

**Features**

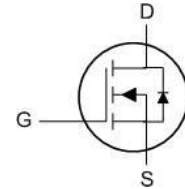
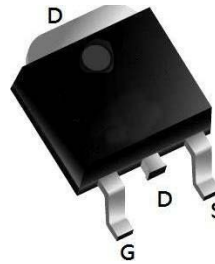
- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$


**Product Summary**

BVDSS	RDSON	ID
100V	8.5mΩ	70A

**Applications**

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

**TO252 Pin Configuration**

**Absolute Maximum Ratings:**

Symbol	Parameter	Value	Units
$V_{DSS}$	Drain-to-Source Voltage	100	V
$I_D$	Continuous Drain Current	70	A
	Continuous Drain Current	45	A
$I_{DM}^{a1}$	Pulsed Drain Current	280	A
$E_{AS}^{a2}$	Single pulse avalanche energy	110	mJ
$V_{GS}$	Gate-to-Source Voltage	±20	V
$P_D$	Power Dissipation	100	W
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	150, -55 to 150	°C
$T_L$	Maximum Temperature for Soldering	260	°C

**Thermal Characteristics:**

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.25	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	64	°C/W

**Electrical Characteristics** (TA= 25°C unless otherwise specified):

Static Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V <sub>DSS</sub>	Drain to Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100	--	--	V
I <sub>DSS</sub>	Drain to Source Leakage Current	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V	--	--	1	μA
I <sub>GSS(F)</sub>	Gate to Source Forward Leakage	V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V	--	--	100	nA
I <sub>GSS(R)</sub>	Gate to Source Reverse Leakage	V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V	--	--	-100	nA
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.3	1.8	2.3	V
R <sub>DS(ON)</sub>	Drain-to-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	--	8.5	10.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A	--	9.5	15	mΩ

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V V <sub>DS</sub> = 50V f = 1.0MHz	--	1368	--	pF
C <sub>oss</sub>	Output Capacitance		--	451	--	
C <sub>rss</sub>	Reverse Transfer Capacitance		--	12.9	--	
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> Open	--	0.48	--	Ω

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
t <sub>d(ON)</sub>	Turn-on Delay Time	I <sub>D</sub> = 10A V <sub>DS</sub> = 50V V <sub>GS</sub> = 10V R <sub>G</sub> = 4Ω	--	16	--	ns
t <sub>r</sub>	Rise Time		--	10	--	
t <sub>d(OFF)</sub>	Turn-Off Delay Time		--	40	--	
t <sub>f</sub>	Fall Time		--	6	--	
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 10V	--	31.3	--	nC
Q <sub>gs</sub>	Gate Source Charge	V <sub>DS</sub> = 50V	--	3.49	--	
Q <sub>gd</sub>	Gate Drain Charge	I <sub>D</sub> = 10A	--	7.63	--	

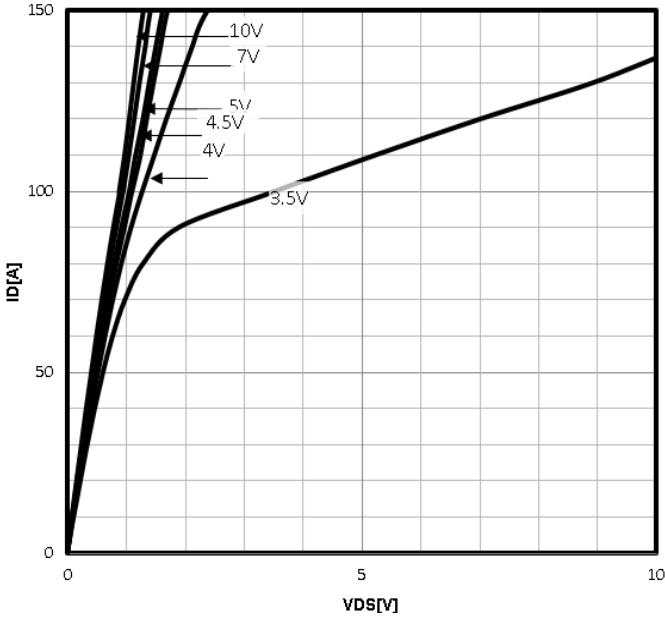
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Value
			Min.	Typ.	Max.	
I <sub>S</sub>	Diode Forward Current	T <sub>C</sub> = 25 °C	--	--	70	A
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =10A, V <sub>GS</sub> =0V	--	--	1.2	V
t <sub>rr</sub>	Reverse Recovery time	I <sub>S</sub> =10A, V <sub>DD</sub> =50V dI/dt=100A/μs	--	103	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge		--	187	--	nC

a1: Repetitive rating; pulse width limited by maximum junction temperature

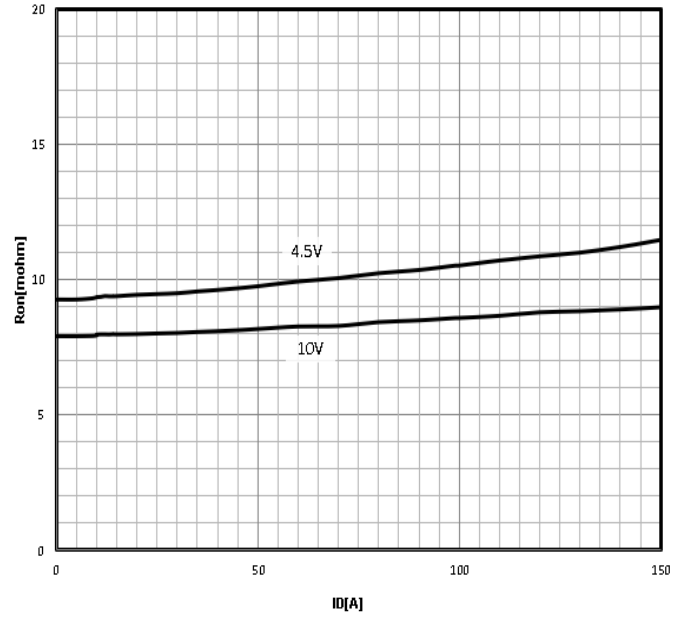
a2: VDD=50V, L=0.3mH, Rg=25Ω, Starting Tj=25 °C

**Characteristics Curve:**

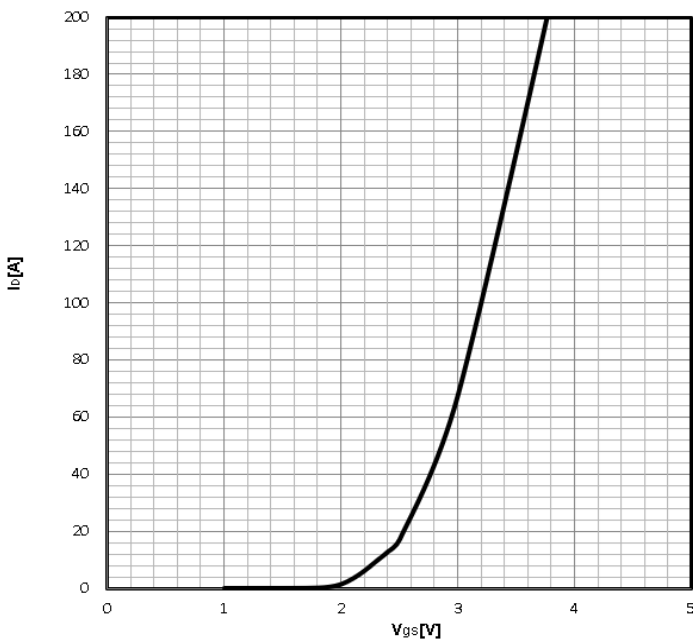
**Typ. output characteristics**  
 $I_D=f(V_{DS})$



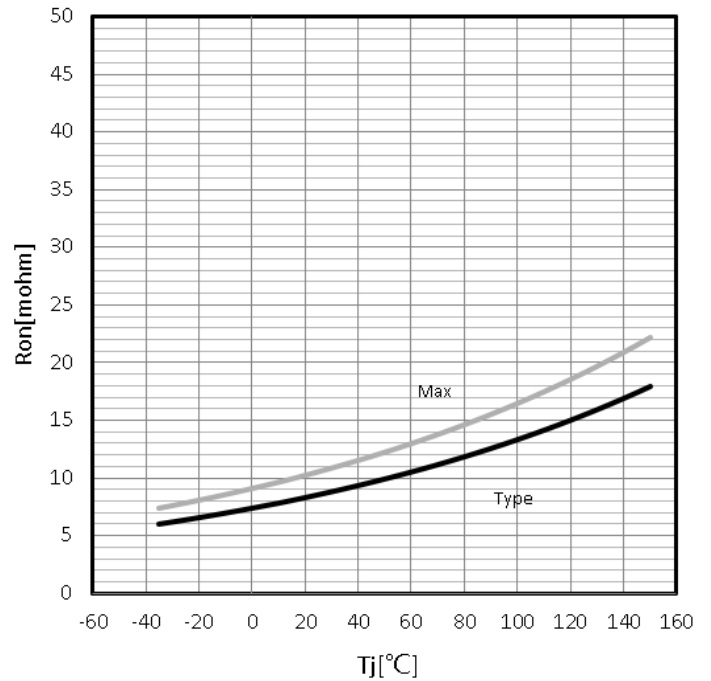
**Typ. drain-source on resistance**  
 $R_{DS(on)}=f(I_D)$



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

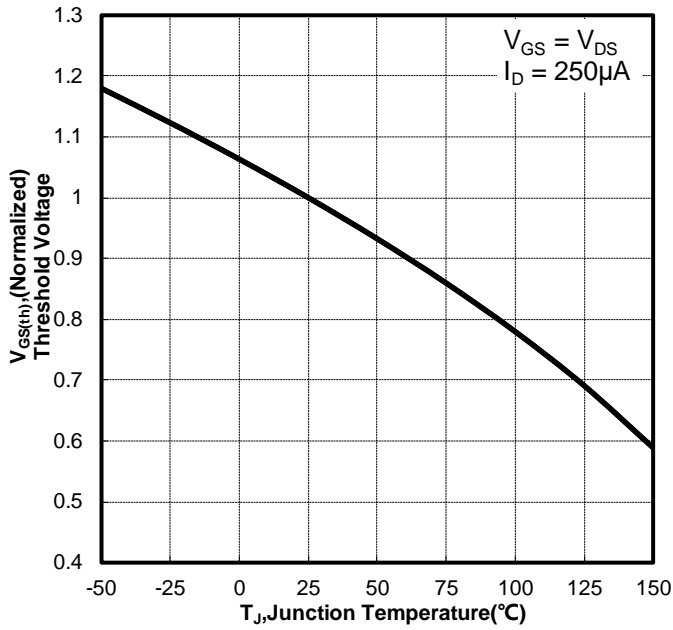


**Drain-source on-state resistance**  
 $R_{DS(on)}=f(T_j); I_D=20A; V_{GS}=10V$



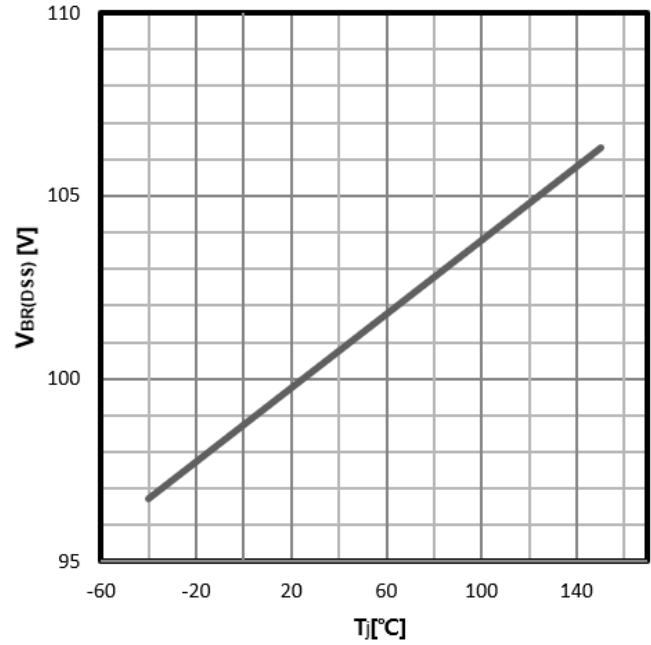
**Gate Threshold Voltage**

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



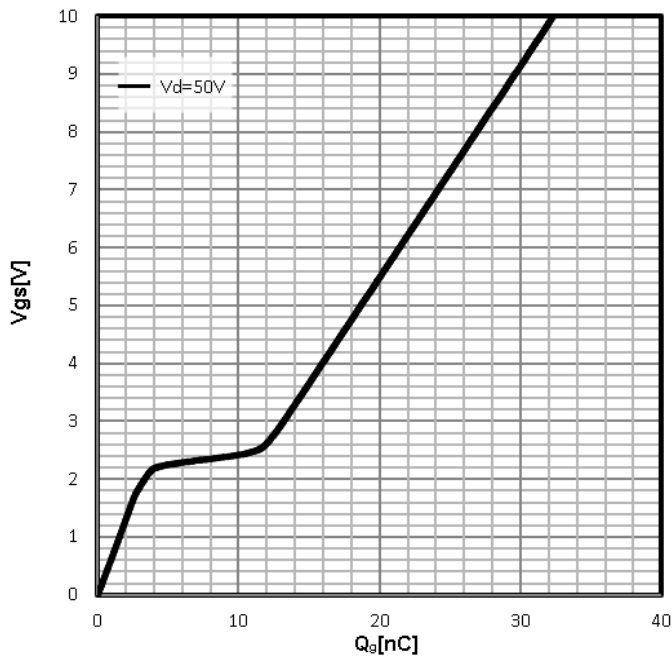
**Drain-source breakdown voltage**

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



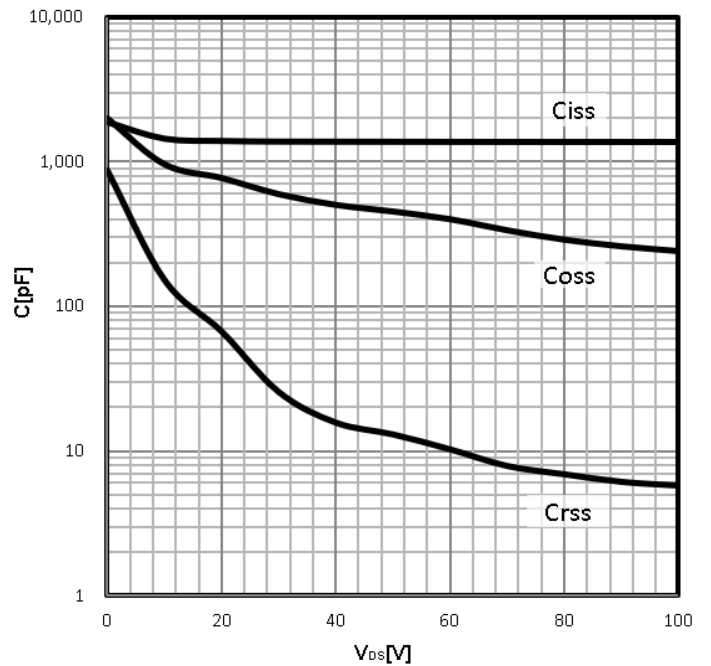
**Typ. gate charge**

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

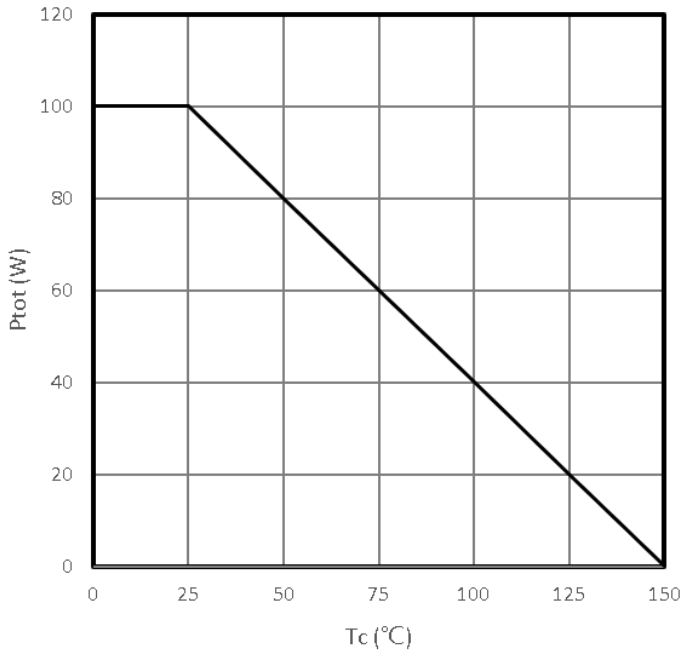


**Typ. capacitances**

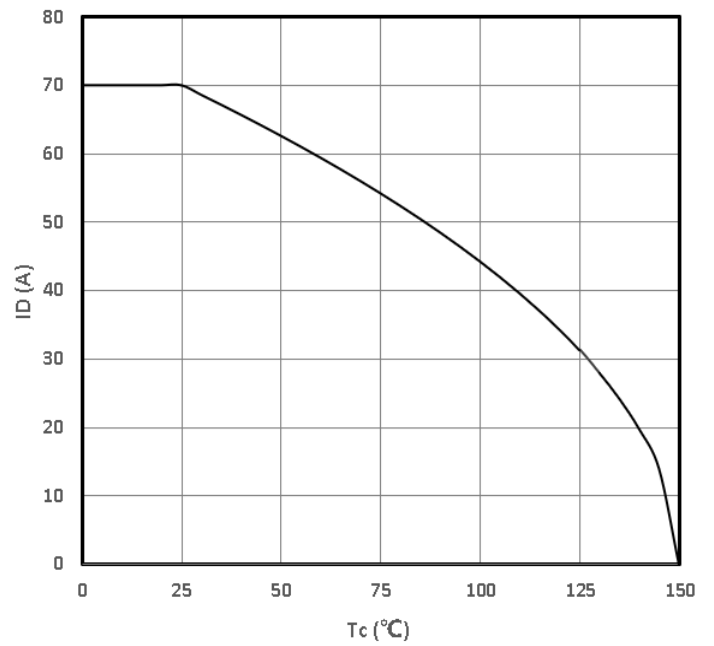
$C=f(V_{DS}); V_{GS}=0V; f=1MHz$



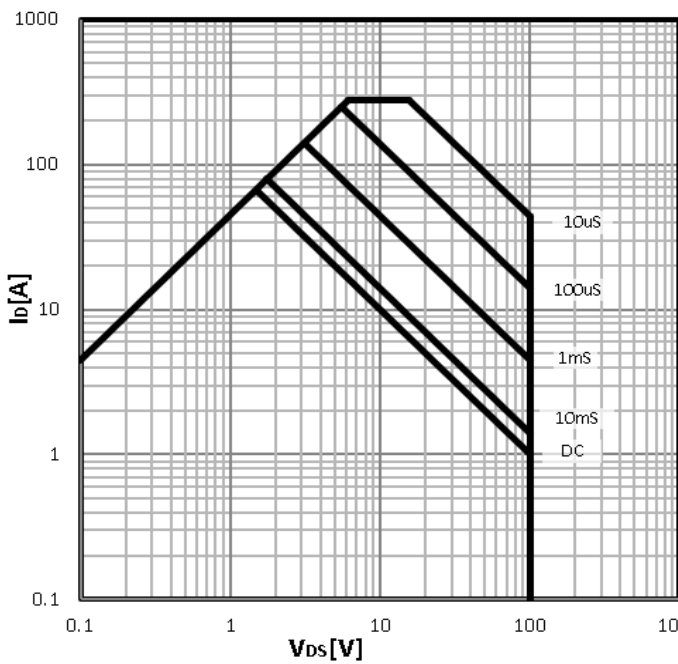
**Power Dissipation**  
 $P_{tot}=f(T_C)$



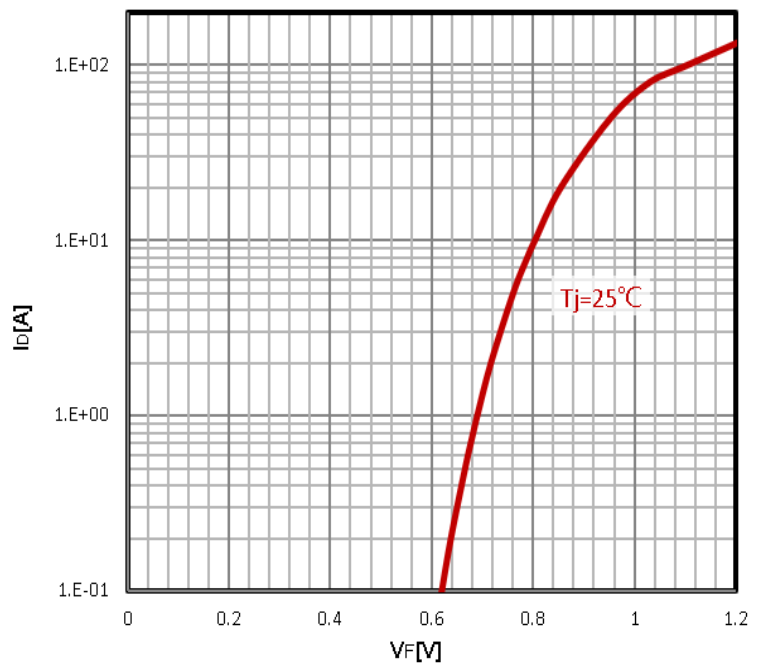
**Maximum Drain Current**  
 $I_D=f(T_C)$



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

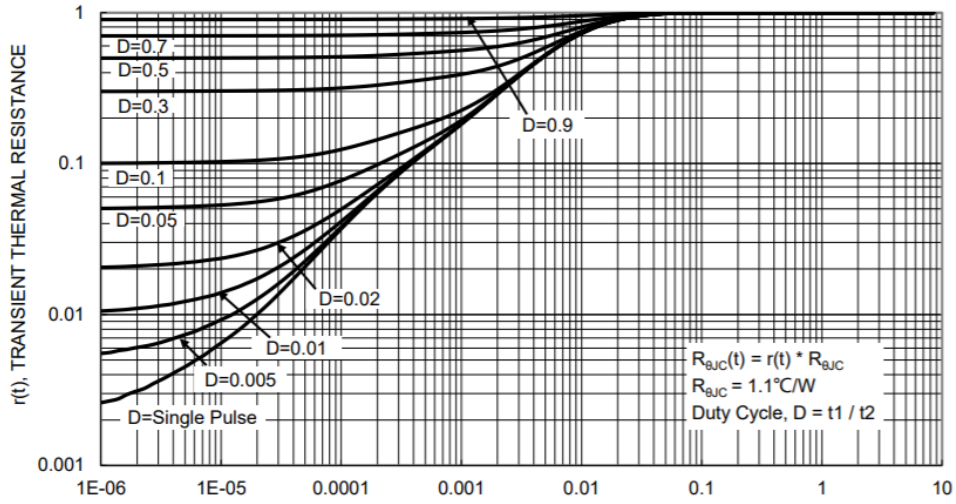


**Body Diode Forward Voltage Variation**  
 $I_F=f(V_{GS})$

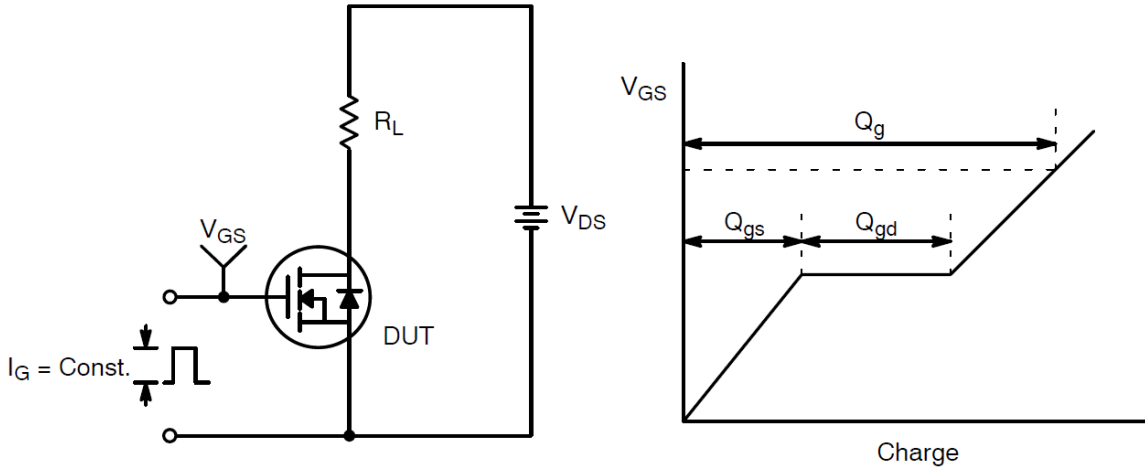


**Max. transient thermal impedance**

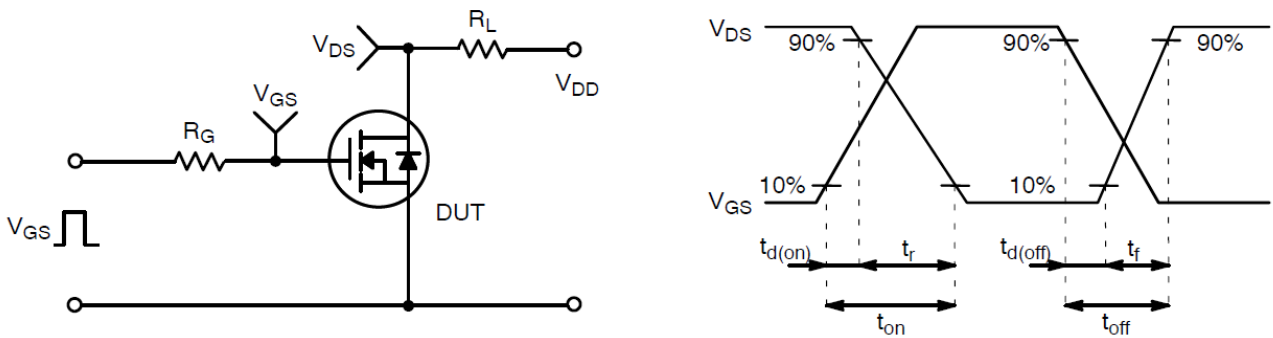
$$Z_{thJC} = f(t_p)$$



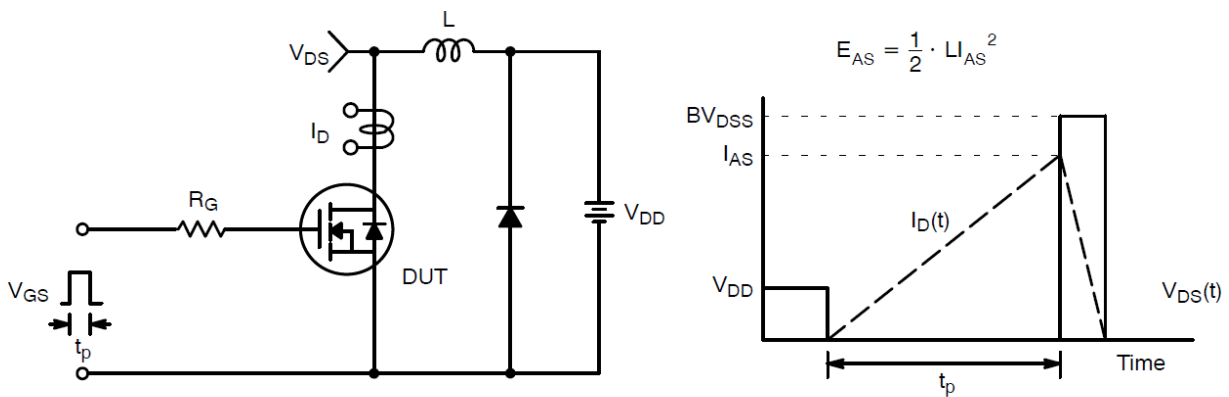
**Test Circuit and Waveform:**



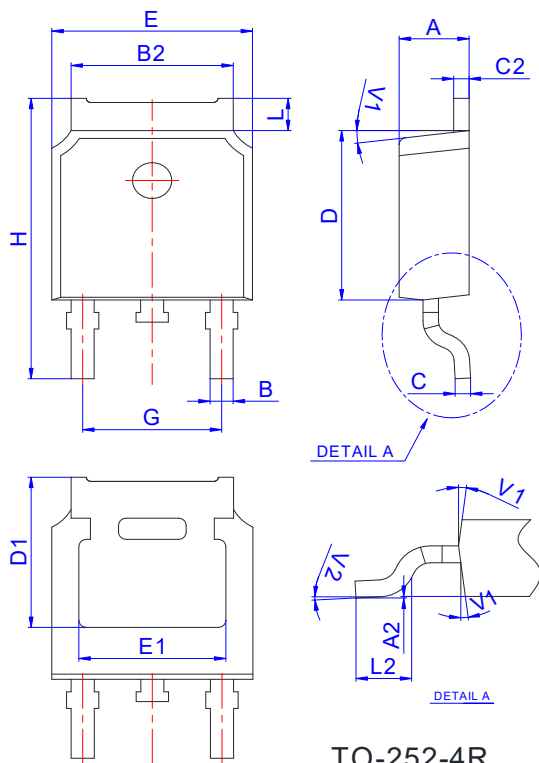
**Gate Charge Test Circuit & Waveform**



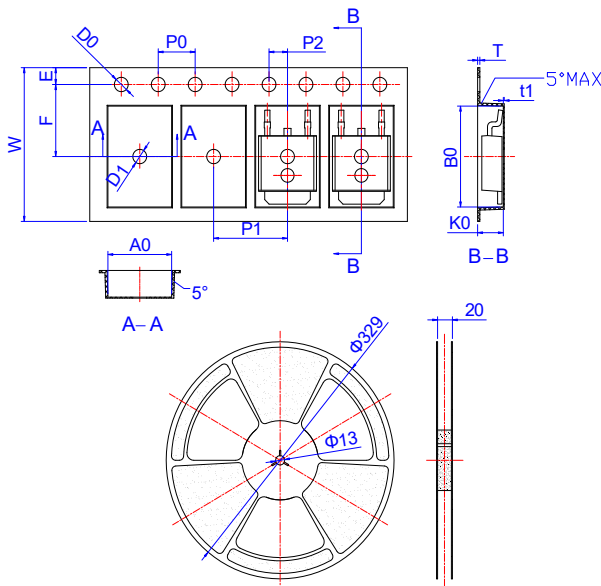
**Resistive Switching Test Circuit & Waveforms**



**Unclamped Inductive Switching Test Circuit & Waveforms**

**Package Mechanical Data-TO-252-4R**

**TO-252-4R**

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 Specification-TO-252-4R**


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