

Features

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

Product Summary

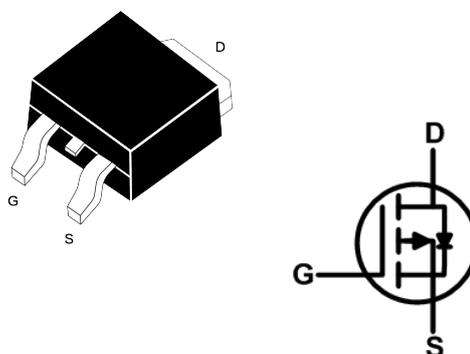


BVDSS	RDSON	ID
-60V	20mΩ	-50A

Applications

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

TO-252 Pin Configuration



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

Symbol	Parameter	Value	Units
V _{DSS}	Drain-to-Source Voltage	-60	V
I _D	Continuous Drain Current	T _C = 25 °C	-50
	Continuous Drain Current	T _C = 100 °C	-25
I _{DM} ^{a1}	Pulsed Drain Current	-150	A
V _{GS}	Gate-to-Source Voltage	±20	V
P _D	Power Dissipation	95	W
E _{AS} ^{a2}	Single pulse avalanche energy	200	mJ
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 _{θJC}	Thermal Resistance, Junction-to-Case	1.32	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	60	°C/W

Electrical Characteristics (T_J= 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	-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 =-10A	--	20.0	25.0	mΩ
R _{DS(ON)} ₂	Drain-to-Source On-Resistance	V _{GS} =-4.5V, I _D =-8A	--	25.0	32.0	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-5A	--	20	--	S

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C _{iss}	Input Capacitance	V _{GS} =0V V _{DS} =-30V f=1.0MHz	--	1500	--	pF
C _{oss}	Output Capacitance		--	248	--	
C _{rss}	Reverse Transfer Capacitance		--	12	--	
R _g	Gate resistance	V _{GS} =0V, V _{DS} Open	--	8.0	--	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	--	15	--	ns
t _r	Rise Time		--	17	--	
t _{d(OFF)}	Turn-Off Delay Time		--	40	--	
t _f	Fall Time		--	45	--	
Q _g	Total Gate Charge	V _{GS} =-10V V _{DS} =-30V I _D =-10A	--	22	--	nC
Q _{gs}	Gate Source Charge		--	3.7	--	
Q _{gd}	Gate Drain Charge		--	3	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I _S	Diode Forward Current	T _C =25 °C	--	--	-50	A
I _{SM}	Diode Pulse Current		--	--	-150	A
V _{SD}	Diode Forward Voltage	I _S =-5.0A, V _{GS} =0V	--	--	-1.2	V

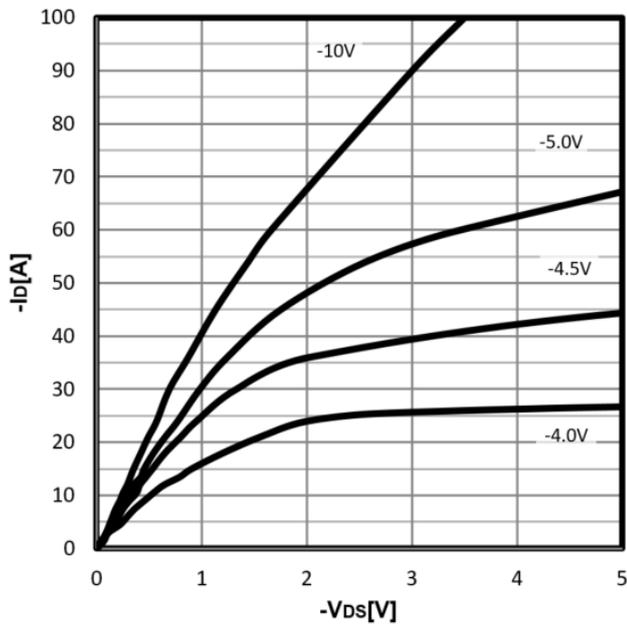
t_{rr}	Reverse Recovery time	$I_S = -10A, V_{DD} = -30V$ $dI/dt = 100A/\mu s$	--	60	--	ns
Q_{rr}	Reverse Recovery Charge		--	105	--	nC

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

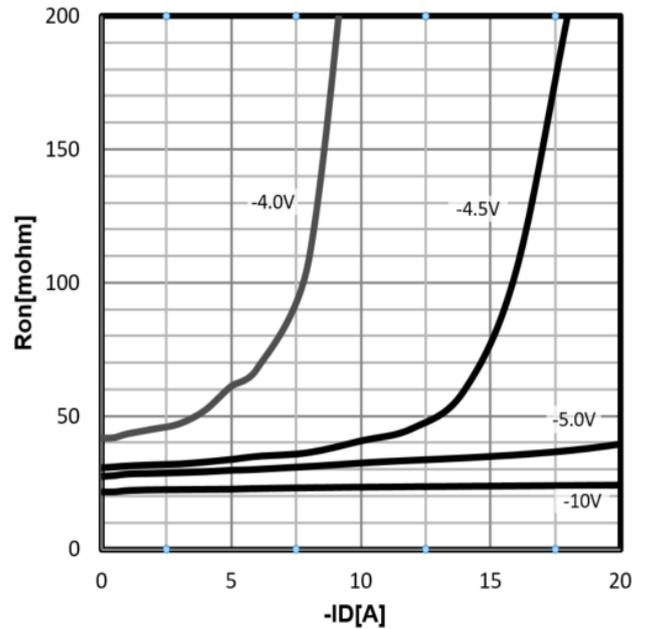
^{a2}: $V_{DD} = -30V, L = 1.0mH, R_G = 25\Omega, \text{Starting } T_j = 25^\circ C$

Characteristics Curve:

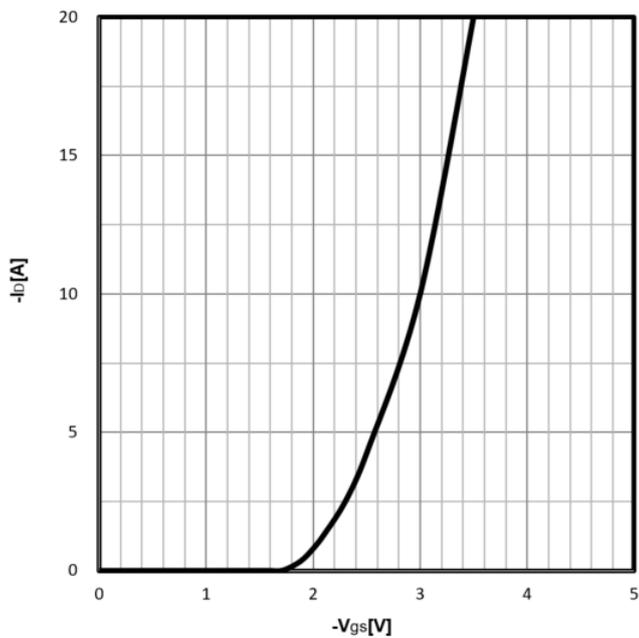
Typ. output characteristics
 $-I_D = f(-V_{DS})$



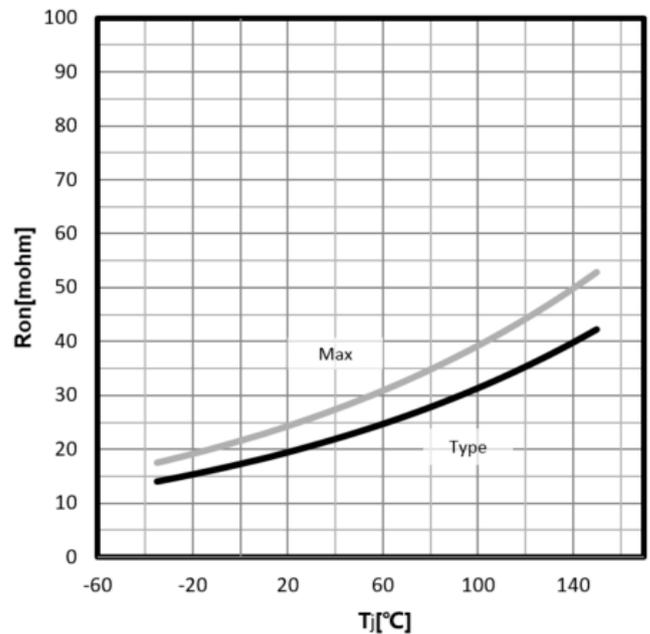
Typ. drain-source on resistance
 $R_{DS(on)} = f(-I_D)$



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

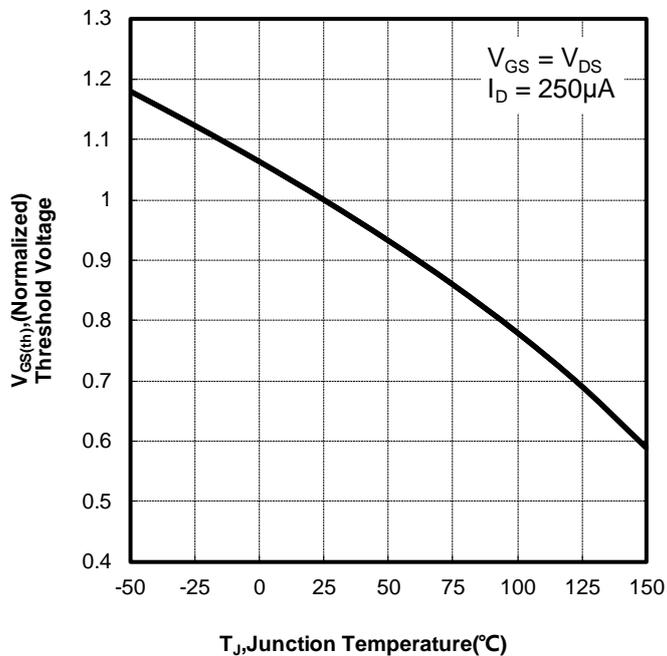


Drain-source on-state resistance
 $R_{DS(on)} = f(T_j); I_D = -10A; V_{GS} = -10V$



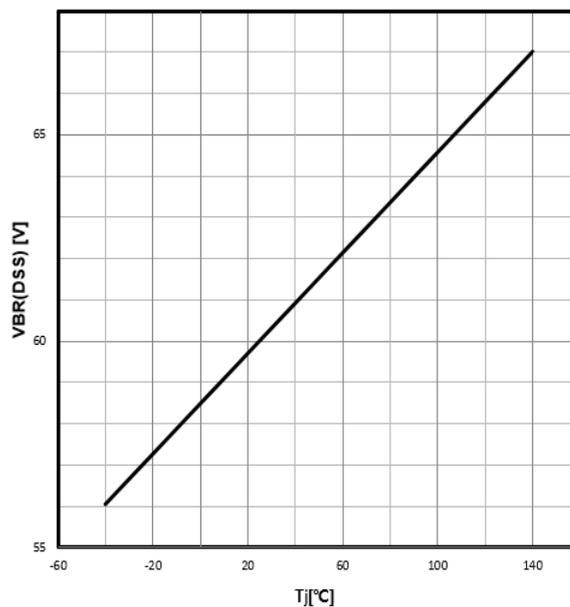
Gate Threshold Voltage

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



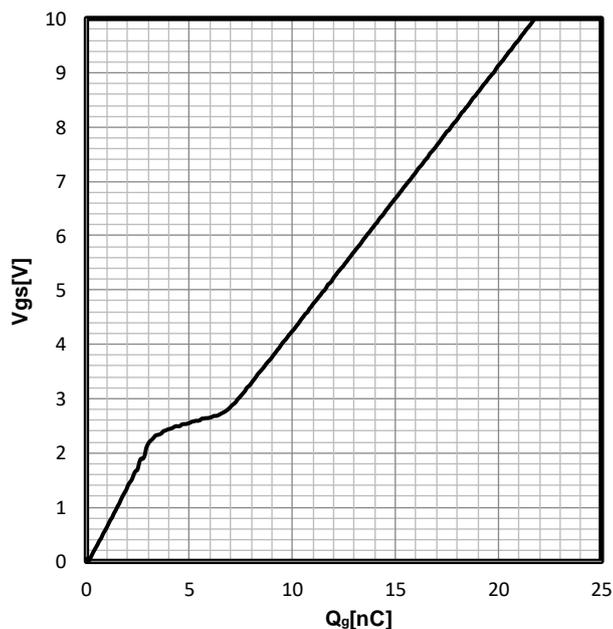
Drain-source breakdown voltage

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



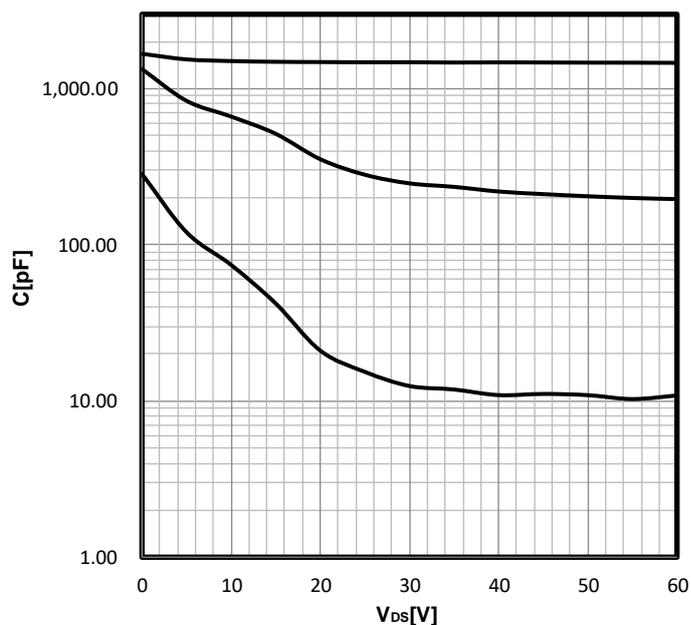
Typ. gate charge

$$V_{GS}=f(Q_{gate}); I_D=-5A$$

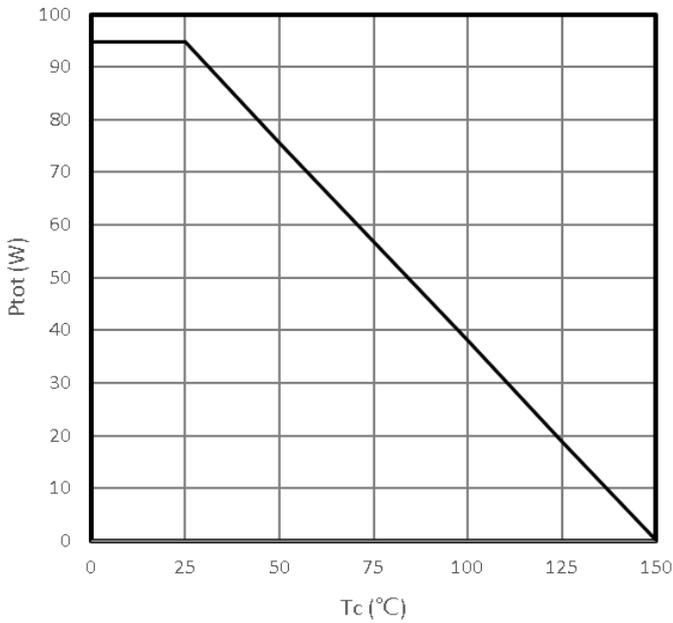


Typ. Capacitances

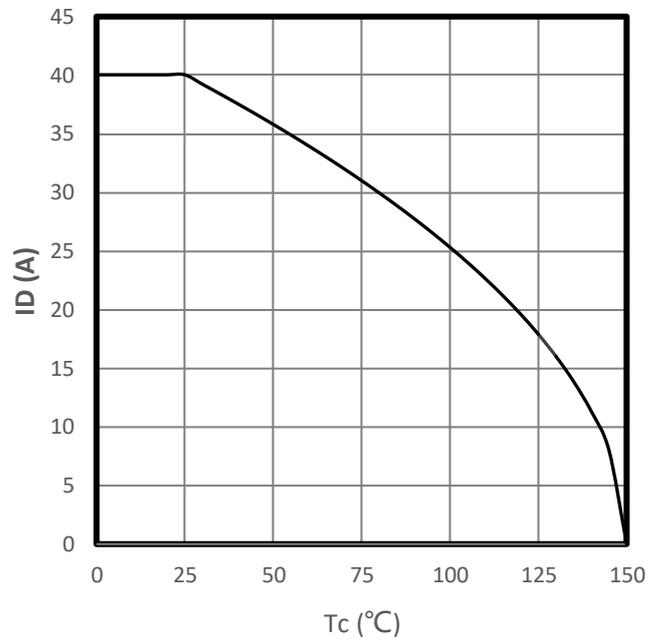
$$C=f(-V_{DS}); V_{GS}=0V; f=1MHz$$



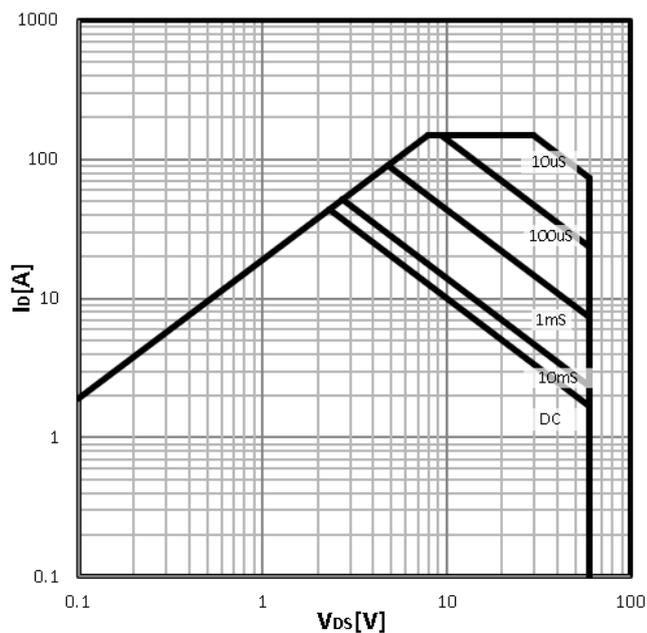
Power Dissipation
 $P_{tot}=f(T_C)$



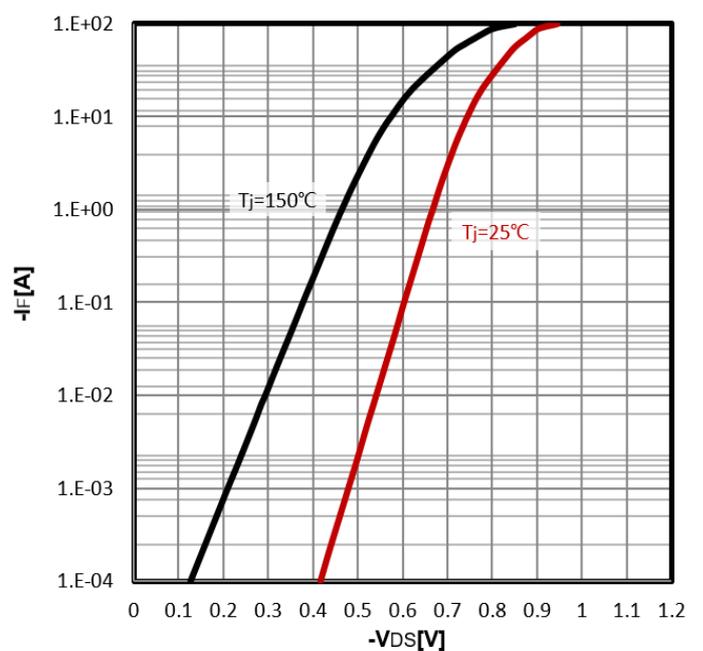
Maximum Drain Current
 $-I_D=f(T_C)$



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

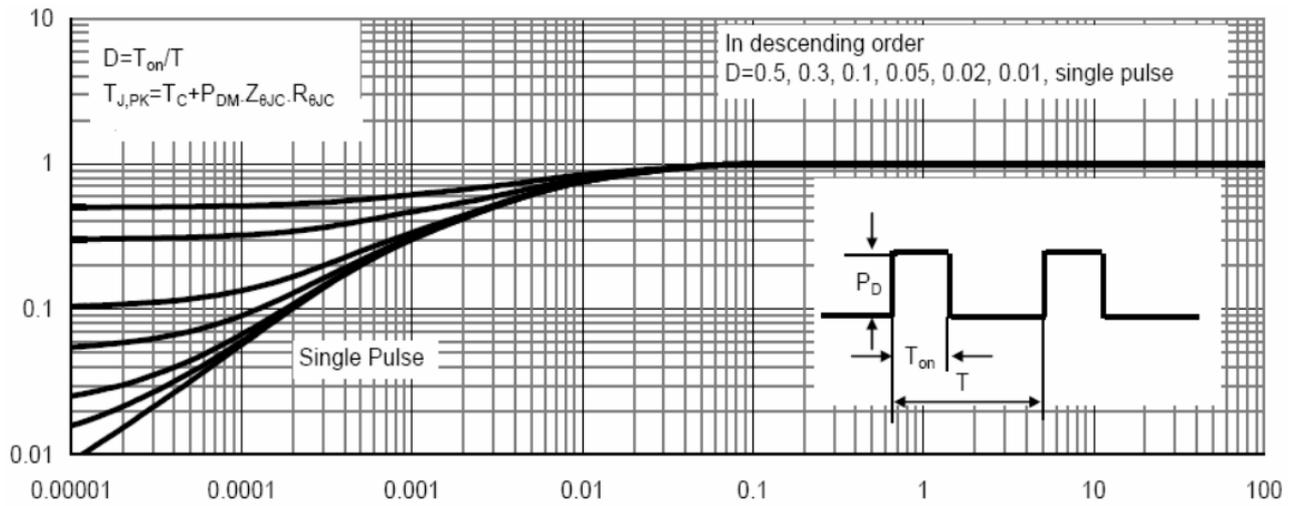


Body Diode Forward Voltage Variation
 $-I_F=f(-V_{DS})$

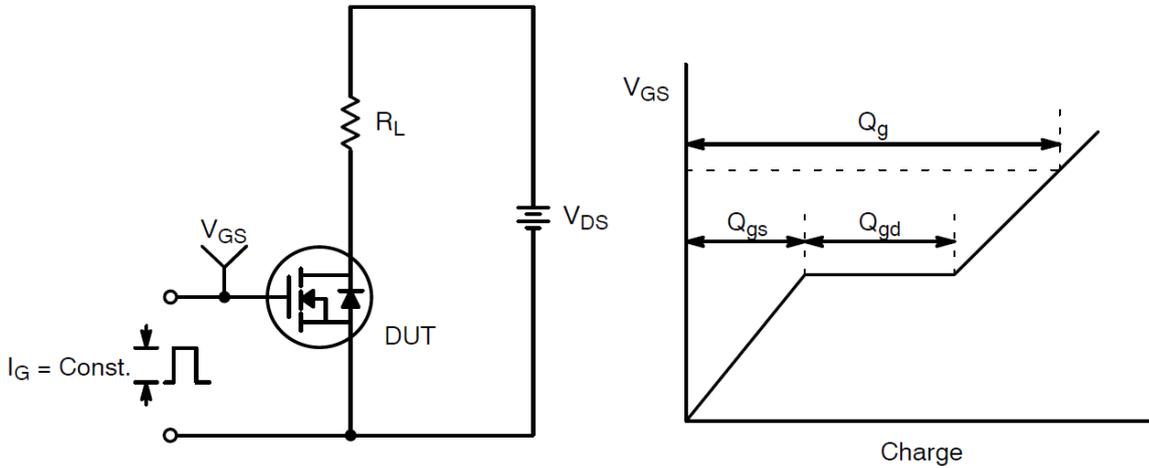


Max. transient thermal impedance

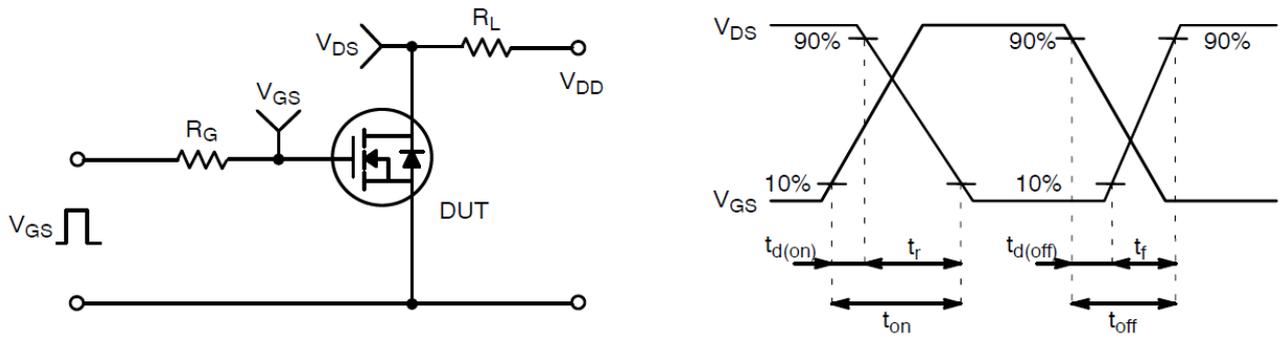
$$Z_{thJC} = f(t_p)$$



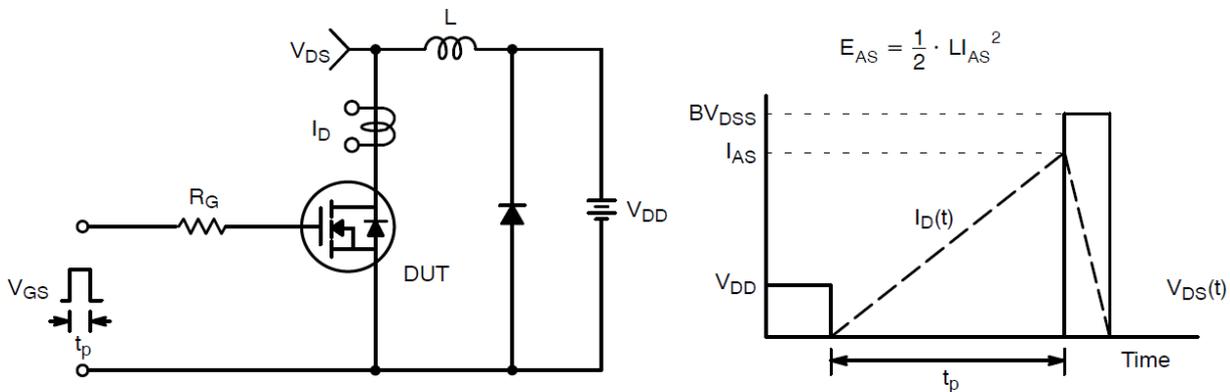
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform



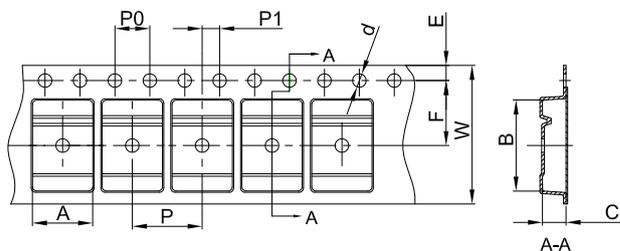
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

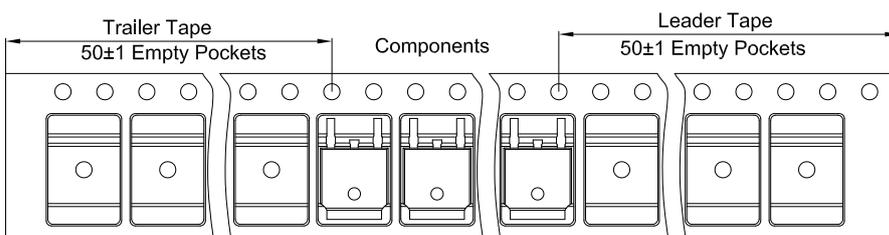
TO-252-2L Tape and Reel

TO-252 Embossed Carrier Tape

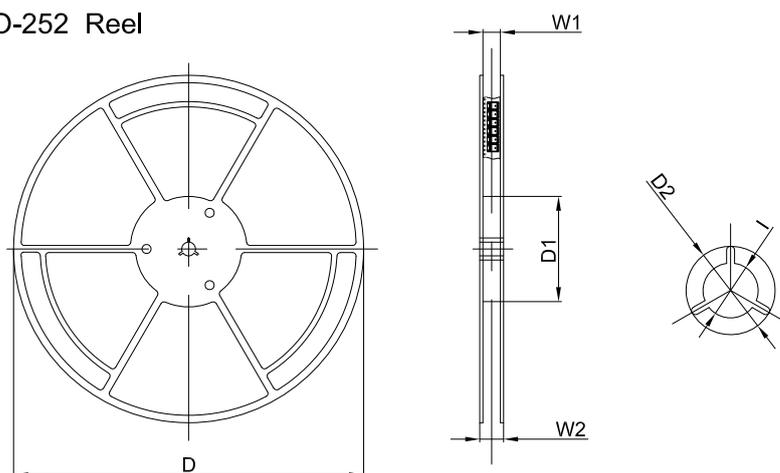


Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
TO-252	6.90	10.50	2.70	Ø1.55	1.75	7.50	4.00	8.00	2.00	16.00

TO-252 Tape Leader and Trailer

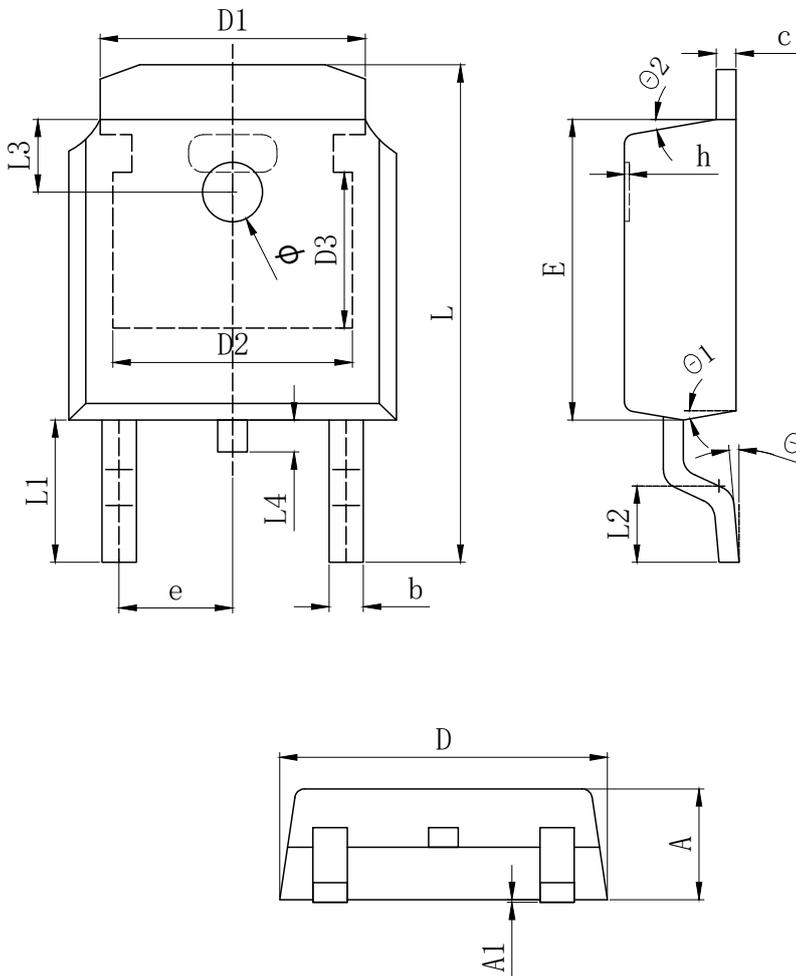


TO-252 Reel



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
Φ	1.100	1.200	1.300
θ	0°		8°
θ 1	9° TYP		
θ 2	9° TYP		

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