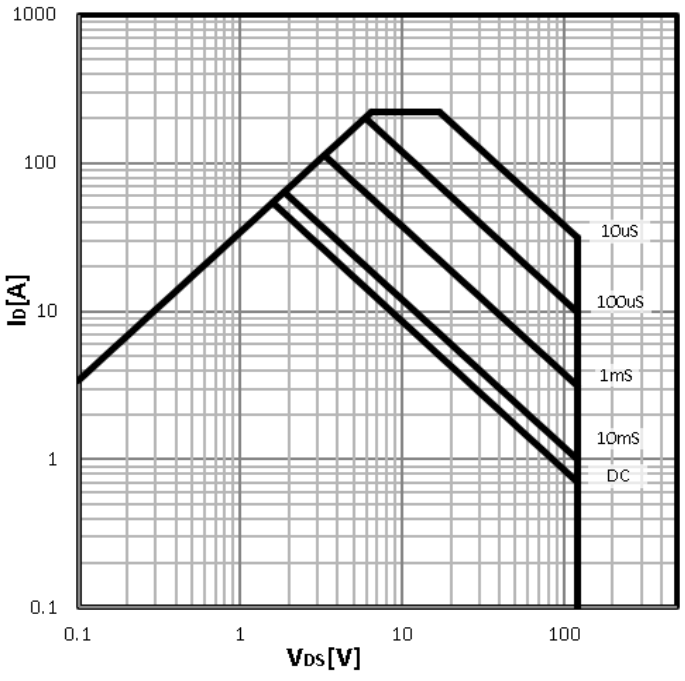
Power Dissipation
$P_{tot}=f(T_j)$



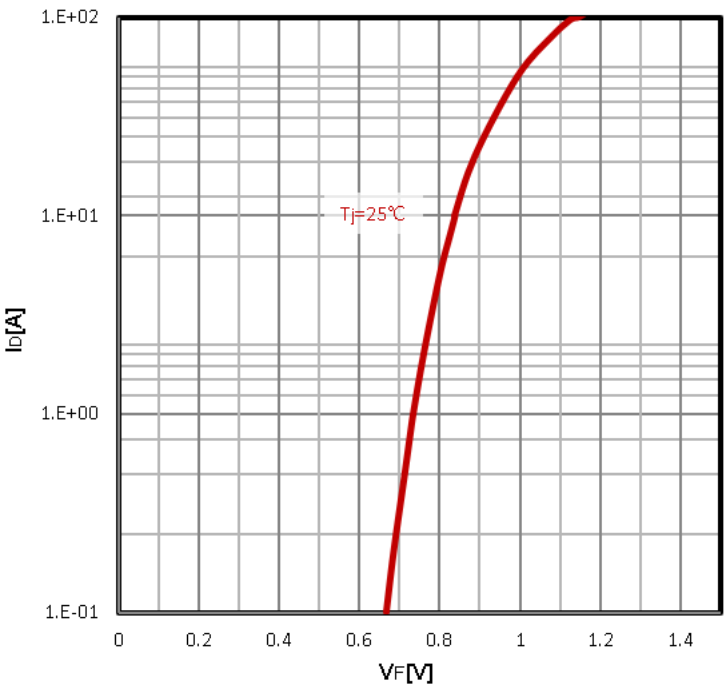
Maximum Drain Current
$I_D=f(T_C)$



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

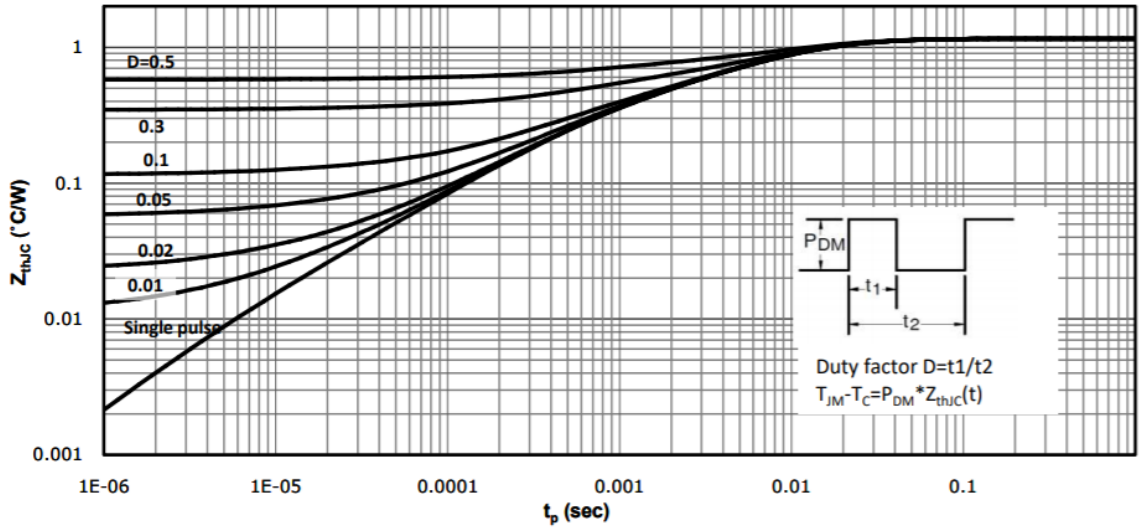


Body Diode Forward Voltage Variation
$I_F=f(V_{GS})$

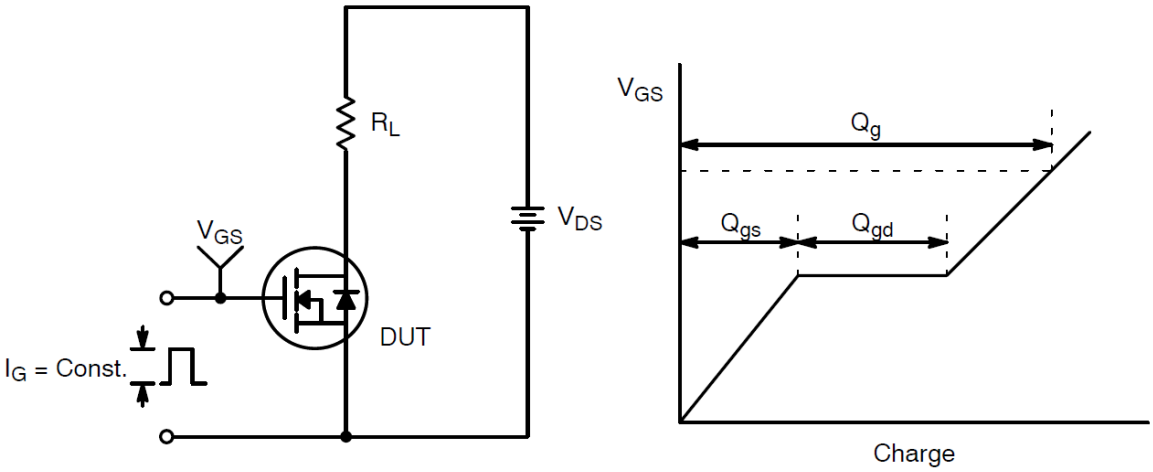


Max. transient thermal impedance

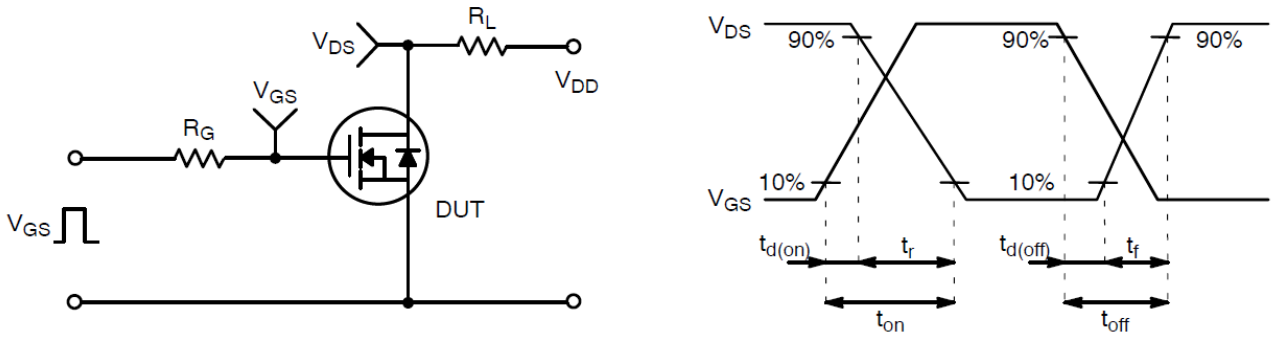
$Z_{thJC}=f(t_p)$



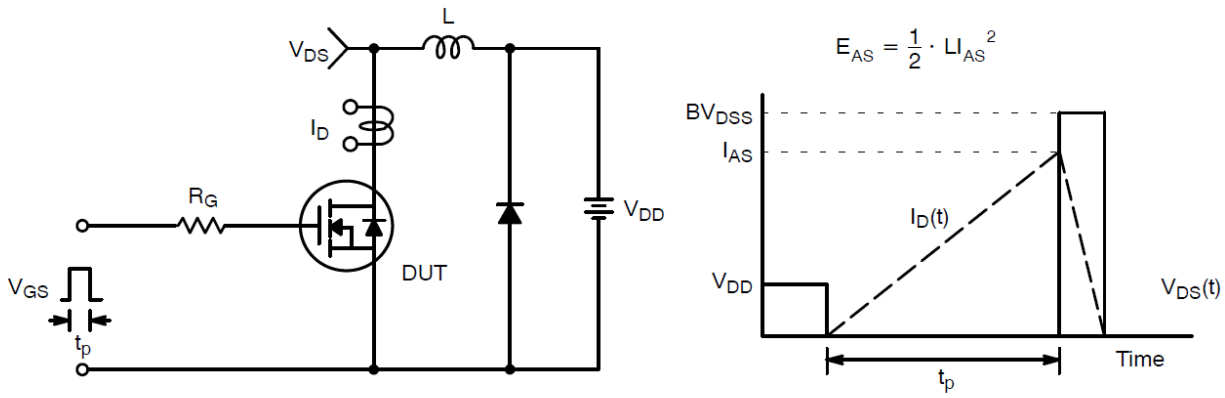
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

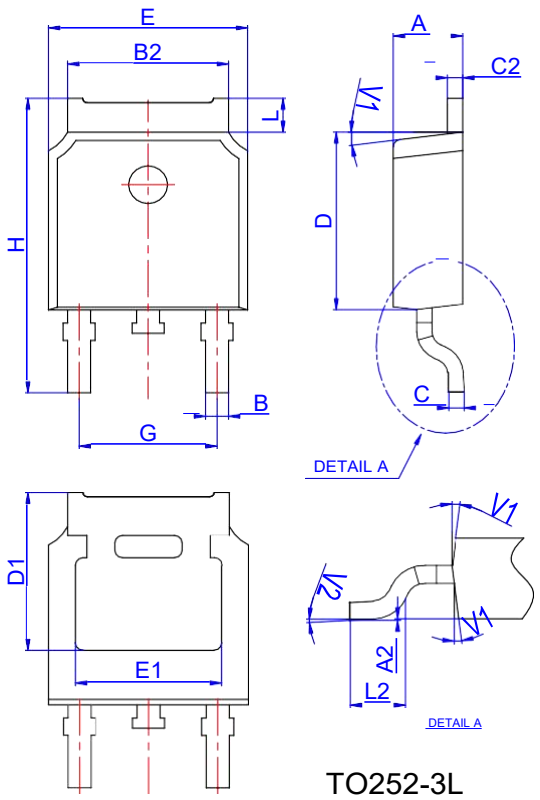


Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

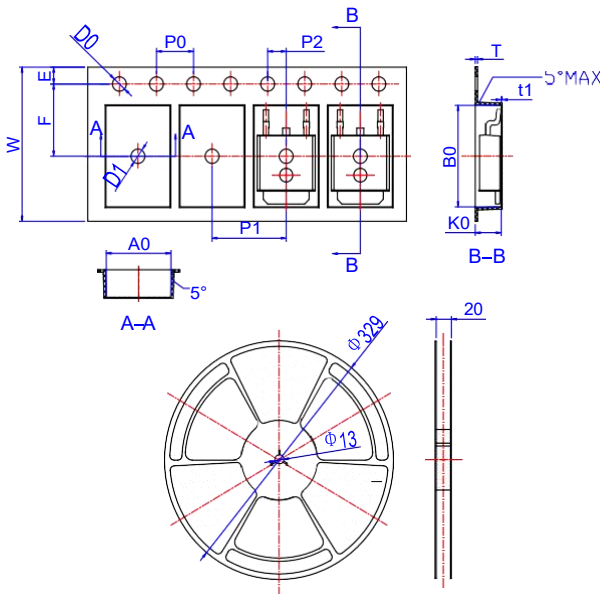
Package Mechanical Data TO252-3L



TO252-3L

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Spectification-TO252-3L



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583