



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

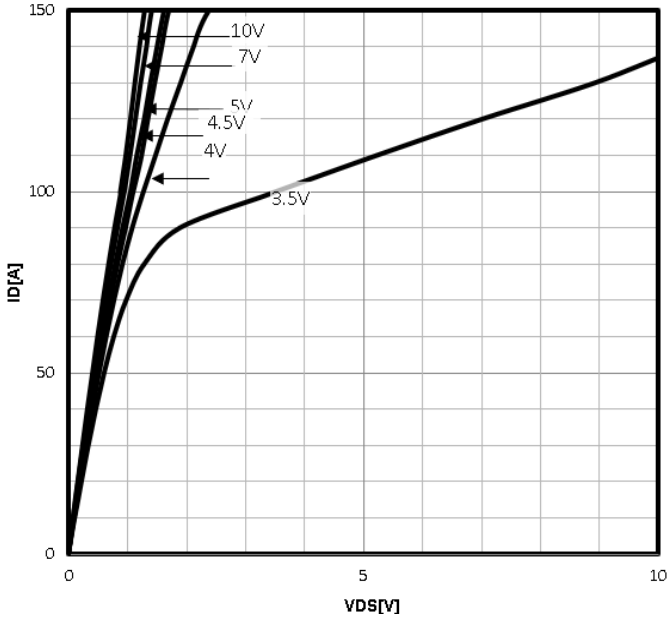
<b>Static Characteristics</b>						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V <sub>DSS</sub>	Drain to Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100	--	--	V
I <sub>DSS</sub>	Drain to Source Leakage Current	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V	--	--	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>D(S)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		11	15	mΩ
<b>Dynamic Characteristics</b>						
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
<b>Resistive Switching Characteristics</b>						
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	--	
<b>Source-Drain Diode Characteristics</b>						
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

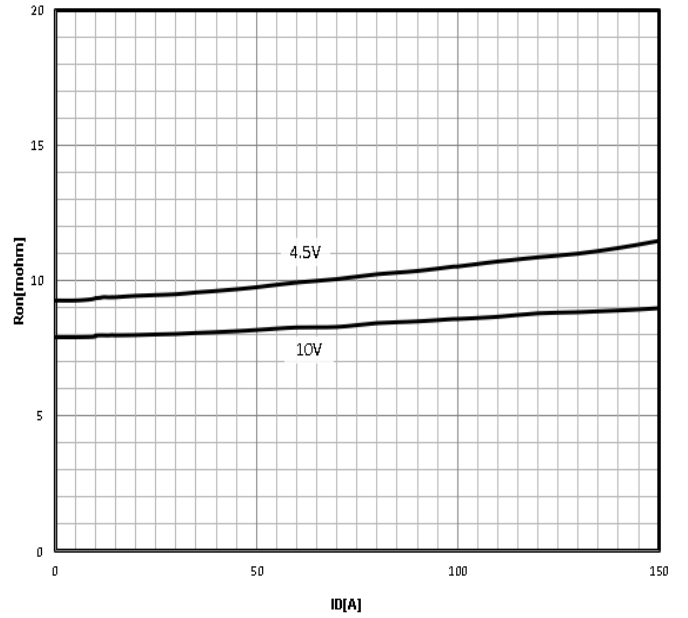
a2: VDD=50V, L=0.3mH, Rg=25Ω, Starting Tj=25 °C

Characteristics Curve:

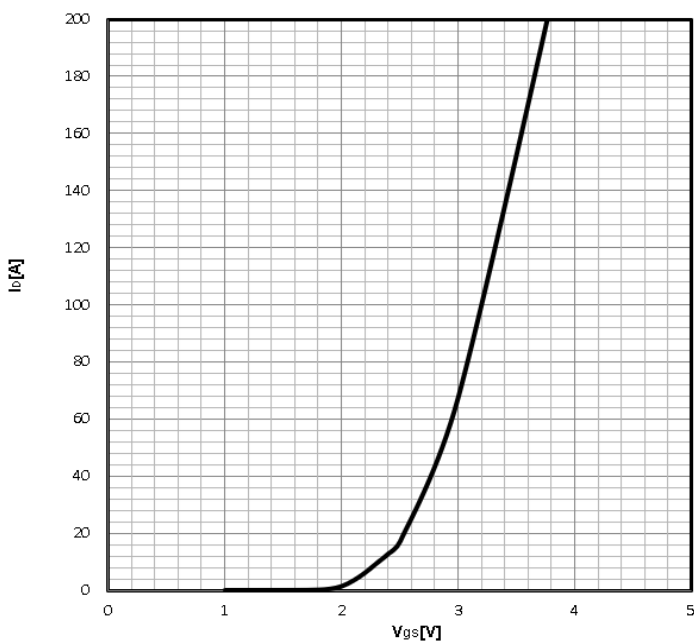
Typ. output characteristics  
 $I_D = f(V_{DS})$



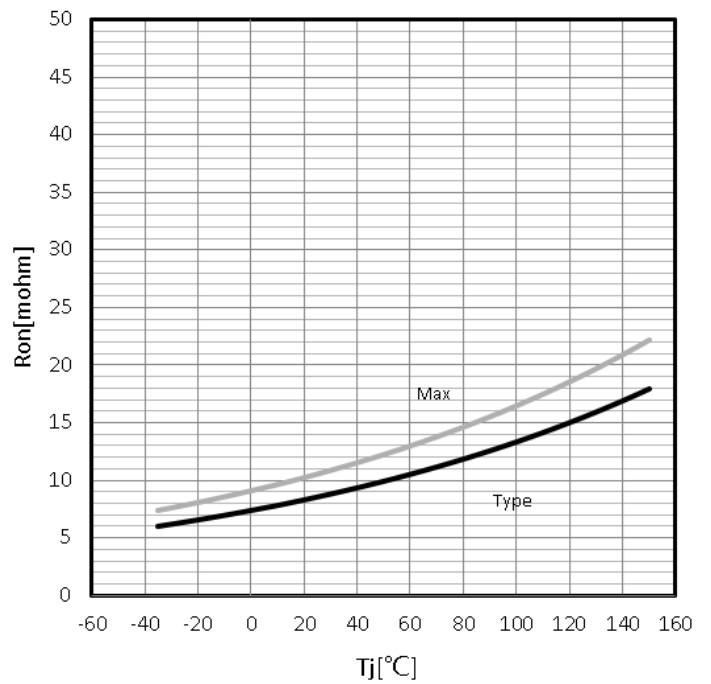
Typ. drain-source on resistance  
 $R_{DS(on)} = f(I_D)$



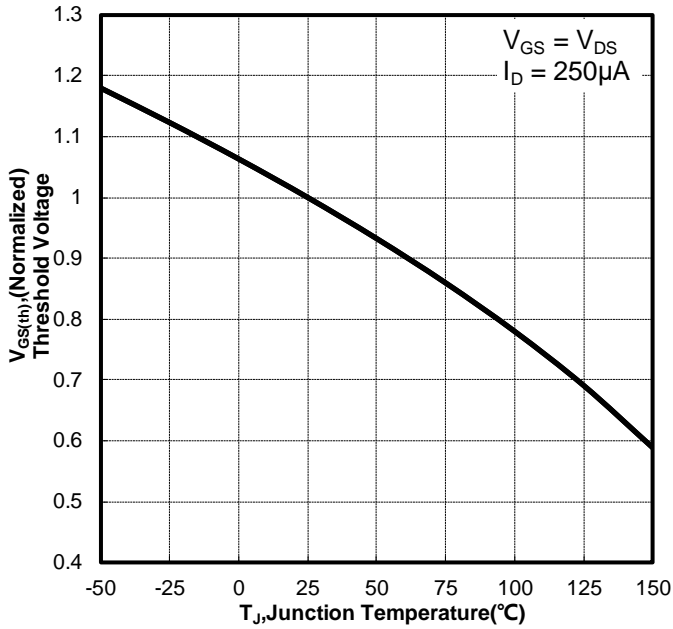
Typ. transfer characteristics  
 $I_D = f(V_{GS})$



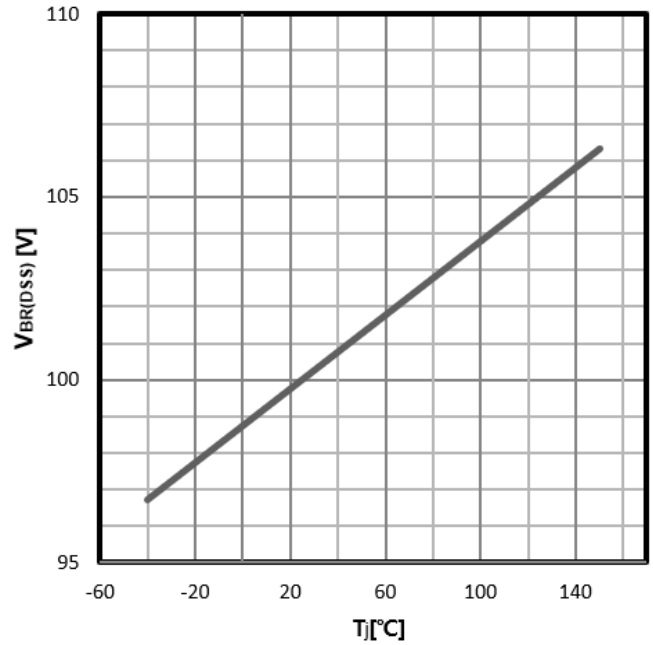
Drain-source on-state resistance  
 $R_{DS(on)} = f(T_j); I_D = 20A; V_{GS} = 10V$



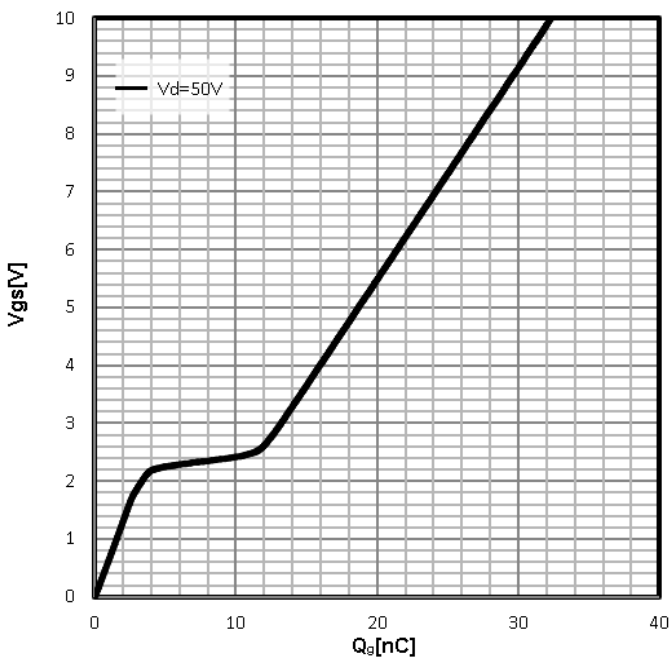
**Gate Threshold Voltage**  
 $V_{TH}=f(T_j); I_D=250\mu A$



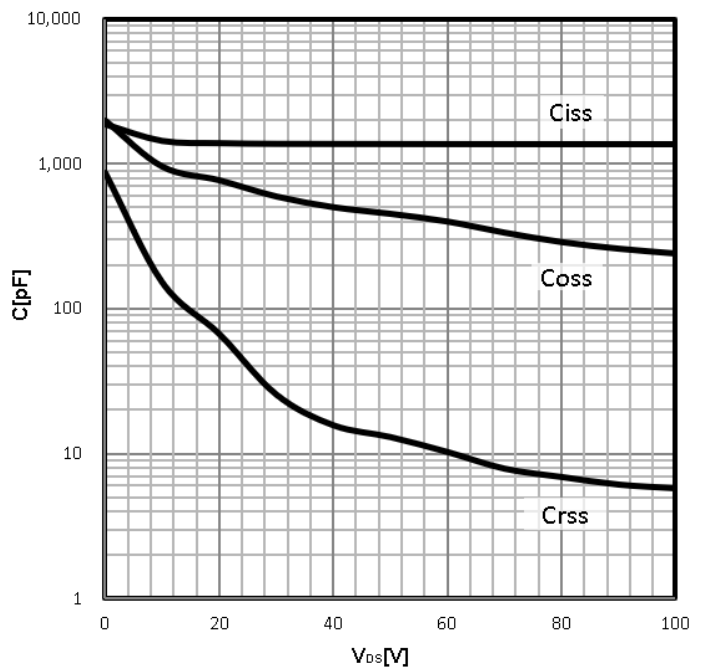
**Drain-source breakdown voltage**  
 $V_{BR(DSS)}=f(T_j); I_D=250\mu A$



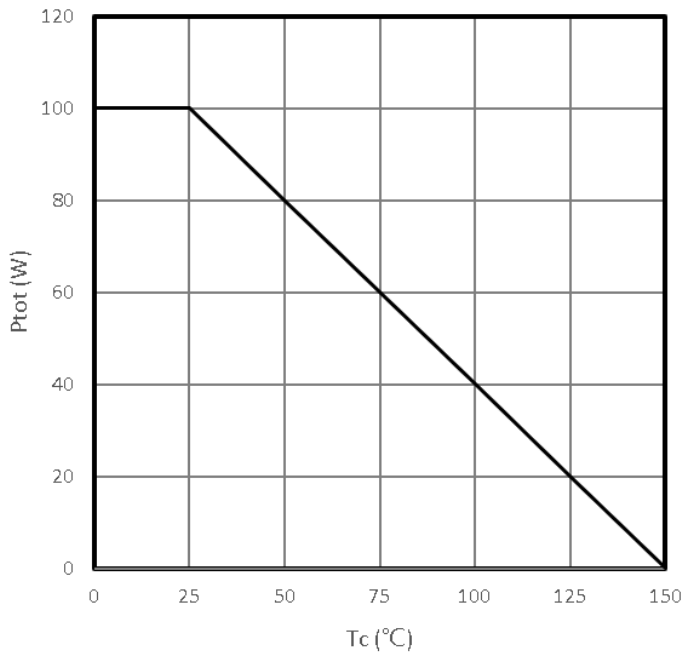
**Typ. gate charge**  
 $V_{GS}=f(Q_g); I_D=10A$



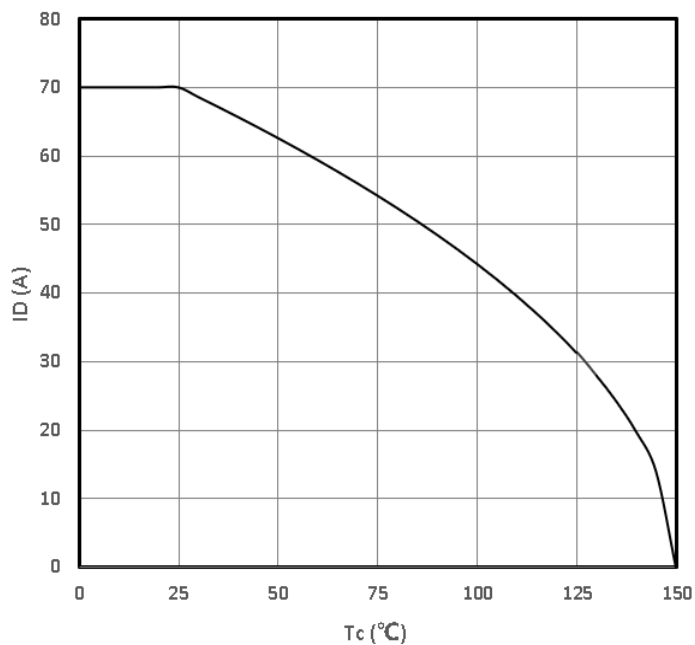
**Typ. capacitances**  
 $C=f(V_{DS}); V_{GS}=0V; f=1MHz$



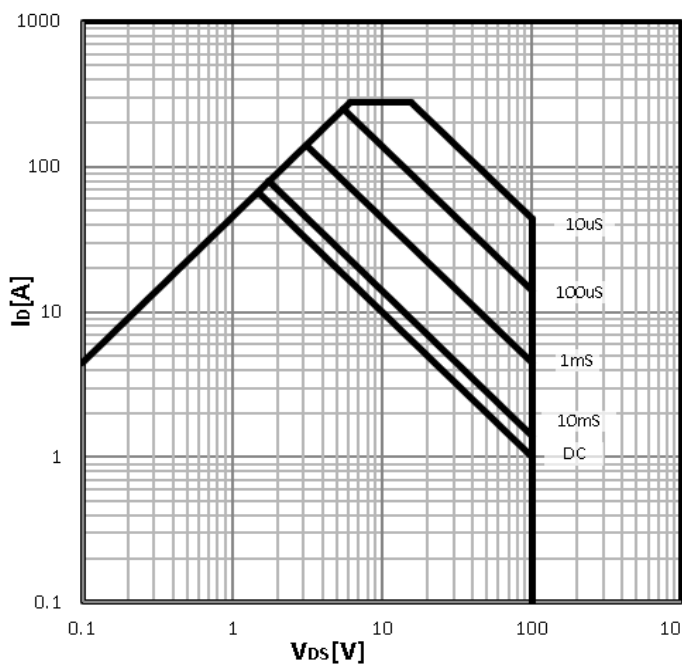
**Power Dissipation**  
 $P_{tot}=f(T_C)$



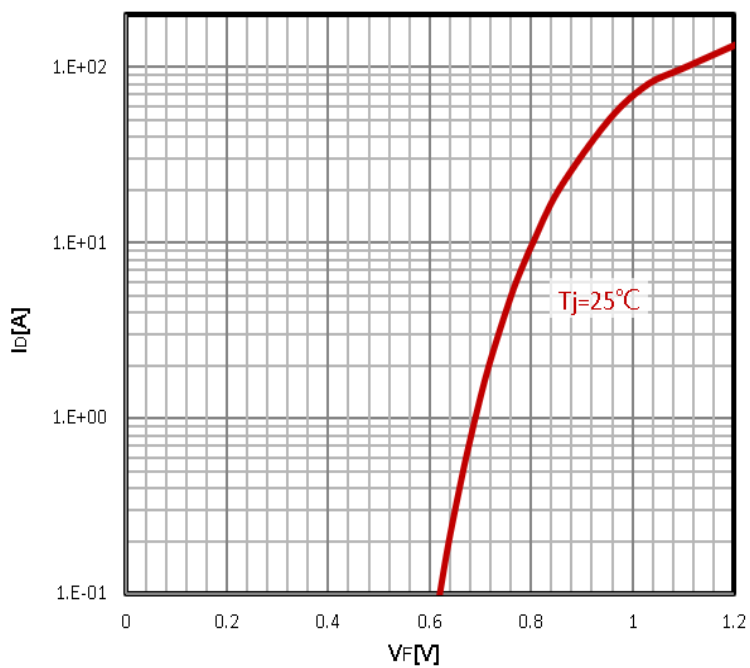
**Maximum Drain Current**  
 $I_D=f(T_C)$



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

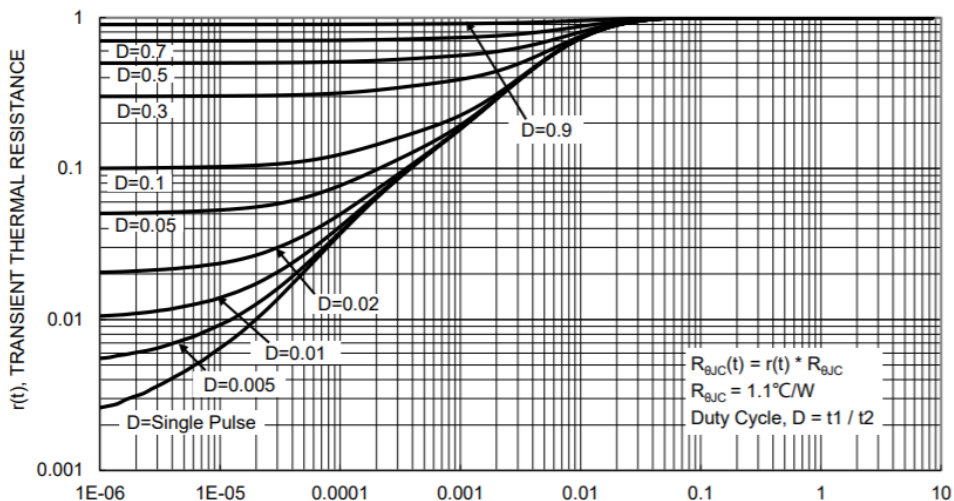


**Body Diode Forward Voltage Variation**  
 $I_F=f(V_{GS})$

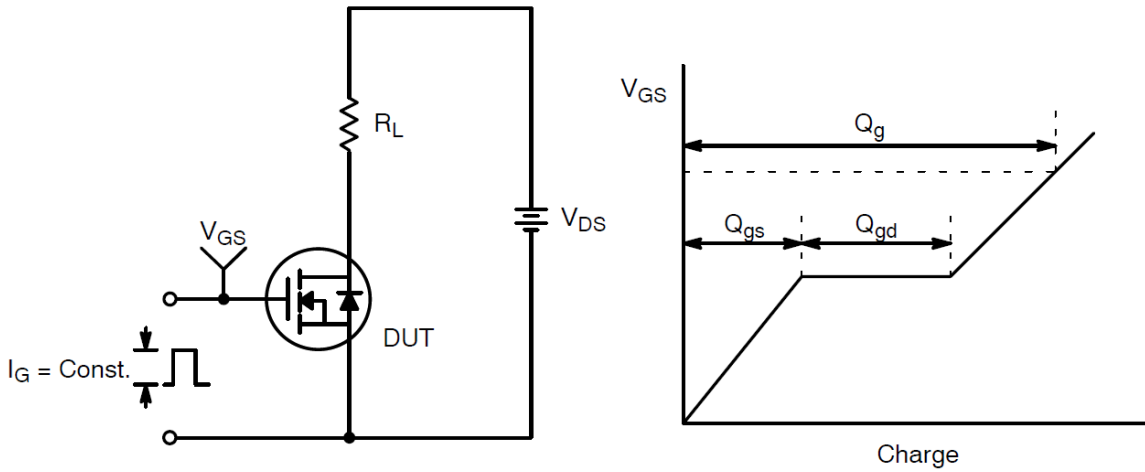


Max. transient thermal impedance

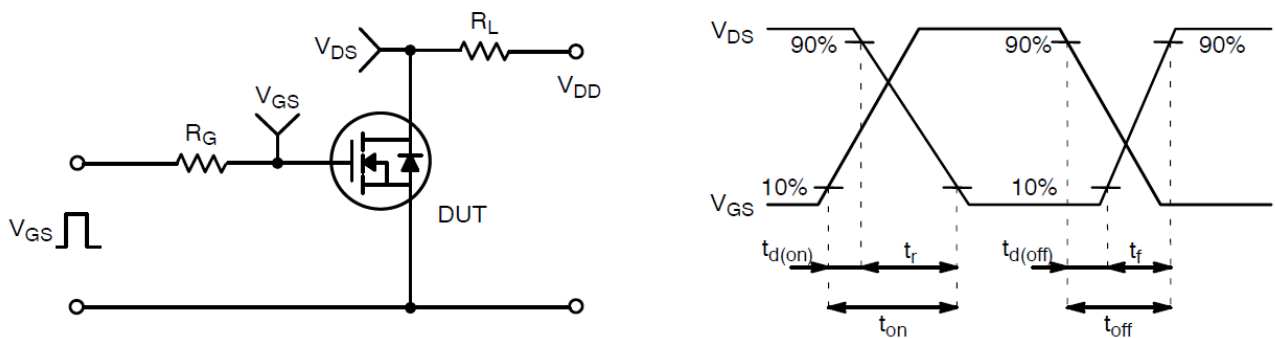
$$Z_{thJC} = f(t_p)$$



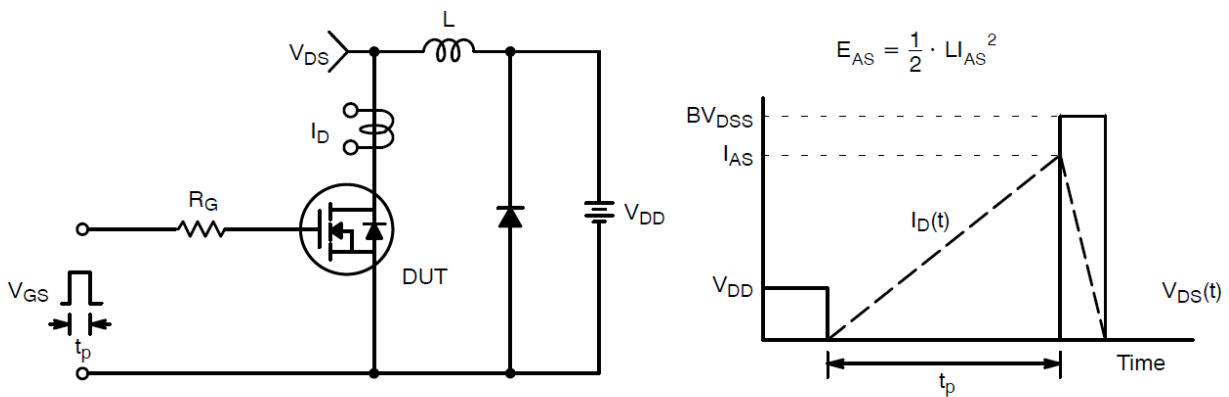
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

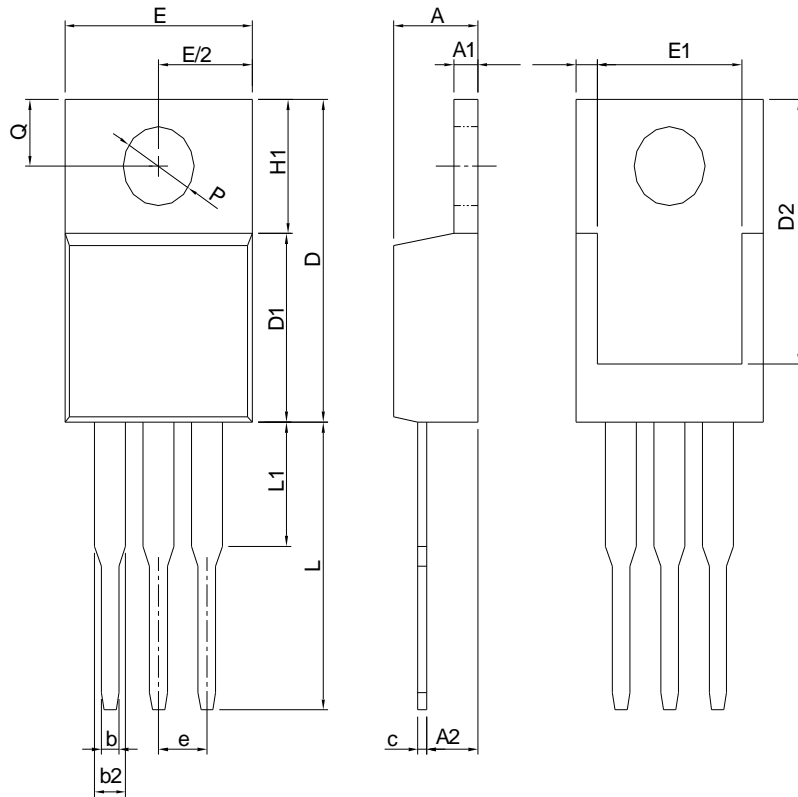


Resistive Switching Test Circuit & Waveforms



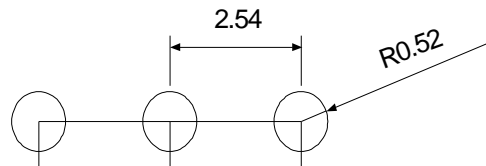
Unclamped Inductive Switching Test Circuit & Waveforms

# Package Information :TO-220AB



FORM	TO-220			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	3.56	4.83	0.140	0.190
A1	0.51	1.40	0.020	0.055
A2	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b2	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.22	16.51	0.560	0.650
D1	8.38	9.02	0.330	0.355
D2	12.19	13.65	0.480	0.537
E	9.65	10.67	0.380	0.420
E1	6.86	8.89	0.270	0.350
e	2.54 BSC		0.100 BSC	
H1	5.84	6.86	0.230	0.270
L	12.70	14.73	0.500	0.580
L1	-	6.35	-	0.250
P	3.53	4.09	0.139	0.161
Q	2.54	3.43	0.100	0.135

## RECOMMENDED LAND PATTERN



UNIT: mm

Note: Follow JEDEC TO-220 AB.