Features

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

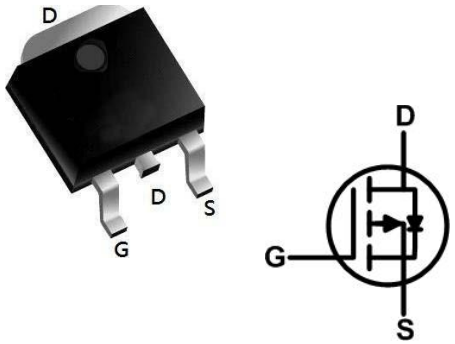
Product Summery

BVDSS	RDSON	ID
-60V	12mΩ	-60A

Applications

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

TO252 Pin Configuration



Absolute Maximum Ratings (T_C= 25℃ unless otherwise specified):

Symbol	Parameter		Value	Units
V_{DSS}	Drain-to-Source Voltage		-60	V
I_D	Continuous Drain Current	T_C = 25 ℃	-60	A
	Continuous Drain Current	T_C = 100 ℃	-35	A
I_{DM}[a1]	Pulsed Drain Current		-220	A
V_{GS}	Gate-to-Source Voltage		±20	V
P_D	Power Dissipation		100	W
E_{AS} [a2]	Single pulse avalanche energy		337	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range		150, –55 to 150	℃
T_L	Maximum Temperature for Soldering		260	℃

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.25	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	60	℃/W

Electrical Characteristics (T_J= 25℃ 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	-60	--	--	V
I_{DSS}	Drain to Source Leakage Current	V_{DS} = -60V, V_{GS}= 0V	--	--	1	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS} =-20V	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS} =+20V	--	--	-100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250μA	-1.3	-1.8	-2.3	V
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	V_{GS}=-10V, I_D=-20A	--	12	16	mΩ
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	V_{GS}=-4.5V, I_D=-10A	--	18	20	mΩ

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	V_{GS}=0V V_{DS}=-30V f=1.0MHz	--	2630	--	pF
C_{oss}	Output Capacitance		--	484	--	
C_{rss}	Reverse Transfer Capacitance		--	9.4	--	
R_g	Gate resistance	V_{GS}=0V, V_{DS} Open	--	12.5	--	Ω

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D=-10A, R_L=3.0Ω V_{DS}= -30V V_{GS}= -10V R_G= 3Ω	--	20	--	ns
tr	Rise Time		--	25	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	60	--	
tf	Fall Time		--	30	--	
Q_g	Total Gate Charge	V_{GS}=-10V V_{DS}=-30V I_D=-10A	--	38	--	nC
Q_{gs}	Gate Source Charge		--	6.9	--	
Q_{gd}	Gate Drain Charge		--	4.98	--	

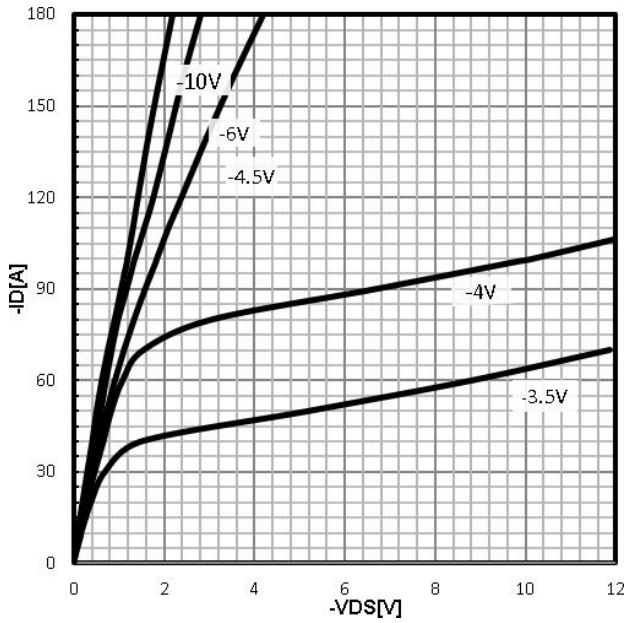
Note:

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current	T_C=25 °C	--	--	-60	A
V_{SD}	Diode Forward Voltage	I_S=-5.0A, V_{GS}=0V	--	--	-1.2	V
t_{rr}	Reverse Recovery time	I_S=-10A, V_{DD}=-30V dI/dt=100A/μs	--	50	--	ns
Q_{rr}	Reverse Recovery Charge		--	80	--	nC

Characteristics Curve:

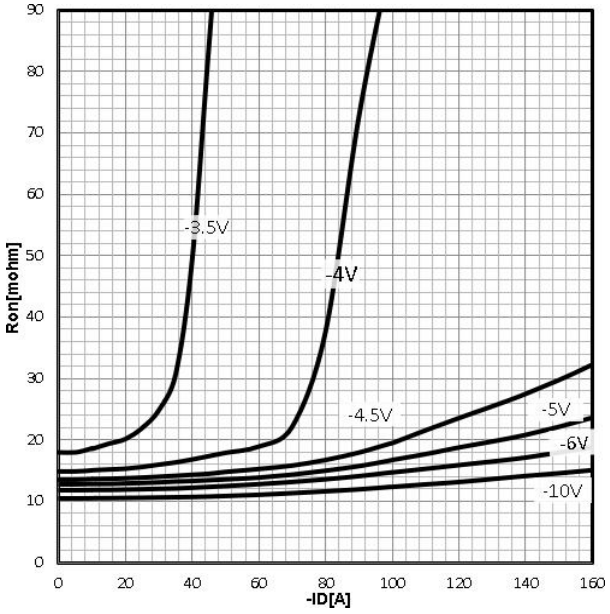
Typ. output characteristics

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



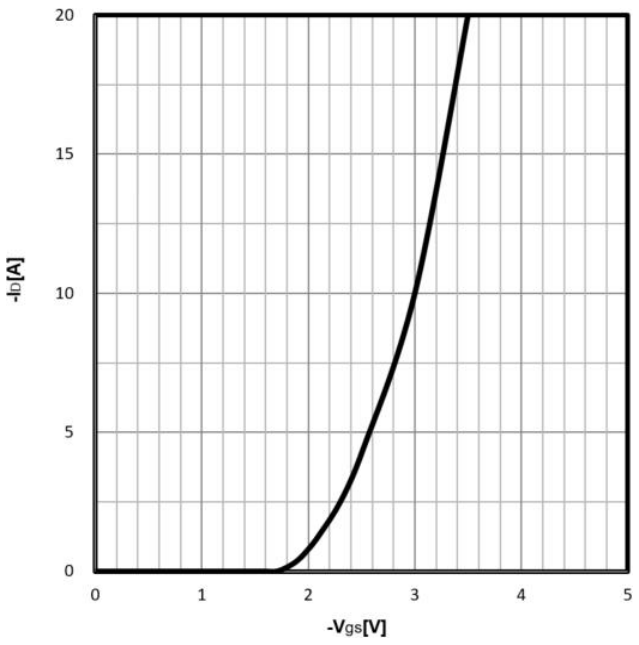
Typ. drain-source on resistance

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



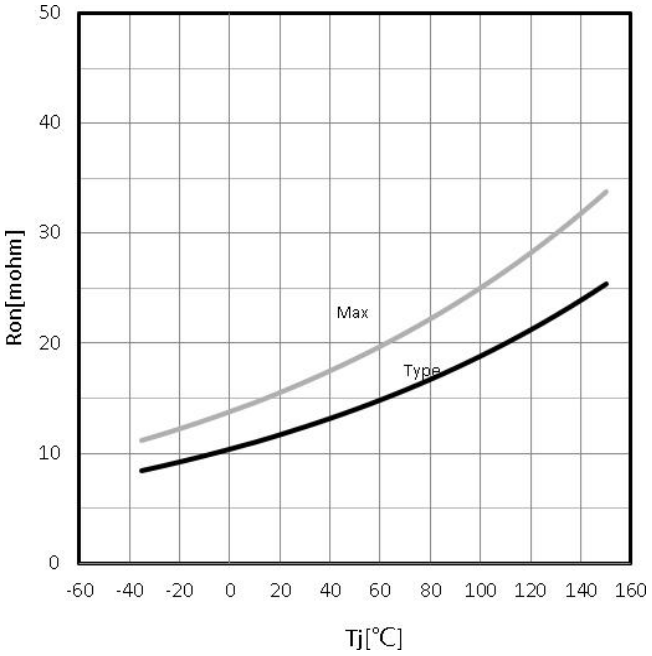
Typ. transfer characteristics

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



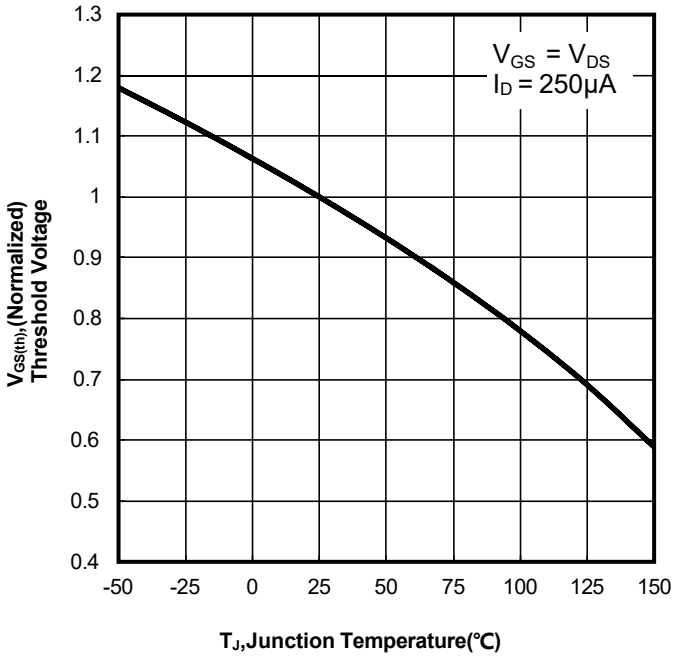
Drain-source on-state resistance

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



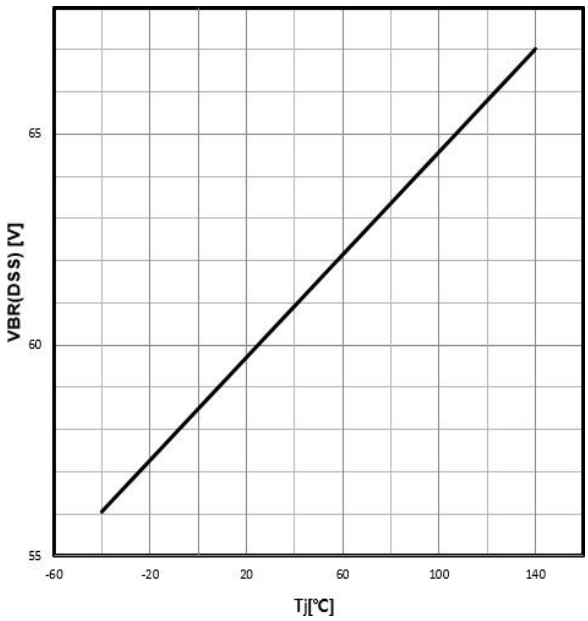
Gate Threshold Voltage

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



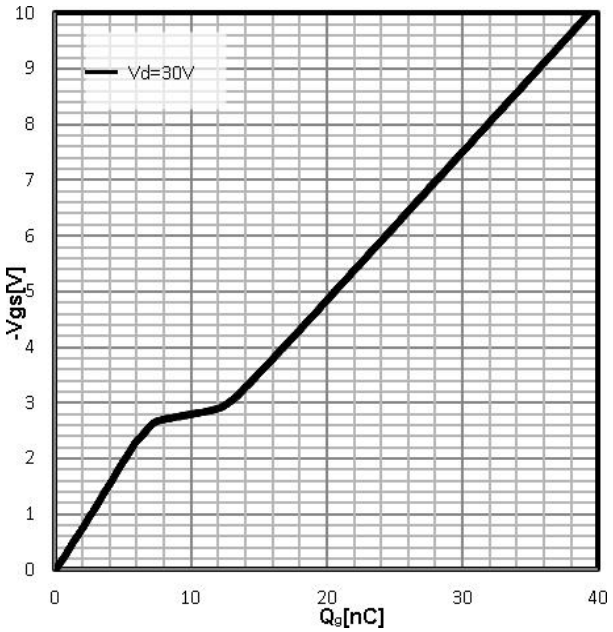
Drain-source breakdown voltage

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



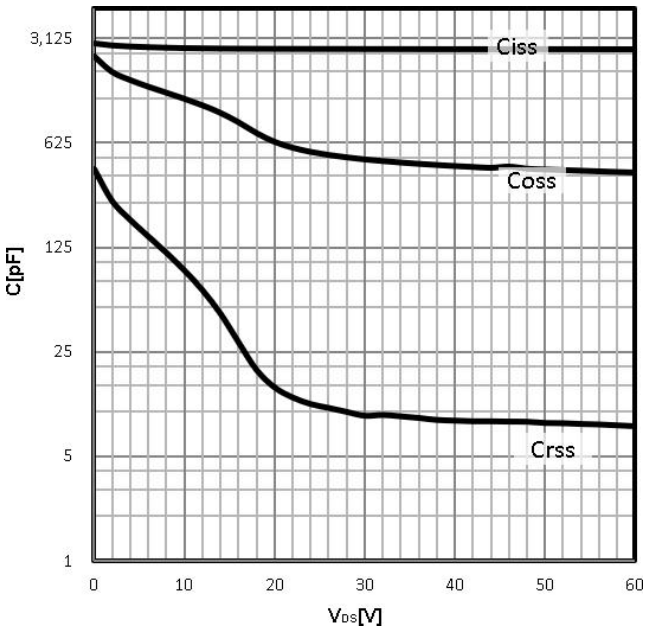
Typ. gate charge

$V_{GS}=f(Q_{gate})$; I_D=-10A



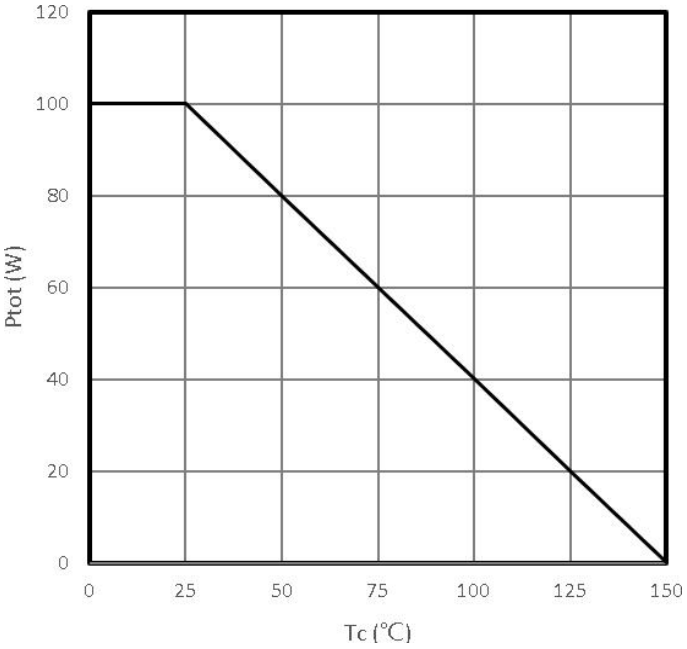
Typ. Capacitances

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



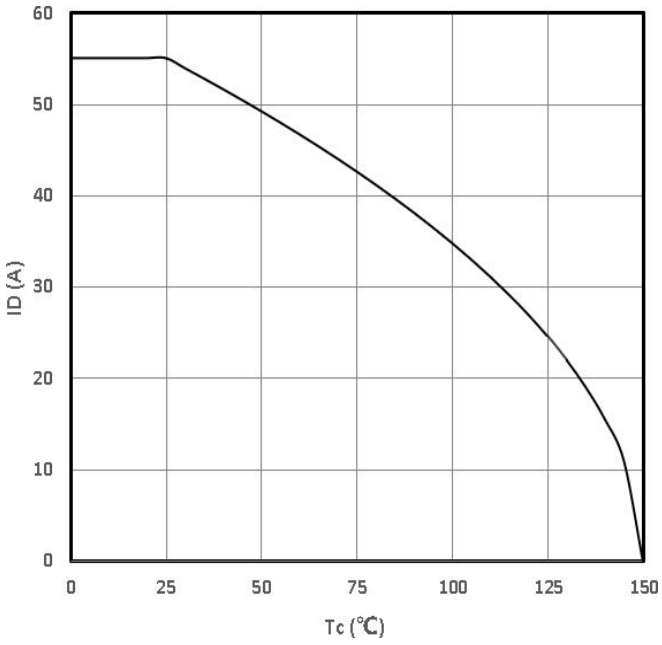
Power Dissipation

$P_{tot}=f(T_C)$



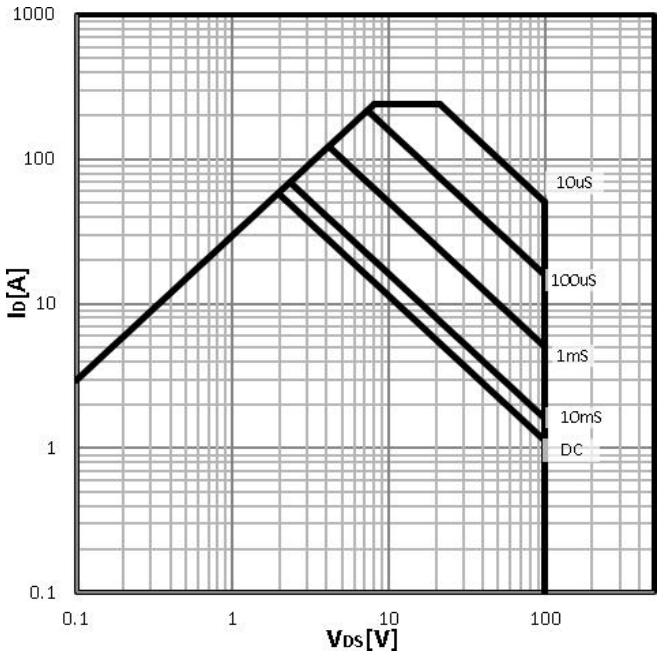
Maximum Drain Current

$-I_D=f(T_C)$



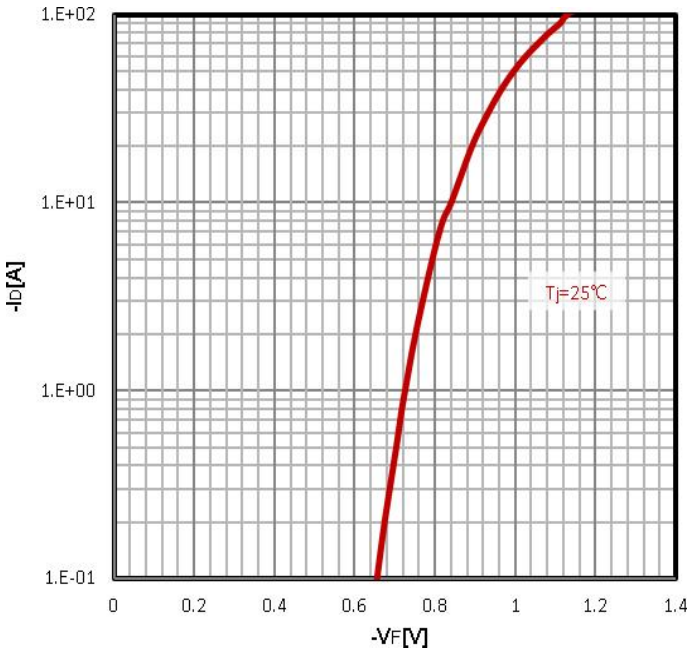
Safe operating area

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



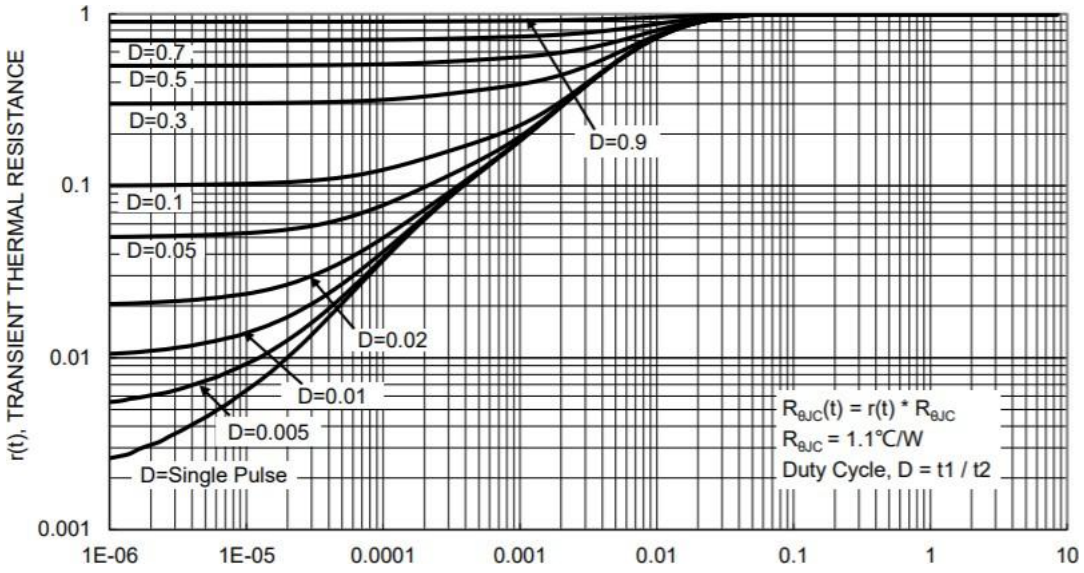
Body Diode Forward Voltage Variation

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

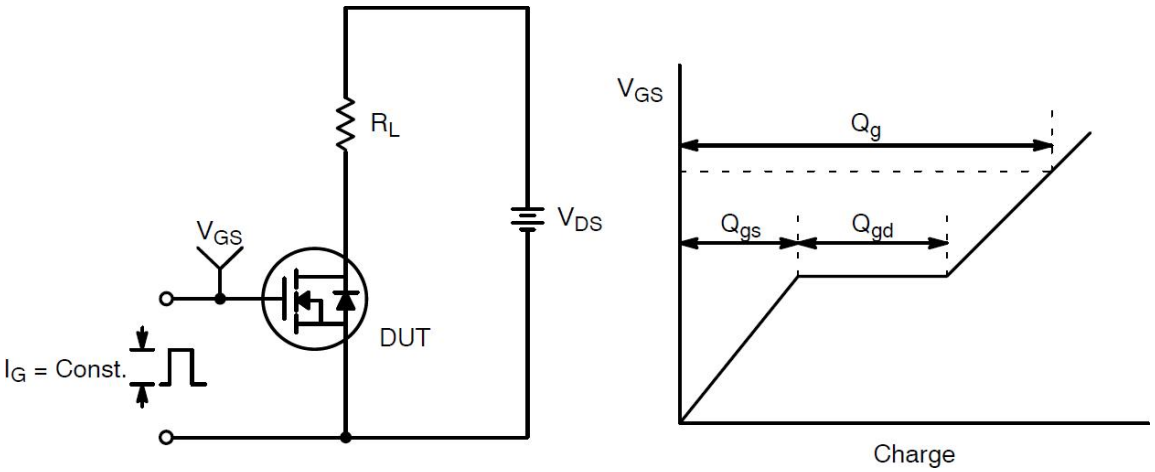


Max. transient thermal impedance

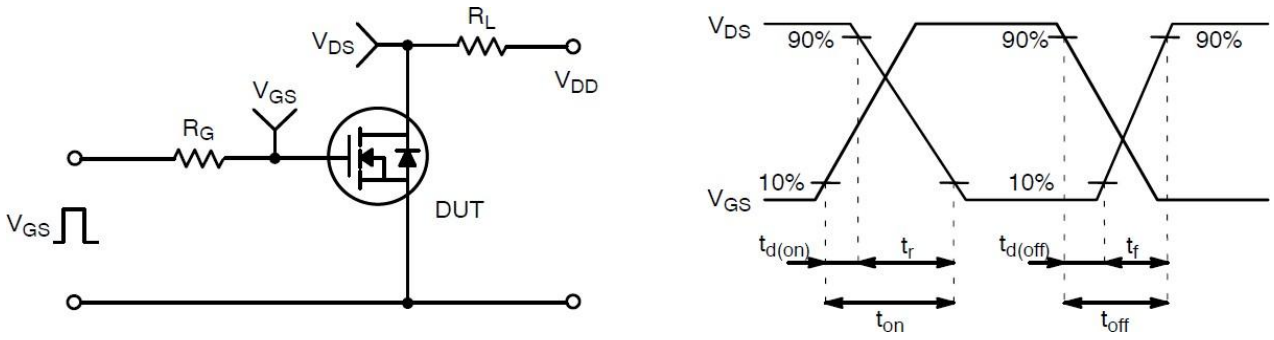
$Z_{thJC}=f(t_p)$



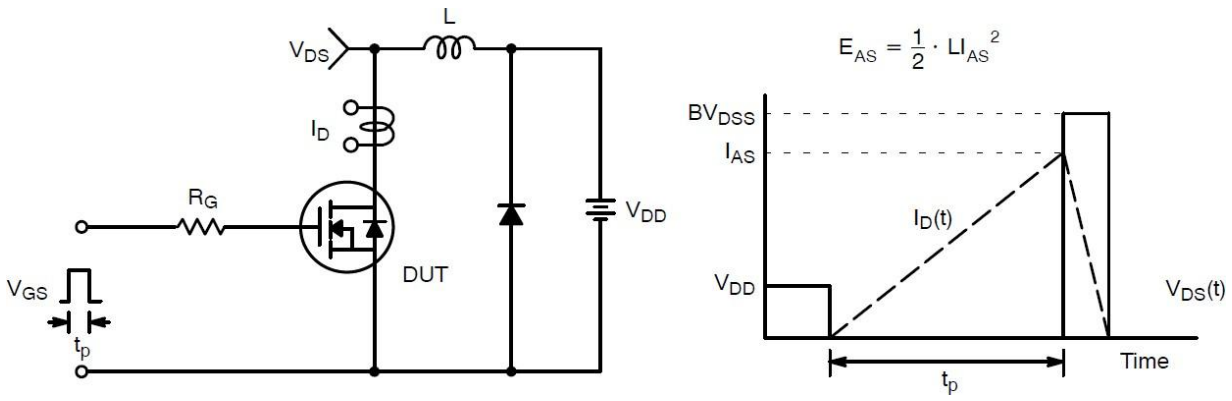
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

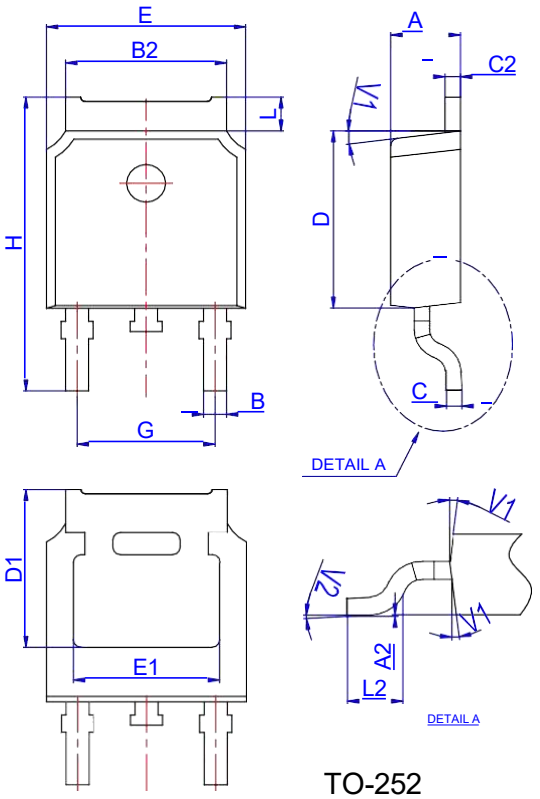


Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

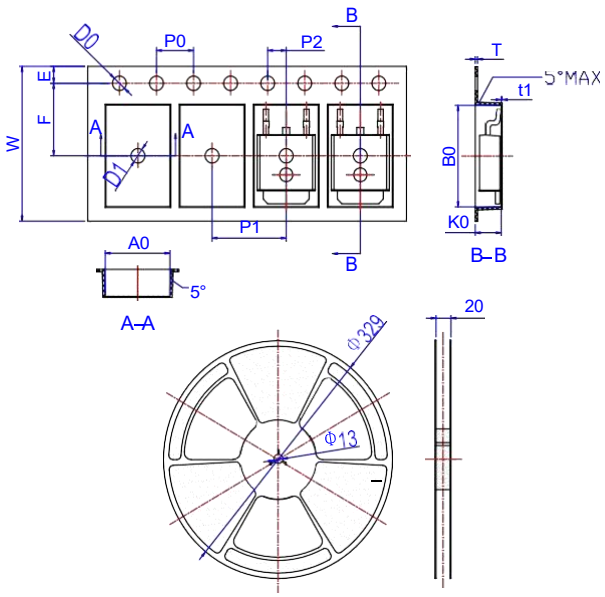
Package Mechanical Data TO 252



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 Spectification-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