

## Features

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

## Product Summary

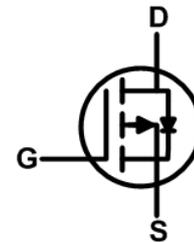
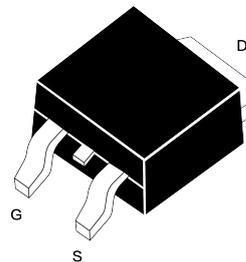


BVDSS	RDSON	ID
-100V	45mΩ	-30A

## Applications

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

## TO-252 Pin Configuration



## Absolute Maximum Ratings:

Symbol	Parameter	Value	Units
$V_{DSS}$	Drain-to-Source Voltage	-100	V
$I_D$	Continuous Drain Current	$T_C = 25\text{ }^\circ\text{C}$	-30
	Continuous Drain Current	$T_C = 100\text{ }^\circ\text{C}$	-17.8
$I_{DM}^{a1}$	Pulsed Drain Current	-112	A
$E_{AS}^{a2}$	Single pulse avalanche energy	225	mJ
$I_{AR}$	Single pulse avalanche current	30	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$P_D$	Power Dissipation	83	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	1.5	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	102	$^\circ\text{C/W}$

## 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	-1.5	-2.0	-2.5	V
R <sub>DS(ON)1</sub>	Drain-to-Source Resistance	On- V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A	--	45	55	mΩ
R <sub>DS(ON)2</sub>	Drain-to-Source Resistance	On- V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-10A	--	55	65	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	--	2100	--	pF
C <sub>oss</sub>	Output Capacitance		--	168	--	
C <sub>rss</sub>	Reverse Transfer Capacitance		--	26	--	
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> = 0V, V <sub>DS</sub> Open	--	2.8	--	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> = -20A V <sub>DS</sub> = -50V V <sub>GS</sub> = -10V R <sub>G</sub> = 5Ω	--	8.2	--	ns
t <sub>r</sub>	Rise Time		--	19.6	--	
t <sub>d(OFF)</sub>	Turn-Off Delay Time		--	62.8	--	
t <sub>f</sub>	Fall Time		--	41.4	--	
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = -10V	--	38	--	nC
Q <sub>gs</sub>	Gate Source Charge	V <sub>DS</sub> = -50V	--	6.4	--	
Q <sub>gd</sub>	Gate Drain Charge	I <sub>D</sub> = -20A	--	6.8	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =-20A, V <sub>GS</sub> =0V	--	--	-1.2	V
t <sub>rr</sub>	Reverse Recovery time	I <sub>S</sub> =-20A, V <sub>DD</sub> =-50V dI/dt=100A/μs	--	68	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge		--	200	--	nC

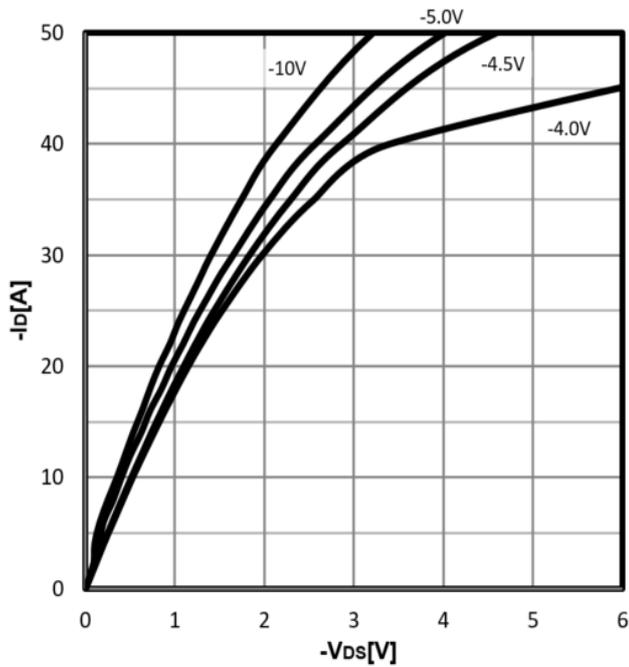
a<sub>1</sub>: Repetitive rating; pulse width limited by maximum junction temperature

a<sub>2</sub>: L=0.5mH, R<sub>g</sub>=25Ω, Starting T<sub>J</sub>=25 °C

## Characteristics Curve:

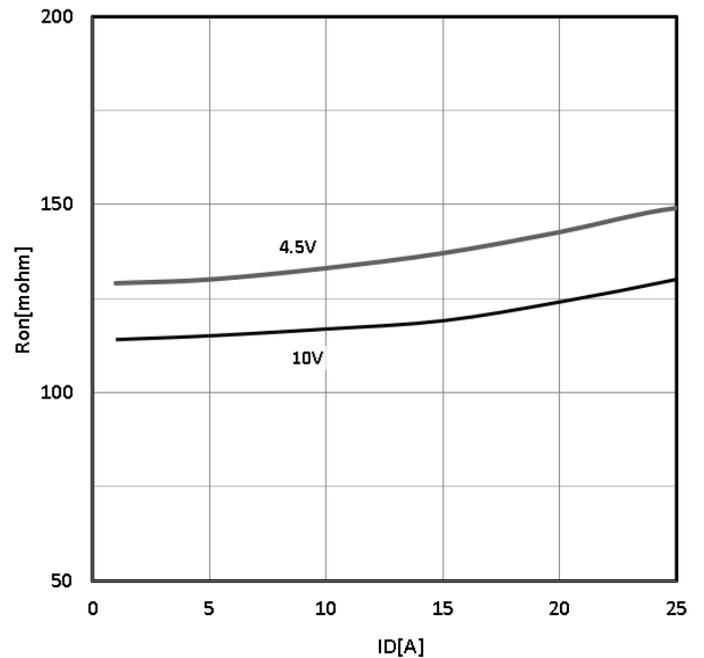
**Typ. output characteristics**

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



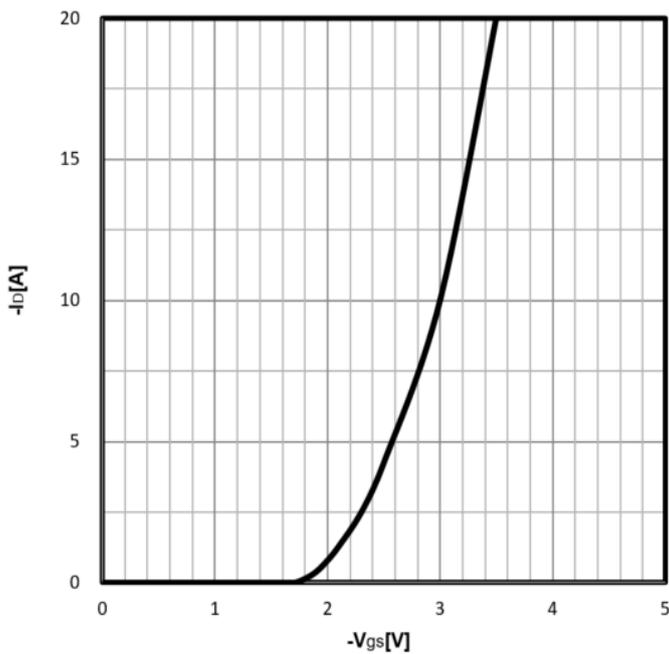
**Typ. drain-source on resistance**

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



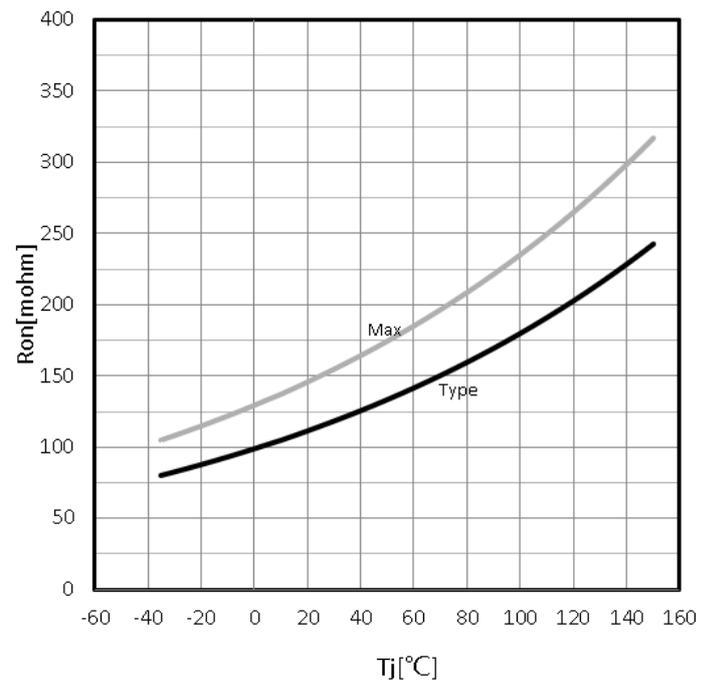
**Typ. transfer characteristics**

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



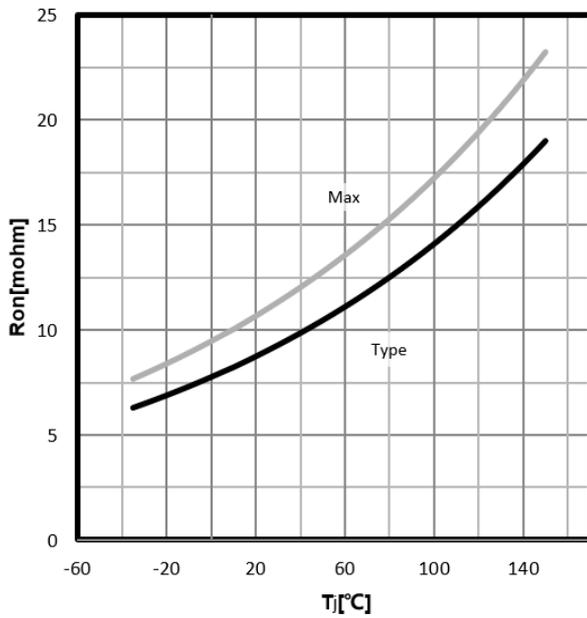
**Drain-source on-state resistance**

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



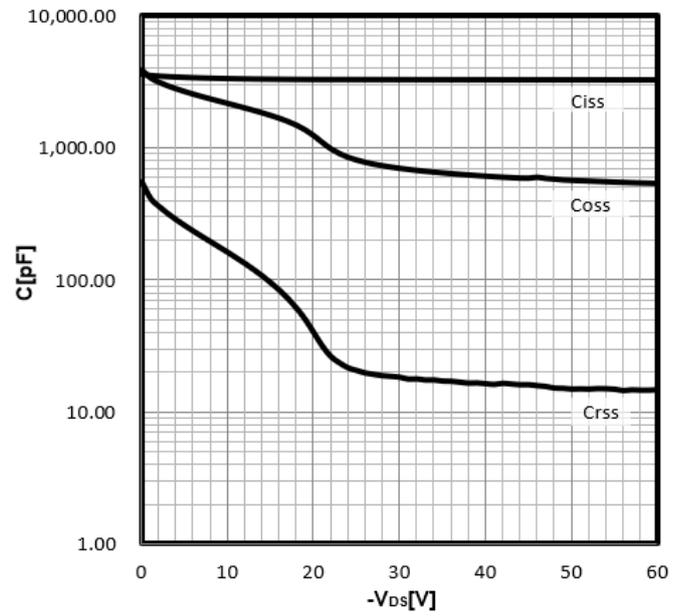
### Drain-source on-state resistance

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



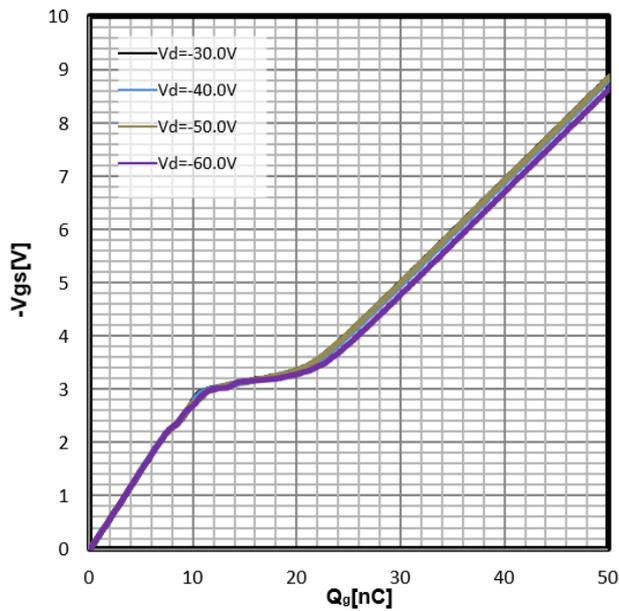
### Typ. capacitances

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



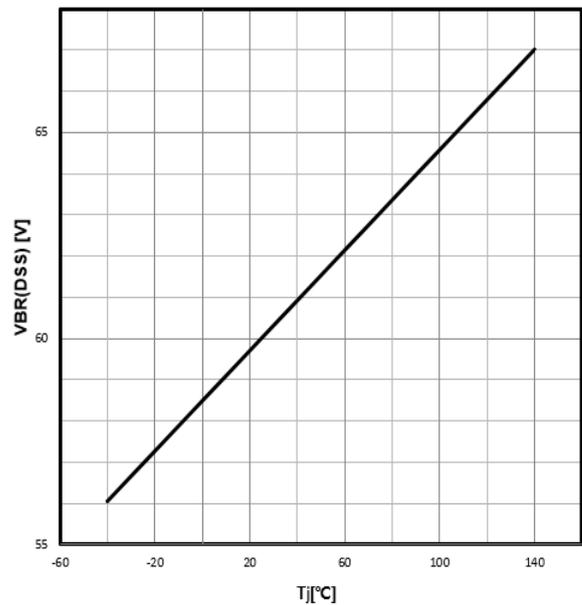
### Typ. gate charge

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

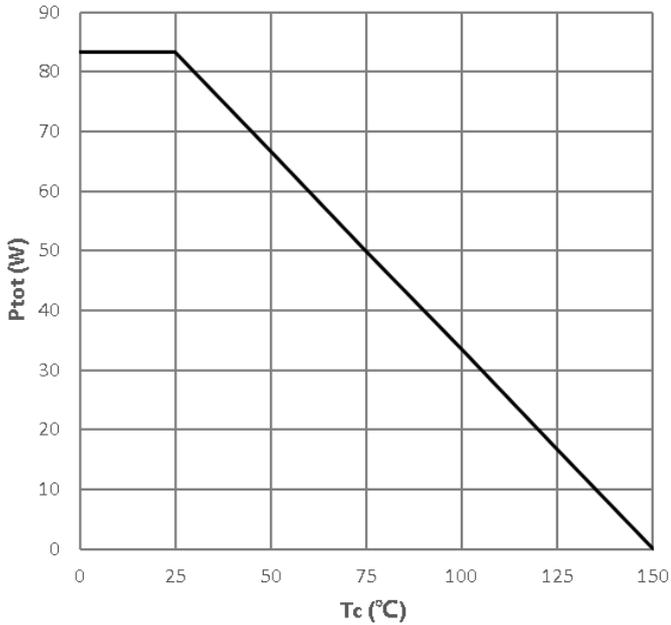


### Drain-source breakdown voltage

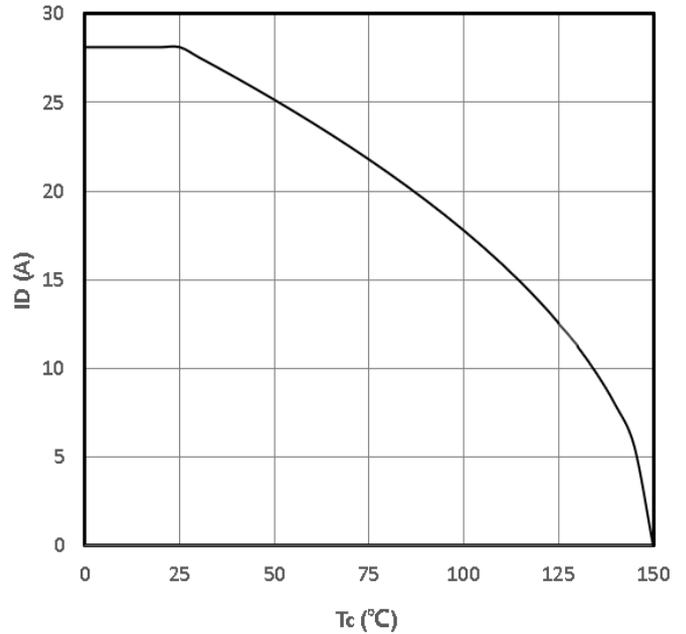
$$V_{BR(DSS)} = f(T_j); I_D = -250\mu A$$



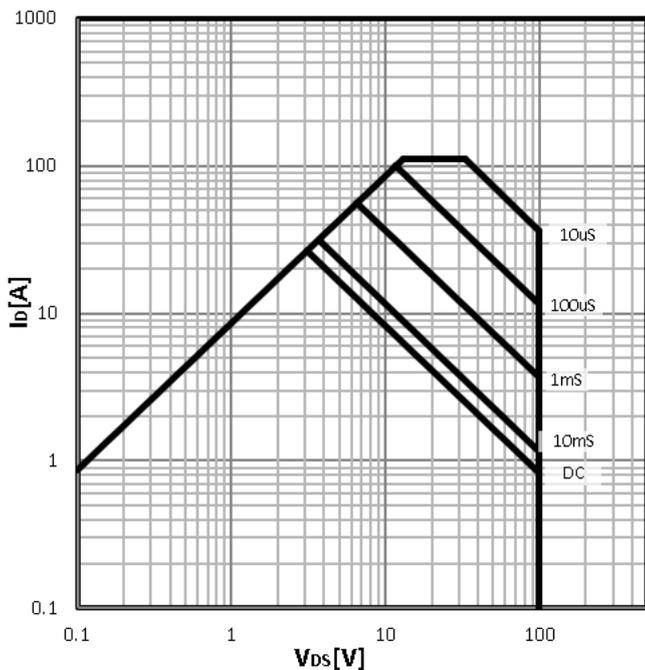
**Power Dissipation**  
 $P_{tot}=f(T_C)$



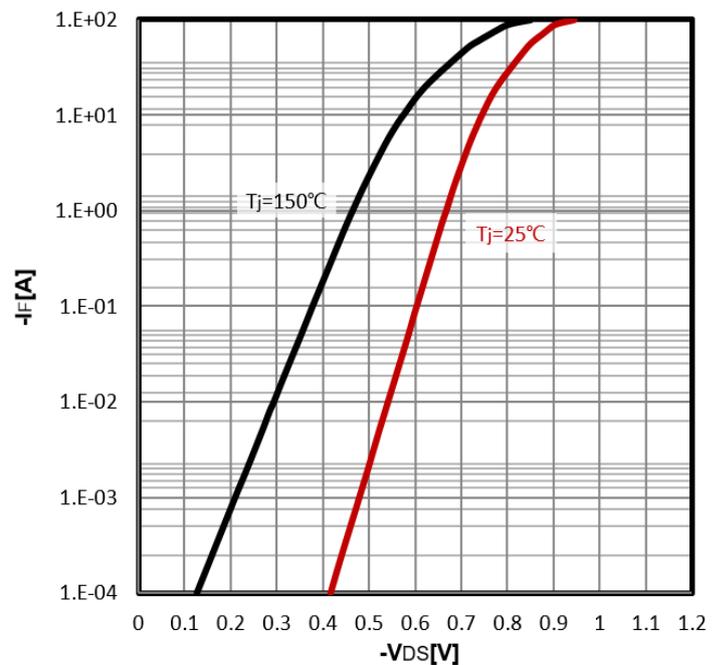
**Maximum Drain Current**  
 $-I_D=f(T_C)$



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

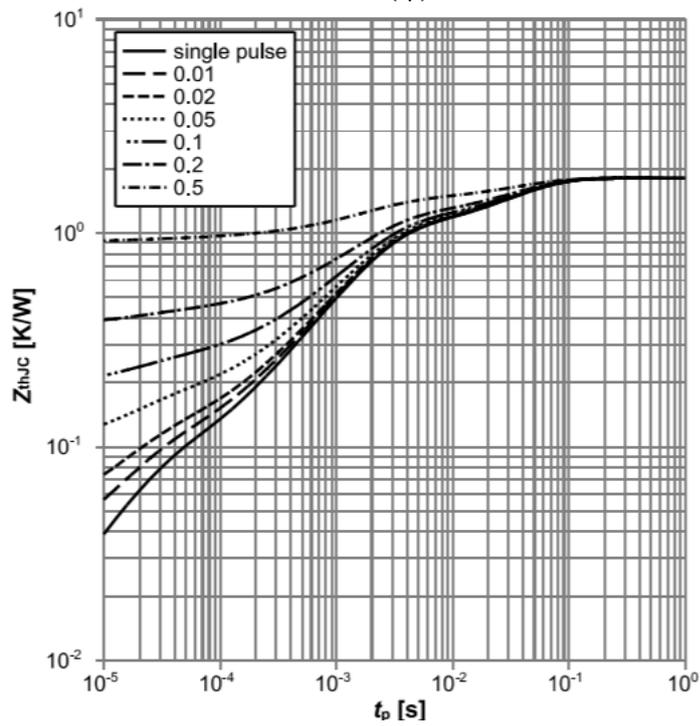


**Body Diode Forward Voltage Variation**  
 $-I_F=f(-V_{DS})$

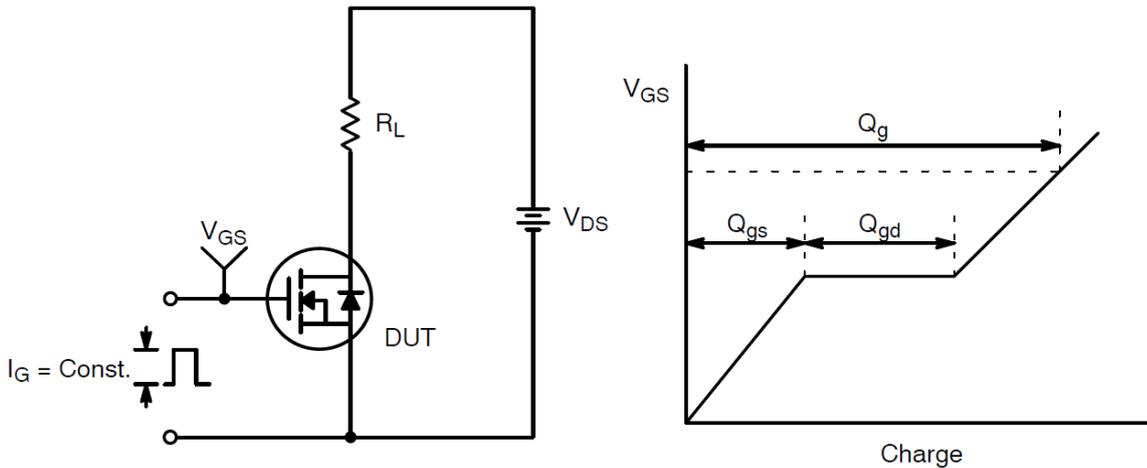


### Max. transient thermal impedance

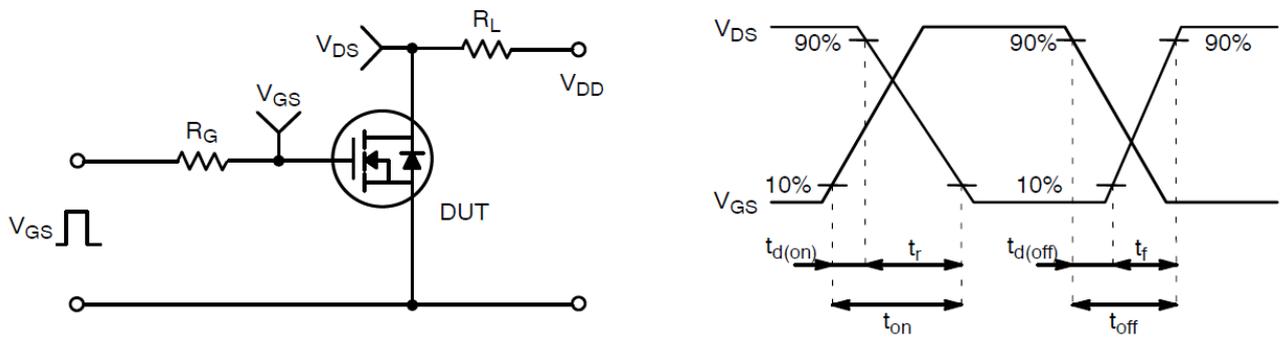
$$Z_{thJC} = f(t_p)$$



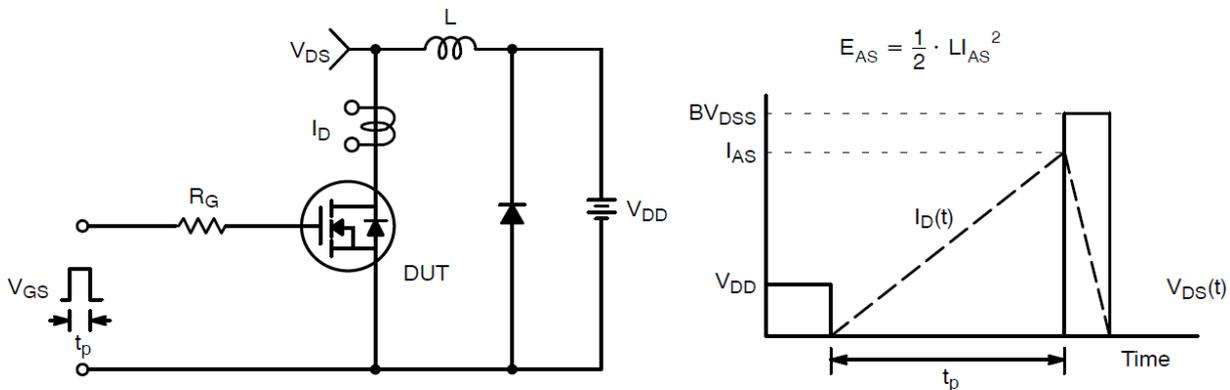
### Test Circuit and Waveform:



**Gate Charge Test Circuit & Waveform**



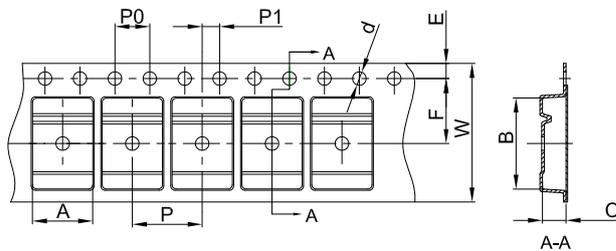
**Resistive Switching Test Circuit & Waveforms**



**Unclamped Inductive Switching Test Circuit & Waveforms**

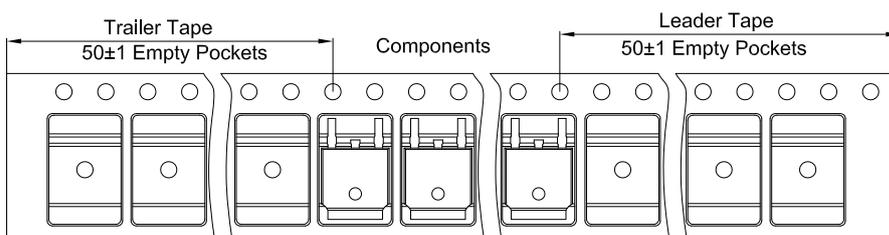
## TO-252-2L Tape and Reel

### TO-252 Embossed Carrier Tape

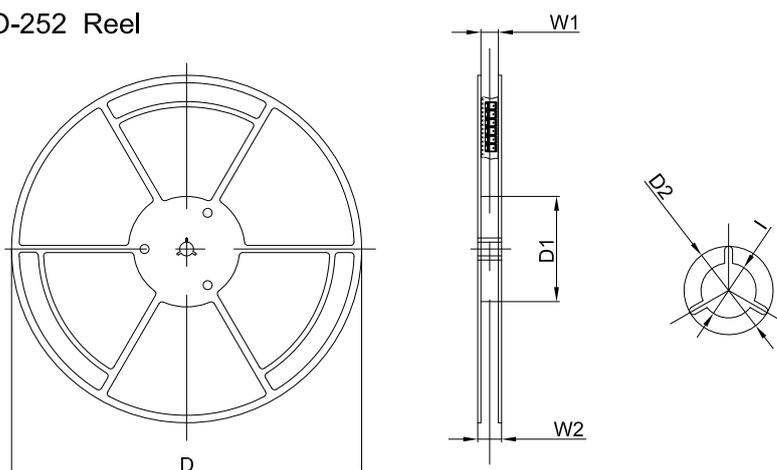


Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
TO-252	6.90	10.50	2.70	Ø1.55	1.75	7.50	4.00	8.00	2.00	16.00

### TO-252 Tape Leader and Trailer

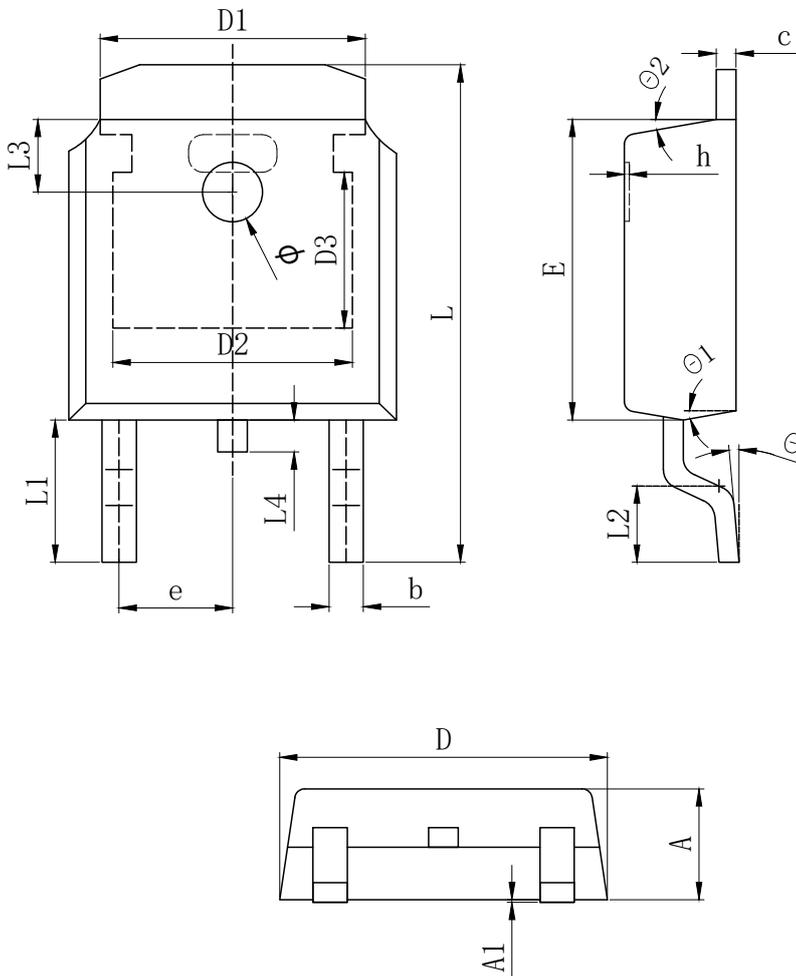


### TO-252 Reel



Dimensions are in millimeter						
Reel Option	D	D1	D2	W1	W2	I
13"Dia	330.00	100.00	Ø21.00	16.40	21.00	Ø13.00

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
2,500 pcs	13inch	2,500 pcs	340×336×29	25,000 pcs	353×346×365	



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.640	0.690	0.740
c (电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	4.826 REF		
D3	3.166 REF		
E	6.000	6.100	6.200
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.888 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.600	0.800	1.000
$\phi$	1.100	1.200	1.300
$\theta$	0°		8°
$\theta 1$	9° TYP		
$\theta 2$	9° TYP		

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