

Features

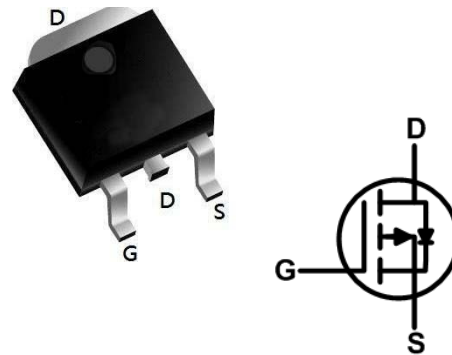
- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$


Product Summary

BVDSS	RDSON	ID
-100V	115mΩ	-15A

Applications

- Battery switching application
- Hard switched and high frequency circuits
- Power management

TO252 Pin Configuration

Absolute Maximum Ratings:

Symbol	Parameter	Value	Units
V_{DSS}	Drain-to-Source Voltage	-100	V
I_D	Continuous Drain Current	$T_C = 25\text{ }^\circ\text{C}$	-15
	Continuous Drain Current	$T_C = 100\text{ }^\circ\text{C}$	-9.2
I_{DM}^{a1}	Pulsed Drain Current	-58	A
V_{GS}	Gate-to-Source Voltage	± 20	V
P_D	Power Dissipation	69	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, -55 to 150	$^\circ\text{C}$
T_L	Maximum Temperature for Soldering	260	$^\circ\text{C}$

Thermal Characteristics:

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.8	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	75	$^\circ\text{C}/\text{W}$

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

Static Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-100	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} =-100V, V _{GS} =0V	--	--	1	μA
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} =-20V, V _{DS} =0V	--	--	100	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} =+20V, V _{DS} =0V	--	--	-100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1.2	-1.7	-2.2	V
R _{DS(ON)1}	Drain-to-Source Resistance	On- V _{GS} =-10V, I _D =-5A	--	115	150	mΩ
R _{DS(ON)2}	Drain-to-Source Resistance	On- V _{GS} =-4.5V, I _D =-5A	--	130	165	mΩ

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C _{iss}	Input Capacitance	V _{GS} = 0V	--	700	--	pF
C _{oss}	Output Capacitance	V _{DS} = -50V	--	56	--	
C _{rss}	Reverse Transfer Capacitance	f = 1.0MHz	--	8.6	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D =-5A V _{DS} = -50V V _{GS} = -10V R _G = 5Ω	--	5.9	--	ns
t _r	Rise Time		--	3.7	--	
t _{d(OFF)}	Turn-Off Delay Time		--	39.5	--	
t _f	Fall Time		--	24.6	--	
Q _g	Total Gate Charge	V _{GS} =-10V	--	12.7	--	nC
Q _{gs}	Gate Source Charge	V _{DS} = -50V	--	2.1	--	
Q _{gd}	Gate Drain Charge	I _D =-5A	--	2.3	--	

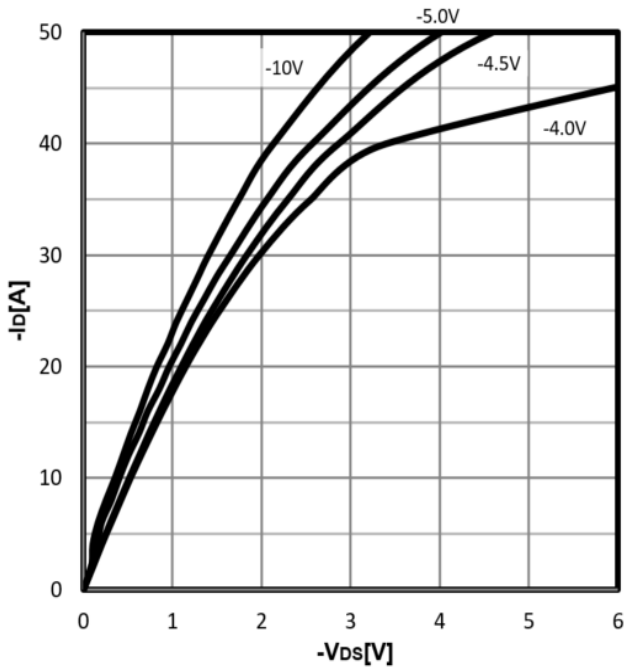
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V _{SD}	Diode Forward Voltage	I _S =-5A, V _{GS} =0V	--	--	-1.2	V
t _{rr}	Reverse Recovery time	I _S =-5A, V _{DD} =-50V	--	66	--	ns
Q _{rr}	Reverse Recovery Charge	dI/dt=100A/μs	--	214	--	nC

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

Characteristics Curve:

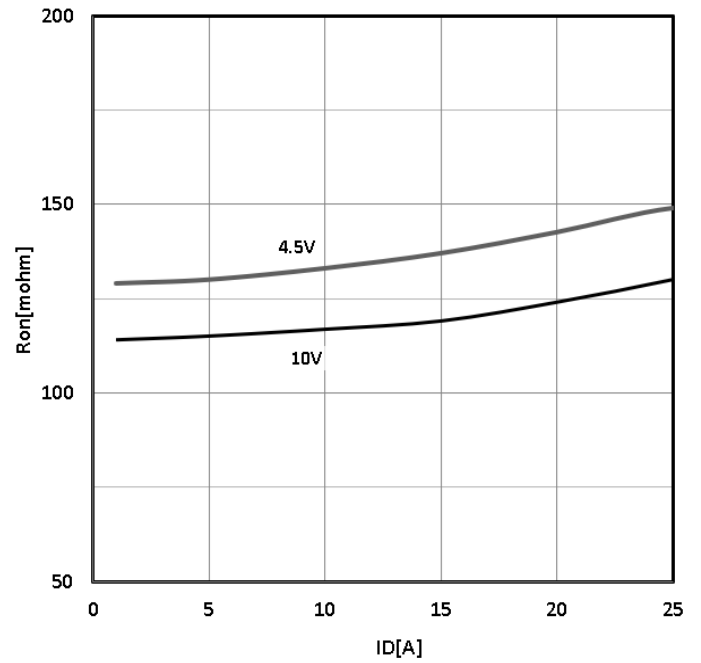
Typ. output characteristics

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



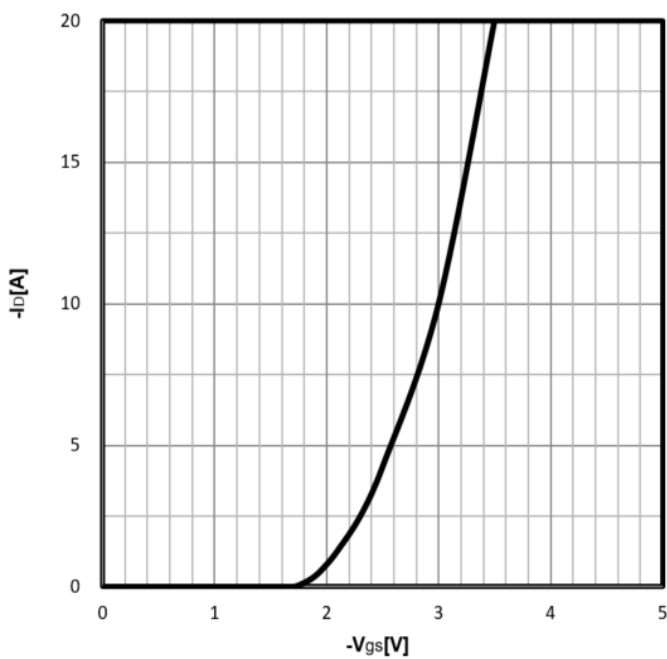
Typ. drain-source on resistance

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



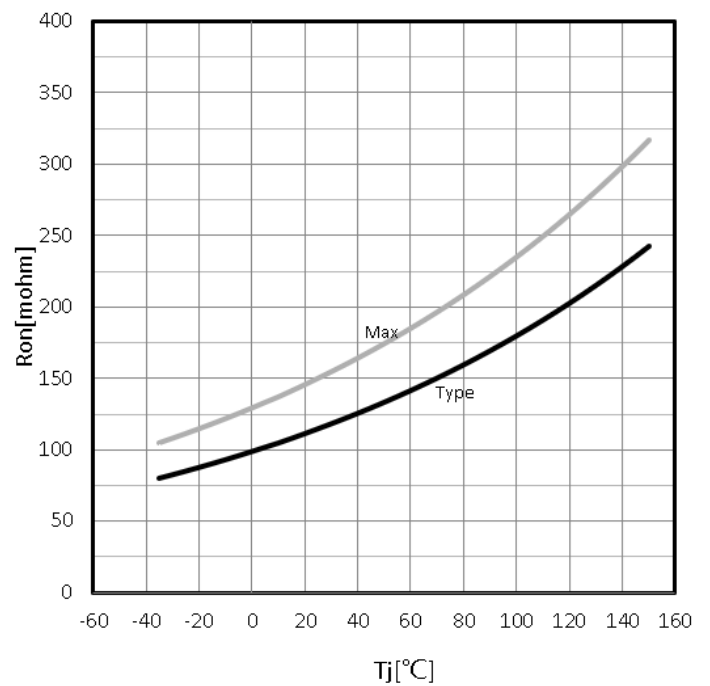
Typ. transfer characteristics

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



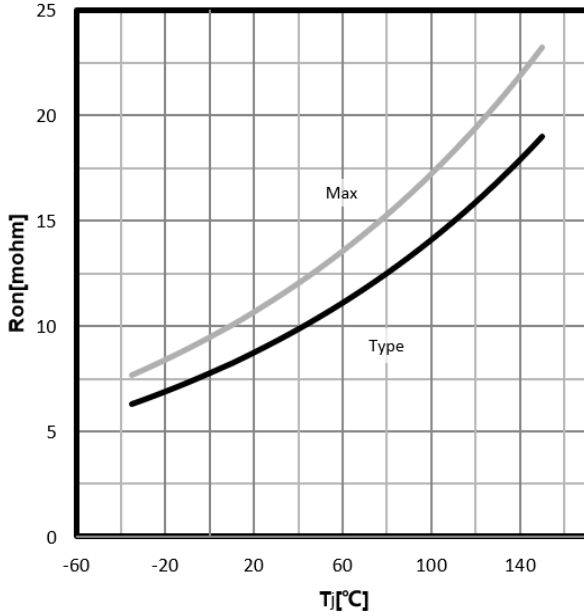
Drain-source on-state resistance

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



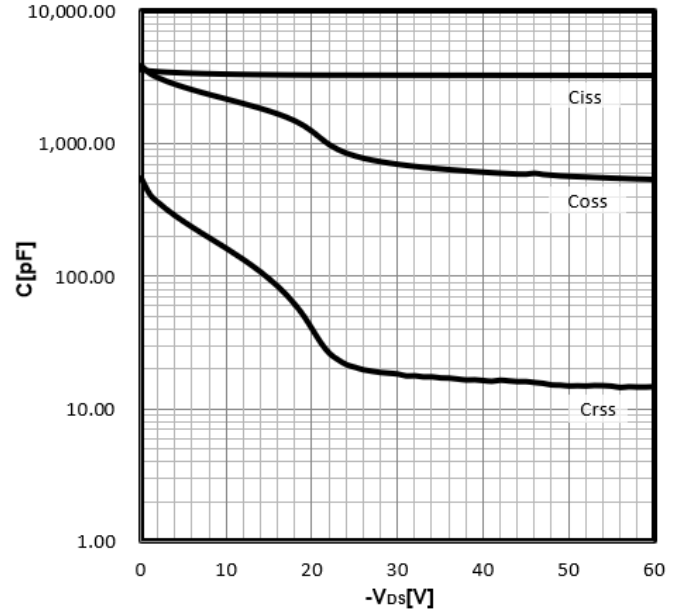
Drain-source on-state resistance

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



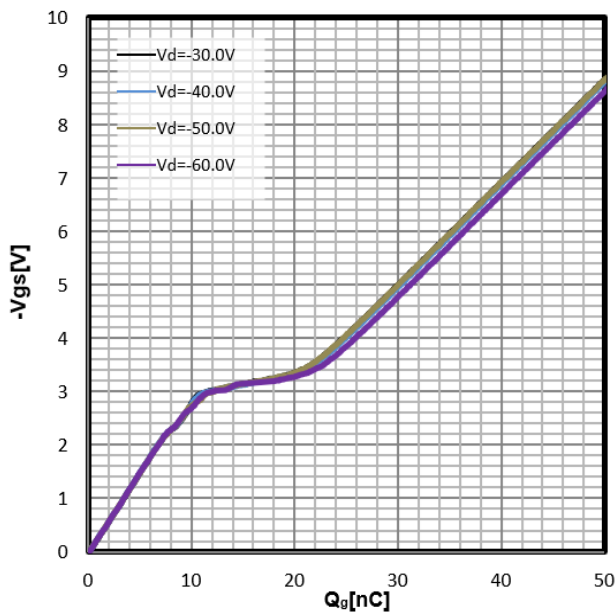
Typ. capacitances

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



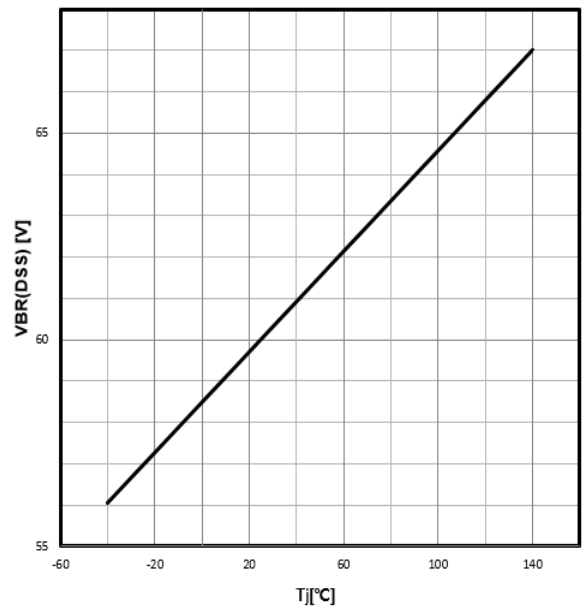
Typ. gate charge

$V_{GS}=f(Q_{gate}); I_D=-20A$

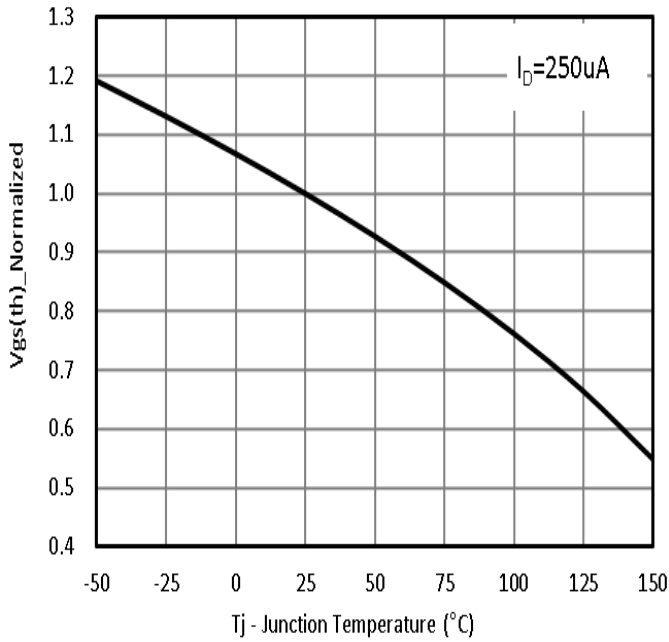


Drain-source breakdown voltage

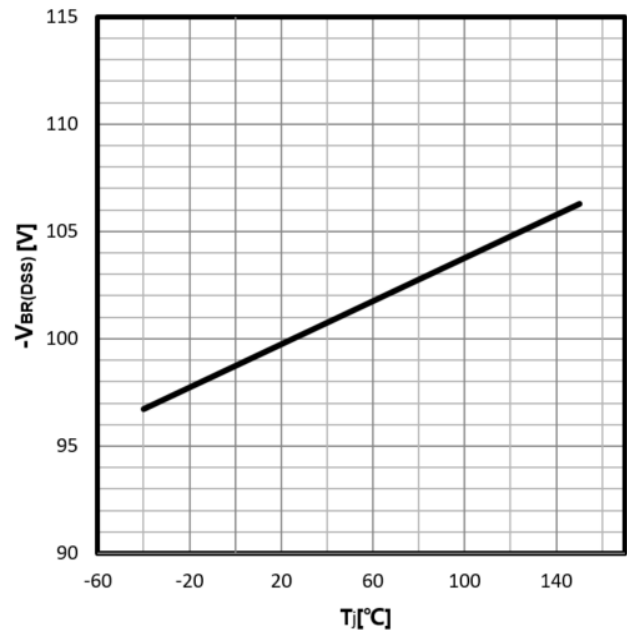
$V_{BR(DSS)}=f(T_j); I_D=-250\mu A$



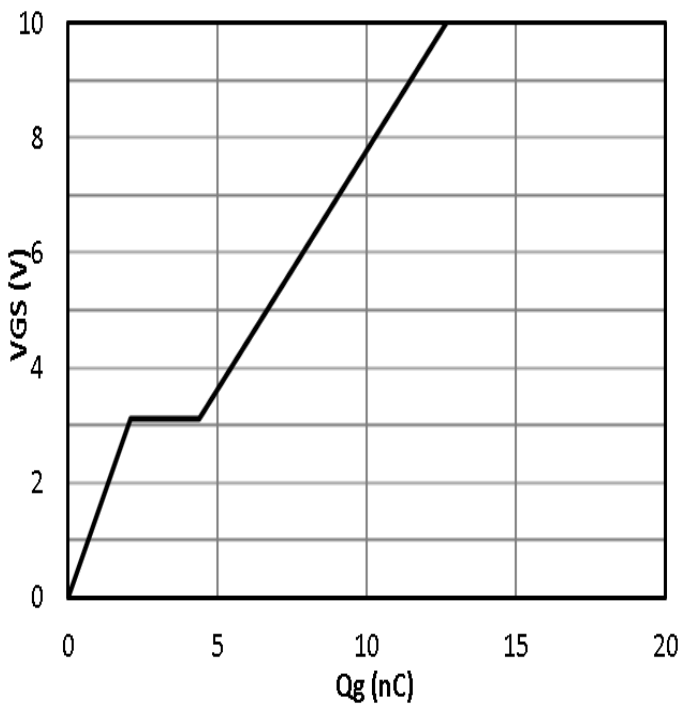
Gate Threshold Voltage
 $-V_{TH}=f(T_j); I_D=-250\mu A$



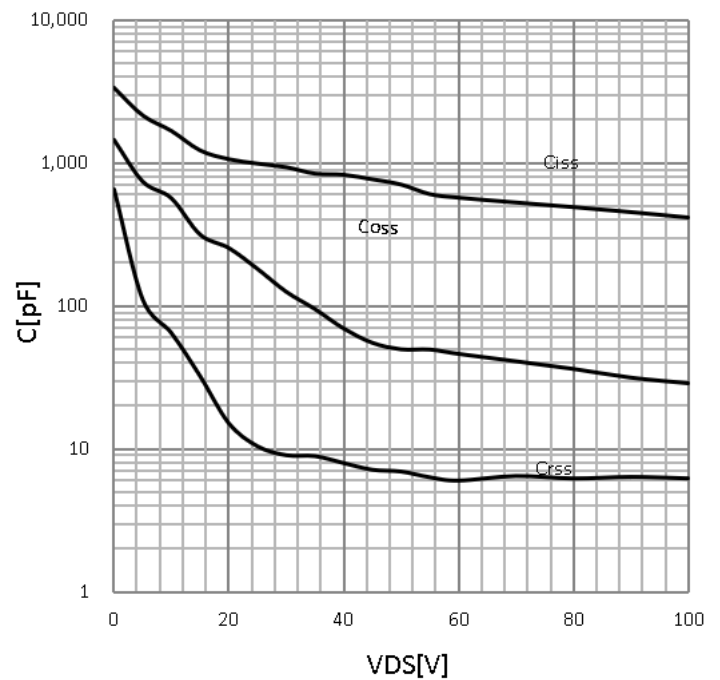
Drain-source breakdown voltage
 $-V_{BR(DSS)}=f(T_j); I_D=-250\mu A$



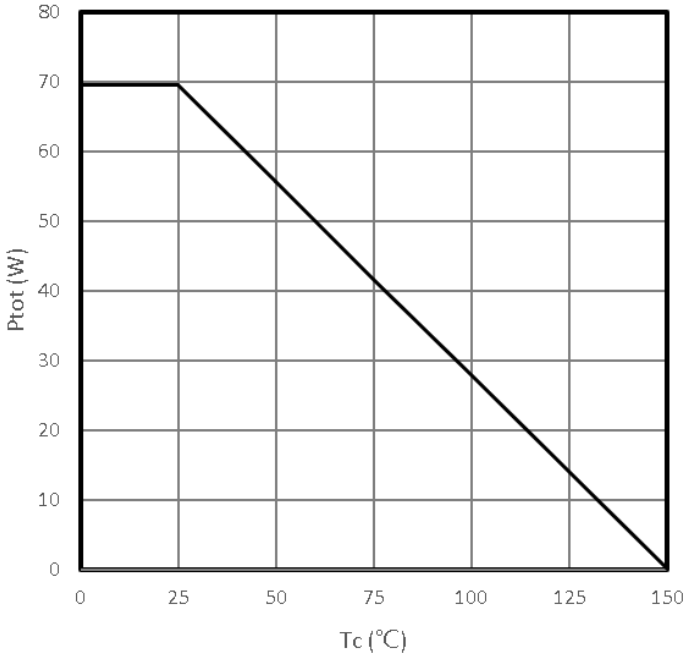
Typ. gate charge
 $-V_{GS}=f(Q_g); I_D=-5A$



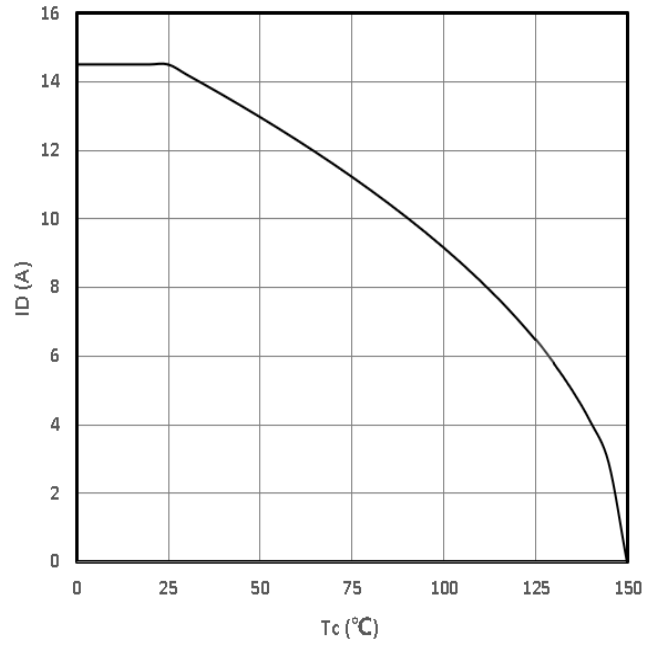
Typ. capacitances
 $C=f(-V_{DS}); V_{GS}=0V; f=1MHz$



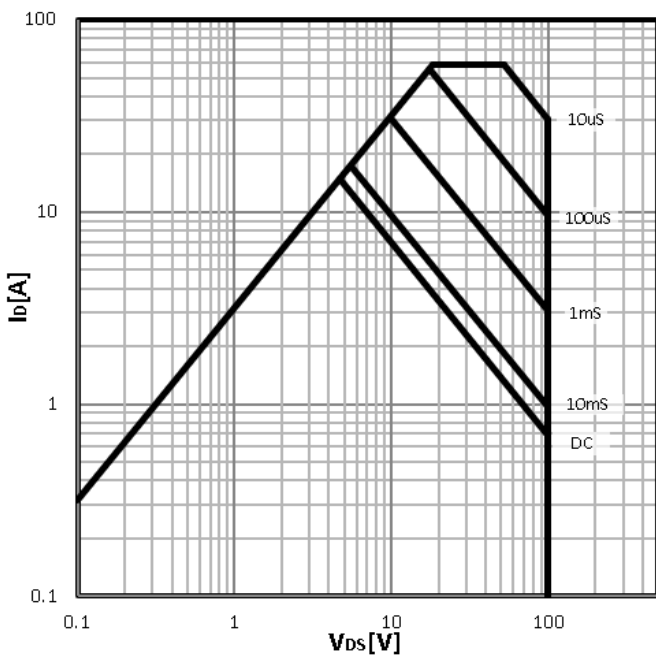
Power Dissipation
 $P_{tot}=f(T_c)$



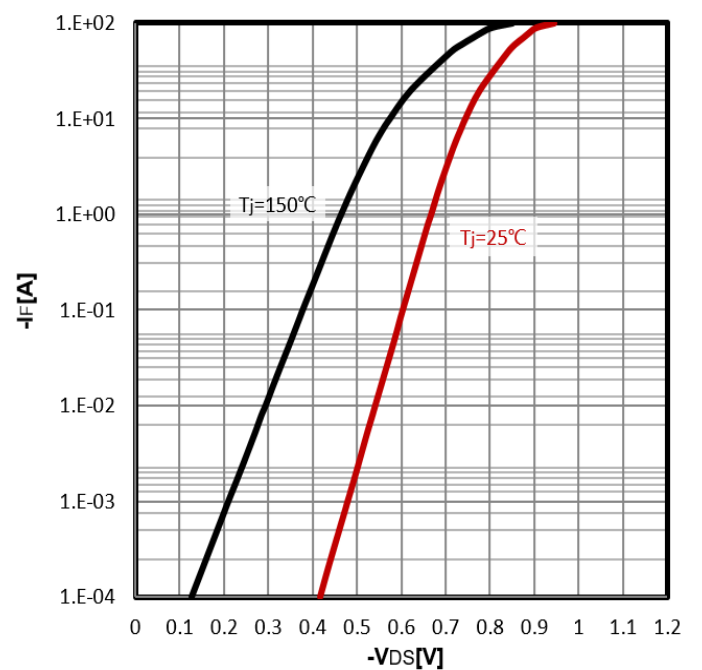
Maximum Drain Current
 $-I_D=f(T_c)$



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

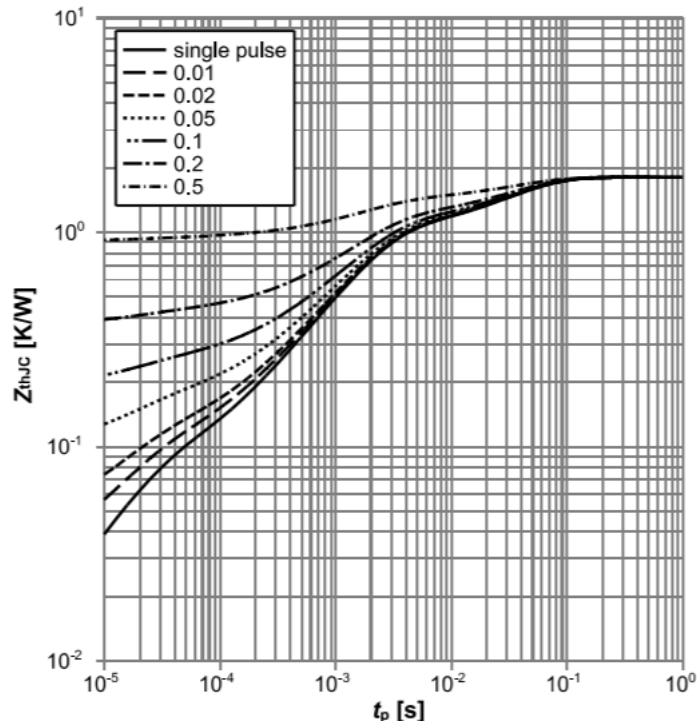


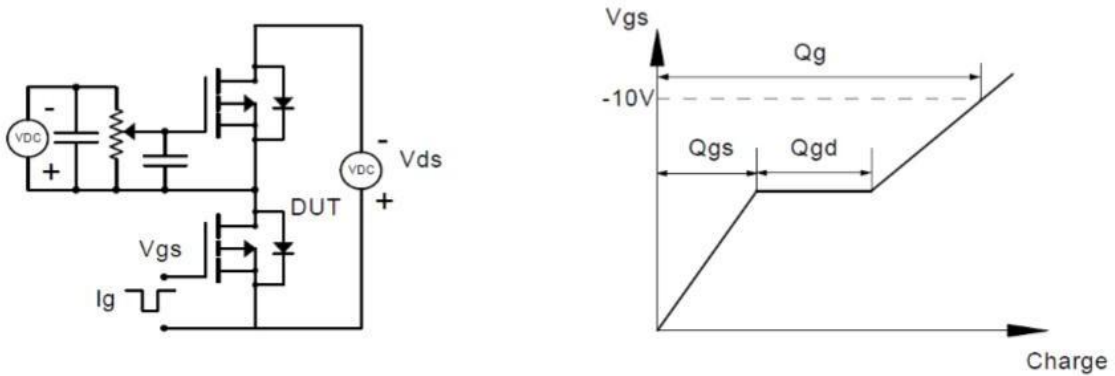
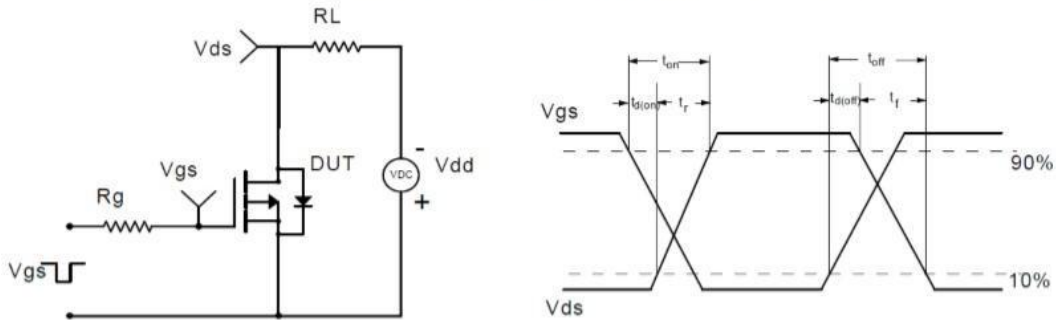
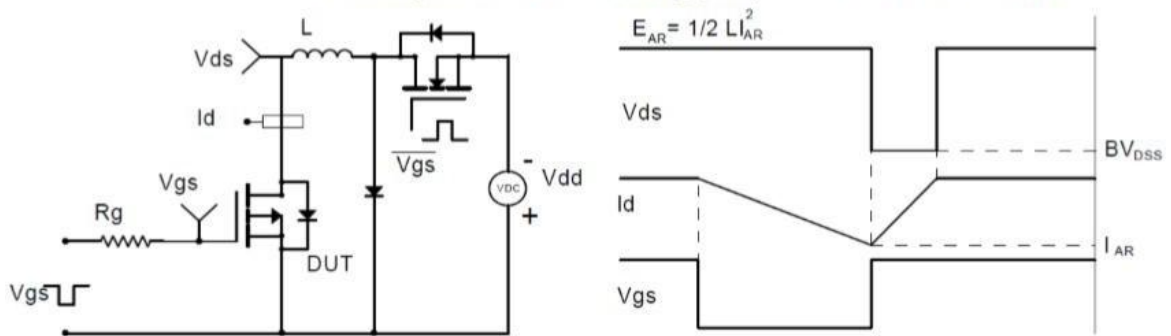
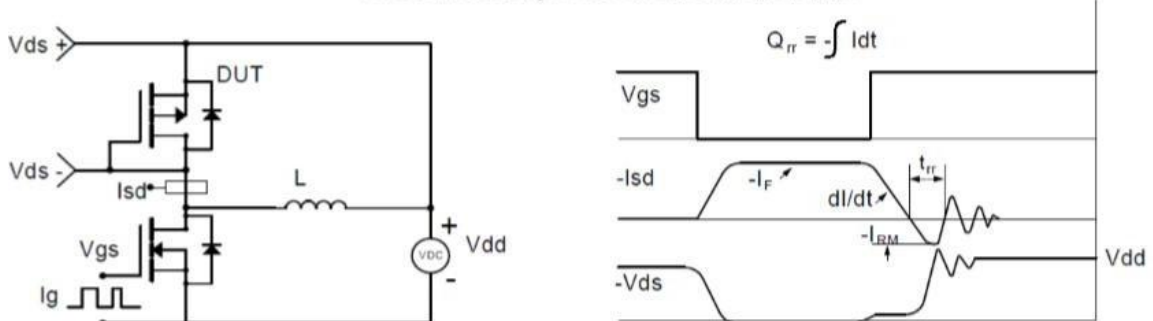
Body Diode Forward Voltage Variation
 $-I_F=f(-V_{DS})$

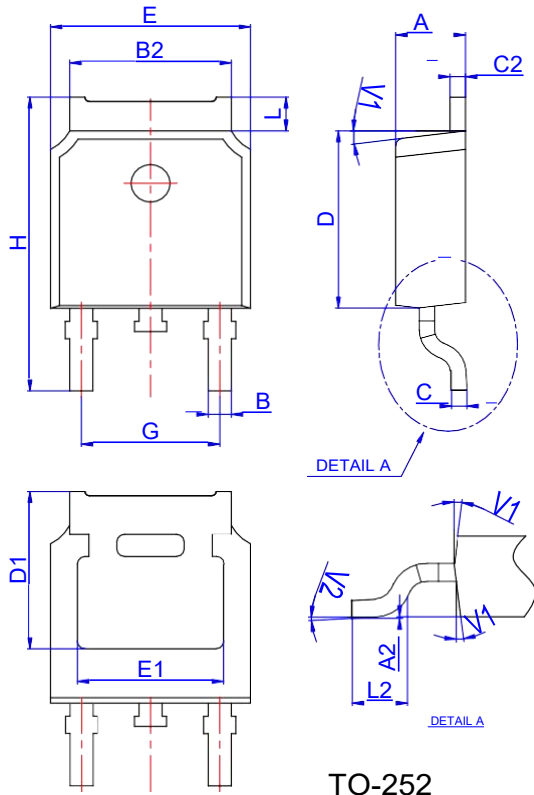


Max. transient thermal impedance

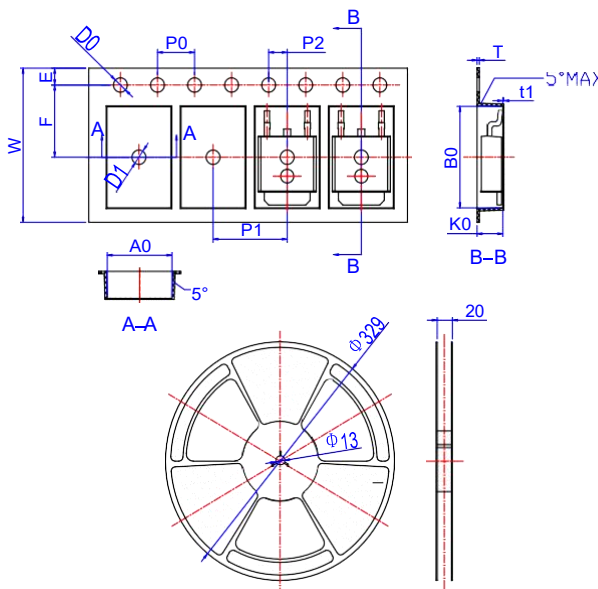
$$Z_{thJC} = f(t_p)$$



Test Circuit and Waveform:
Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

Diode Recovery Test Circuit & Waveforms


Package Mechanical Data TO 252


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