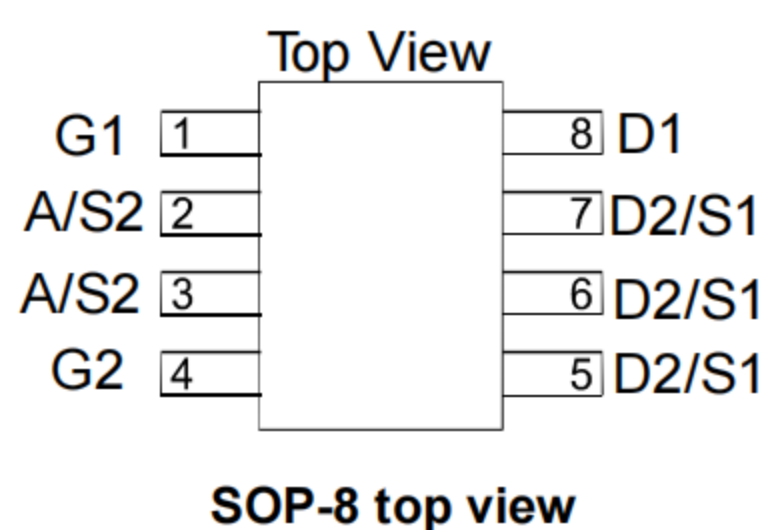


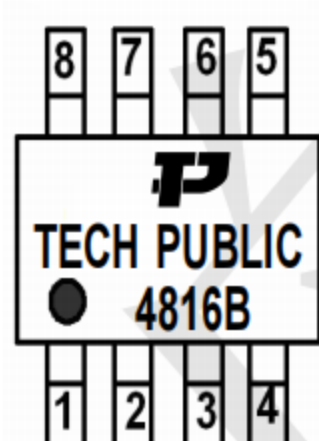
GENERAL FEATURES

- **Q1:N-Channel**
- 30V/7A,
 $R_{DS(ON)} = 19m\Omega$ (typ.) @ $V_{GS} = 10V$
 $R_{DS(ON)} = 24m\Omega$ (typ.) @ $V_{GS} = 4.5V$
- **Q2:N-Channel**
- 30V/11.2A,
 $R_{DS(ON)} = 10m\Omega$ (typ.) @ $V_{GS} = 10V$
 $R_{DS(ON)} = 14m\Omega$ (typ.) @ $V_{GS} = 4.5V$
- **Schottky**
 $V_{DS} = 30V$ $I_F = 2.0A$
 $V_{SD} = 0.5V @ 1.0A$

Package and Pin Configuration



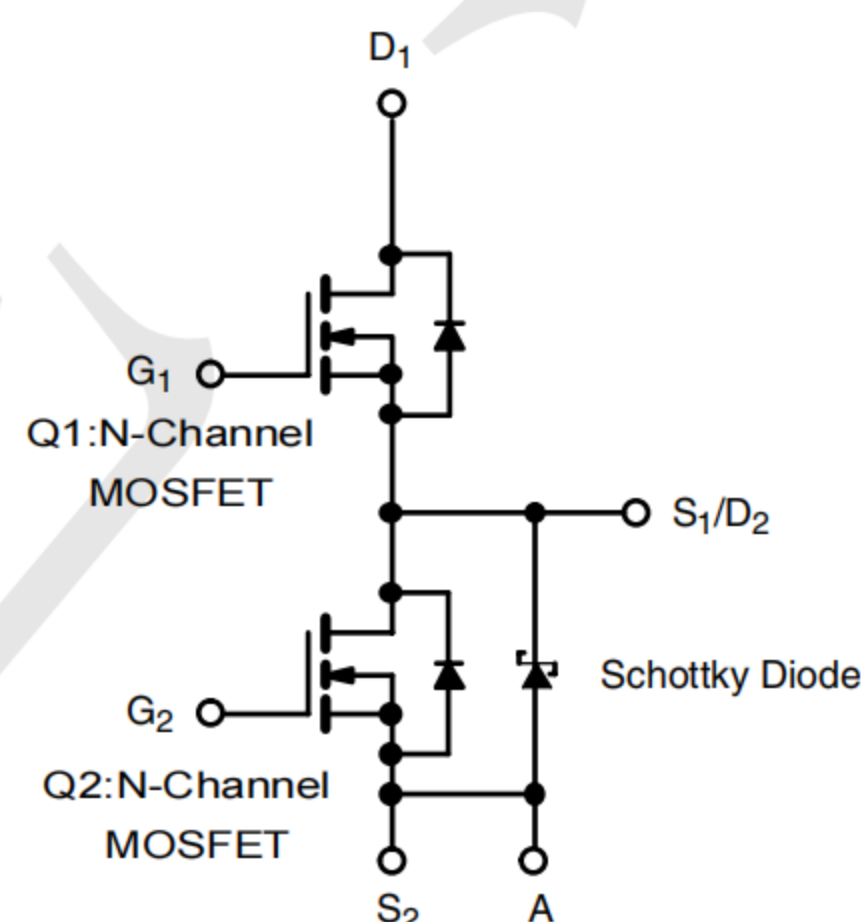
Marking:



APPLICATIONS

- Synchronous Buck Converter
- Game Machine
- Notebook

Circuit diagram



Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Symbol	TECH PUBLIC Parameter		Channel 1	Channel 2	Unit
V _{DSS}	Drain-Source Voltage		30	30	V
V _{GSS}	Gate-Source Voltage		±20	±20	
I _D *	Continuous Drain Current		7	11.2	A
I _{DM} *	Pulsed Drain Current		27	37	
I _S *	Diode Continuous Forward Current		2.5	3	A
T _J	Maximum Junction Temperature		150		°C
T _{STG}	Storage Temperature Range		-55 to 150		
P _D *	Power Dissipation	T _A =25°C	2		W
		T _A =100°C	0.8		
R _{θJA} *	Thermal Resistance-Junction to Ambient		62.5		°C/W

Electrical Characteristics (T_j=25°C unless otherwise noted)

Q1 N-Channel MOSFET

Symbol	TECH PUBLIC Parameter	Test Condition	Channel 1			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V			1	μA
		T _J =85°C			30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1		2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
R _{DS(ON)} ^a	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =6.8A		19	22	mΩ
		V _{GS} =4.5V, I _{DS} =5A		24	27	
V _{SD} ^a	Diode Forward Voltage	I _{SD} =2.5A, V _{GS} =0V		0.8	1.1	V
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _{DS} =7A		10	14	nC
Q _{gs}	Gate-Source Charge			1.5		
Q _{gd}	Gate-Drain Charge			5		
Dynamic Characteristics ^b						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		1.5		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz		880		pF
C _{oss}	Output Capacitance			125		
C _{rss}	Reverse Transfer Capacitance			90		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω		6	12	ns
t _r	Turn-on Rise Time			11	21	
t _{d(OFF)}	Turn-off Delay Time			27	50	
t _f	Turn-off Fall Time			5	10	

Electrical Characteristics (T_j=25°C unless otherwise noted)

Q2 N-Channel MOSFET

Symbol	TECH PUBLIC Parameter	Test Condition	Channel 2			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V			50	μA
		T _J =85°C			5	mA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.0		2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
R _{DS(ON)} ^a	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =10A		10	12	mΩ
		V _{GS} =4.5V, I _{DS} =7A		14	17	
V _{SD} ^a	Diode Forward Voltage	I _{SD} =1A, V _{GS} =0V			0.52	V
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _{DS} =10A		16	22	nC
Q _{gs}	Gate-Source Charge			3.7		
Q _{gd}	Gate-Drain Charge			8.5		
Dynamic Characteristics ^b						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		1.7		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz		1610		pF
C _{oss}	Output Capacitance			255		
C _{rss}	Reverse Transfer Capacitance			160		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω		10	19	ns
t _r	Turn-on Rise Time			11	21	
t _{d(OFF)}	Turn-off Delay Time			39	71	
t _f	Turn-off Fall Time			12	23	

Electrical Characteristics (T_j=25°C unless otherwise noted)

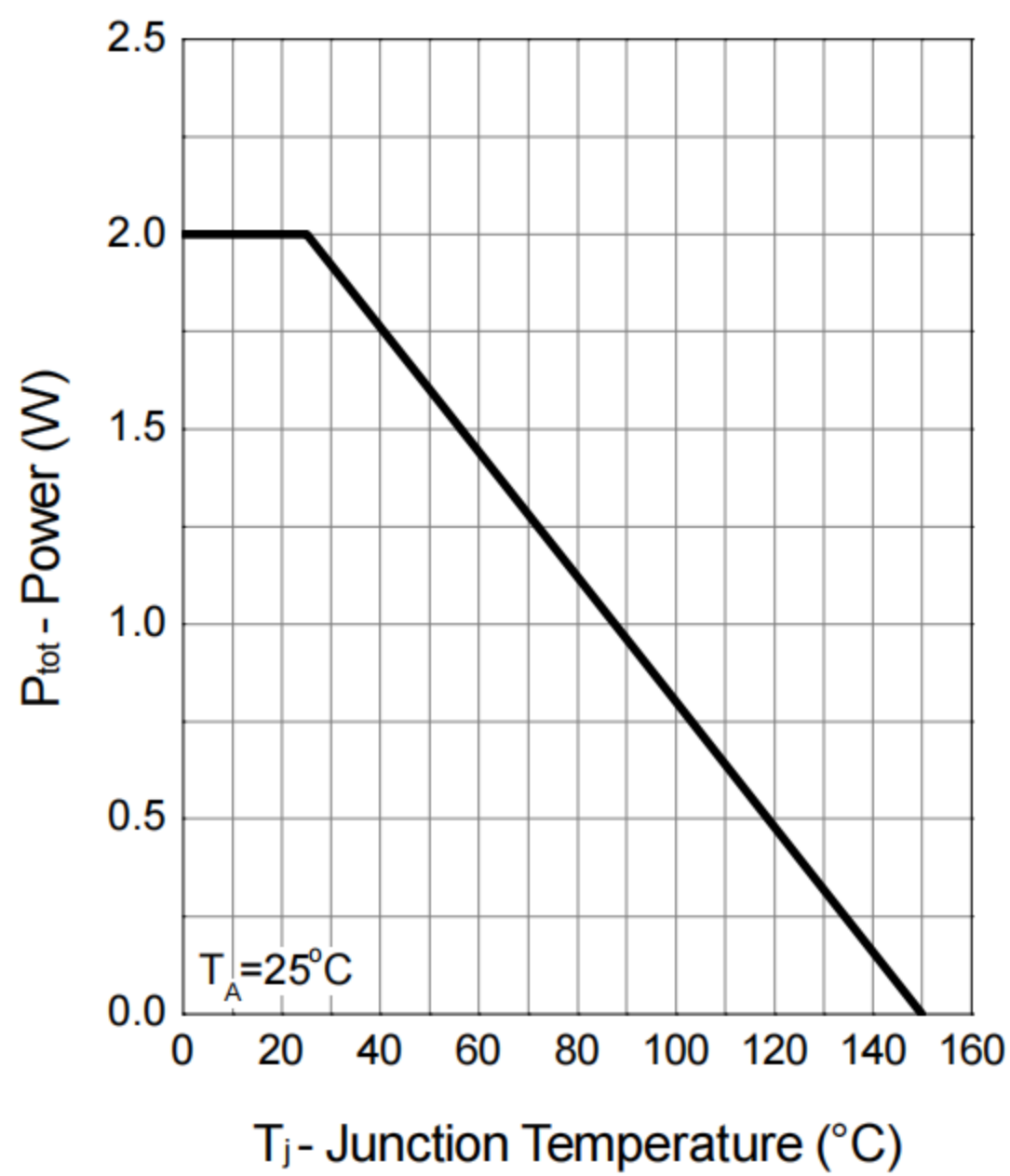
Schottky Diode

Symbol	TECH PUBLIC Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{BR} ^a	Reverse Breakdown Voltage	I _r =100μA	30	-	-	V
V _f	Forward Voltage	I _F =1.0A T _A = 25°C I _F =1.0A T _A = 125°C	-	0.48	0.5 0.42	V
I _r	Leakage Current	V _r =30V T _A = 25°C	-	10	100	μA
C _t	Total Capacitance	V _r = 10V, f = 1.0MHz	-	50	-	pF

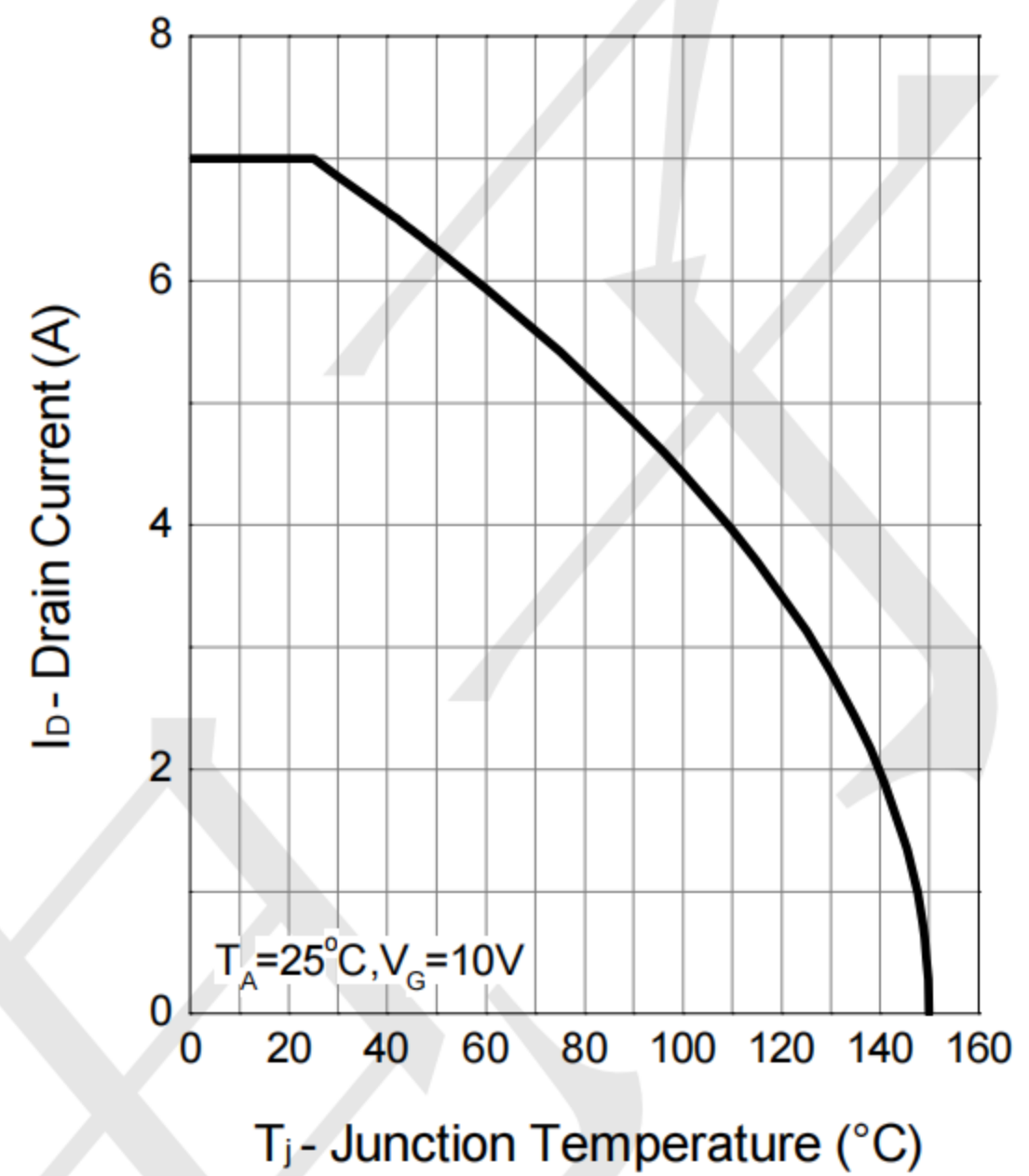
Typical Electrical and Thermal Characteristics

Q1-N-Channel

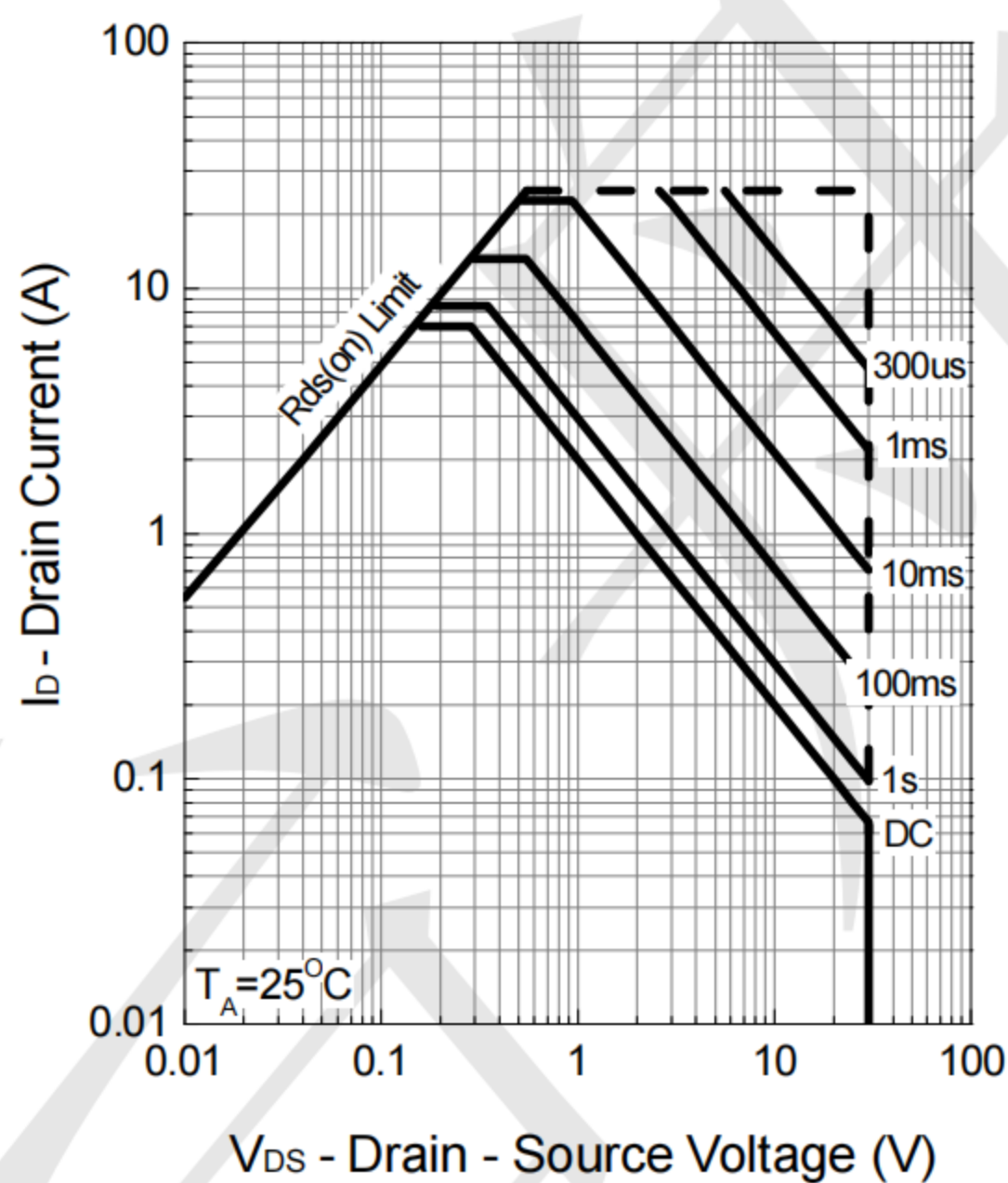
Power Dissipation



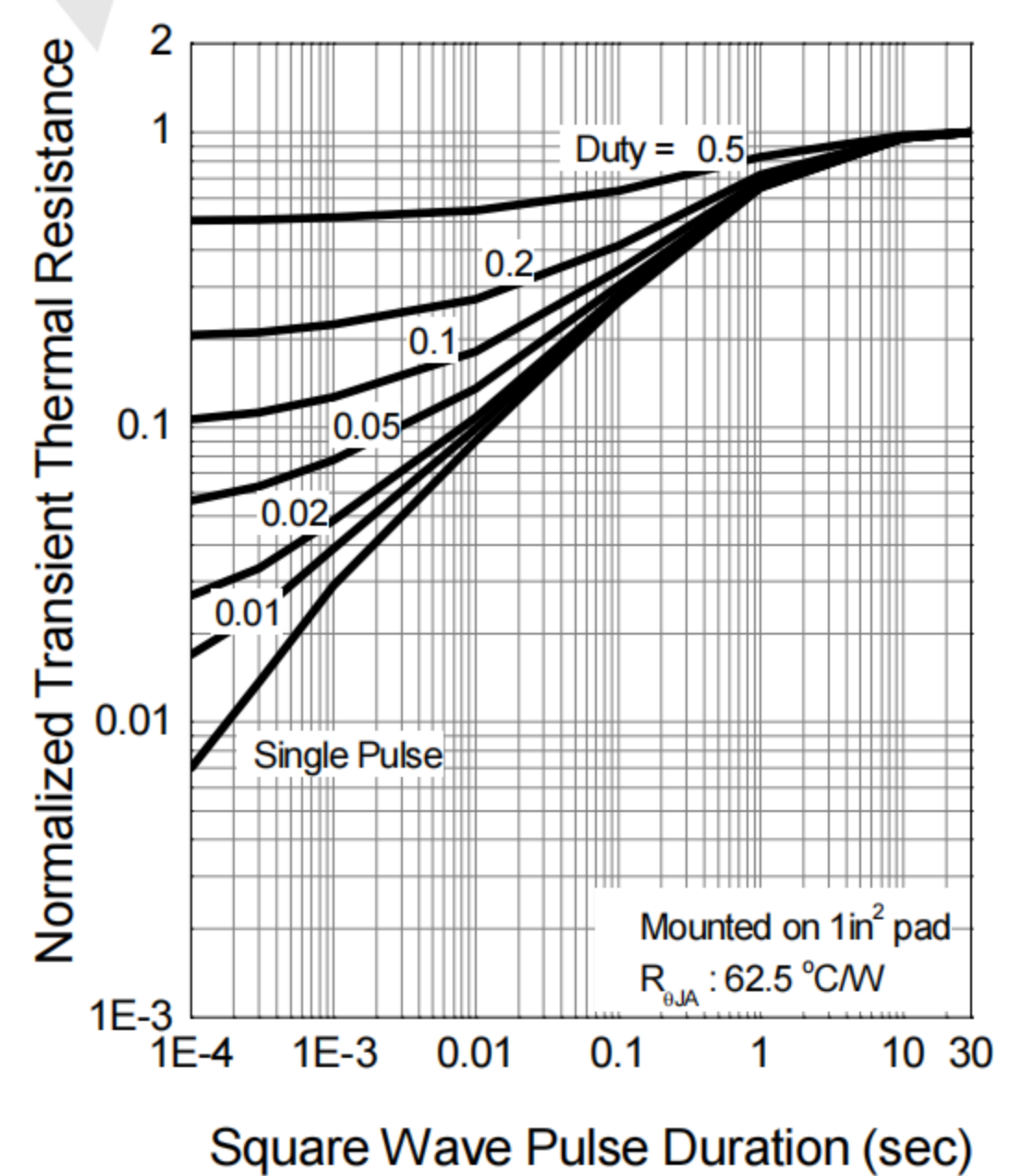
Drain Current



Safe Operation Area

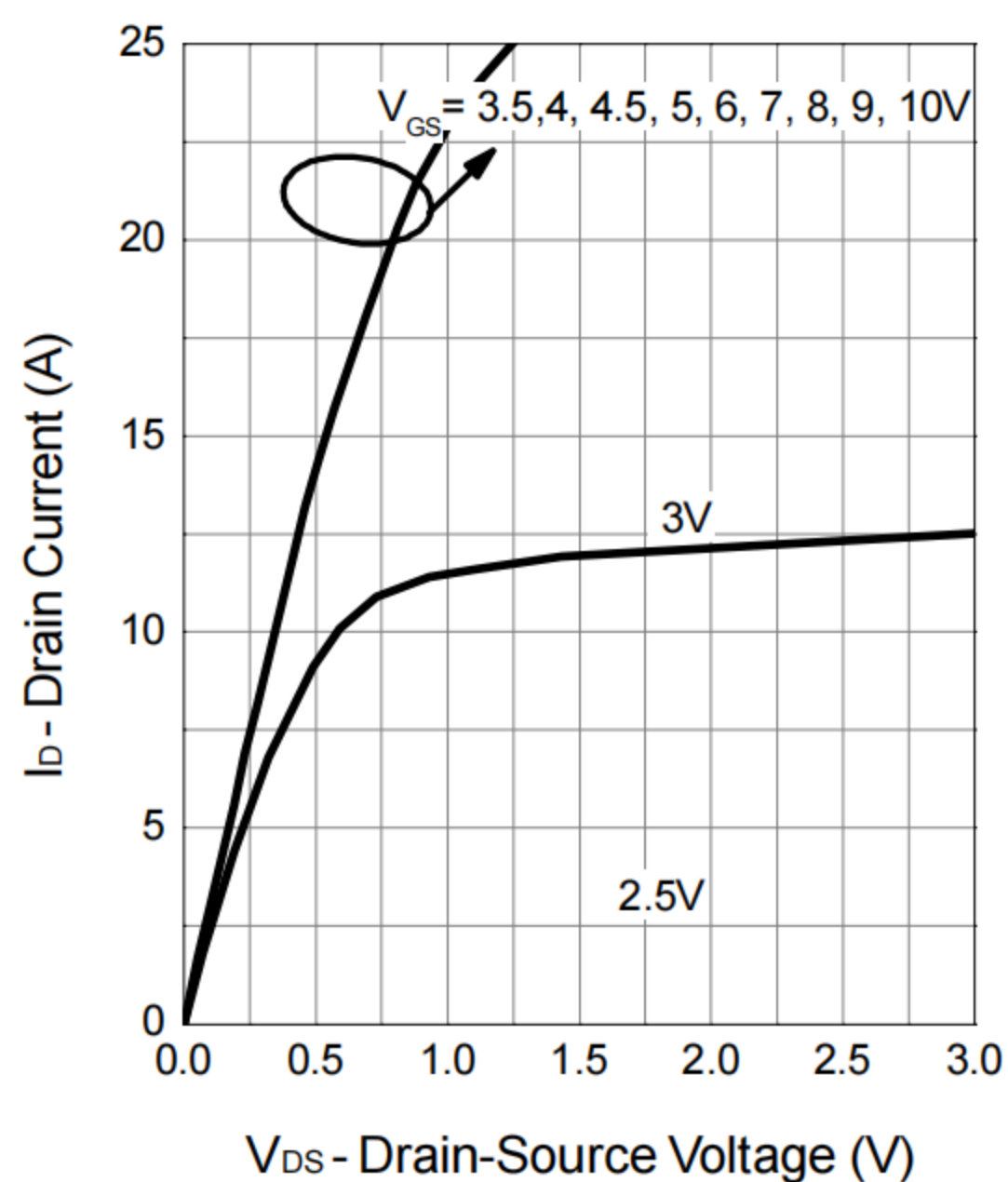


Thermal Transient Impedance

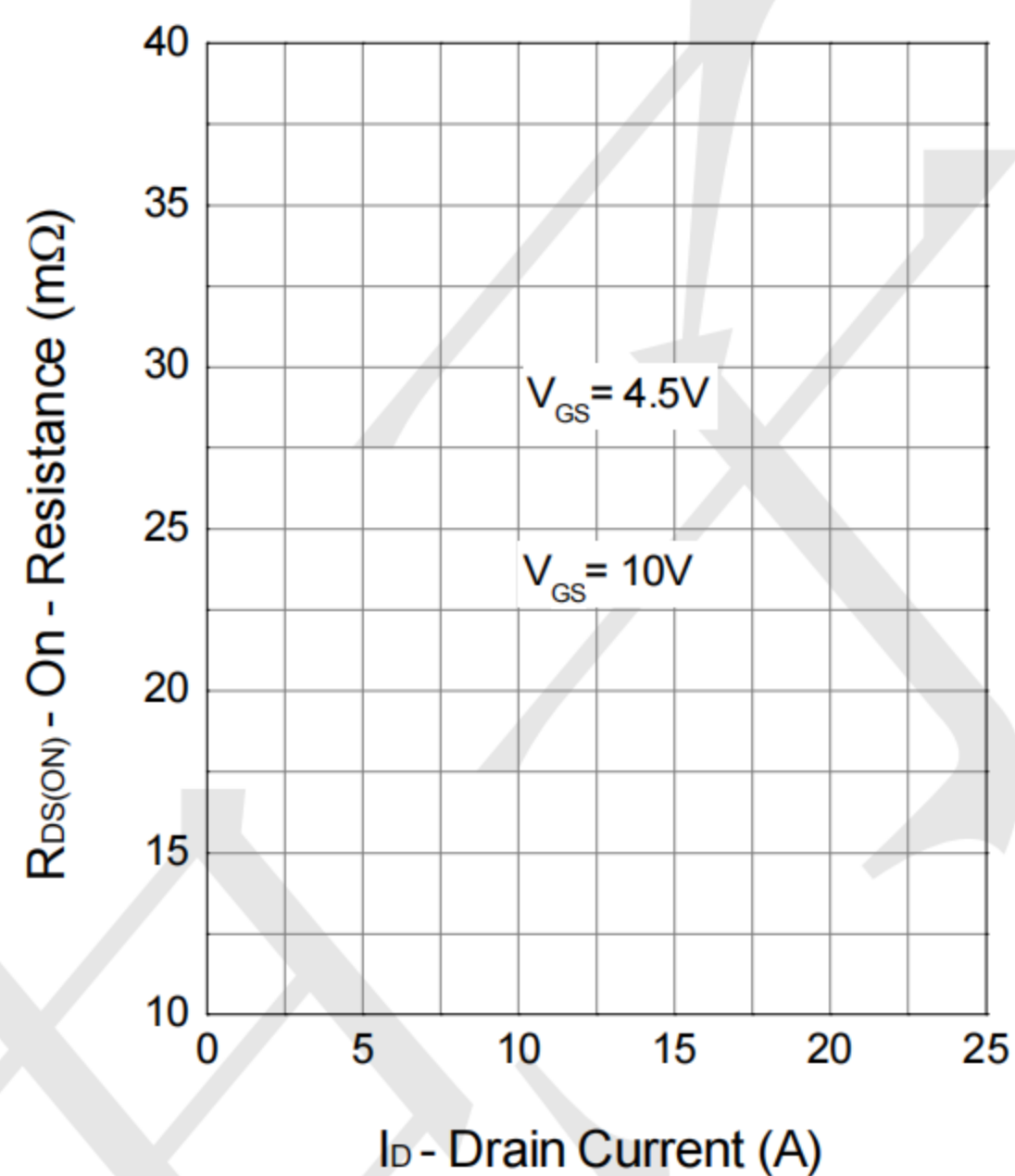


Q1-N-Channel

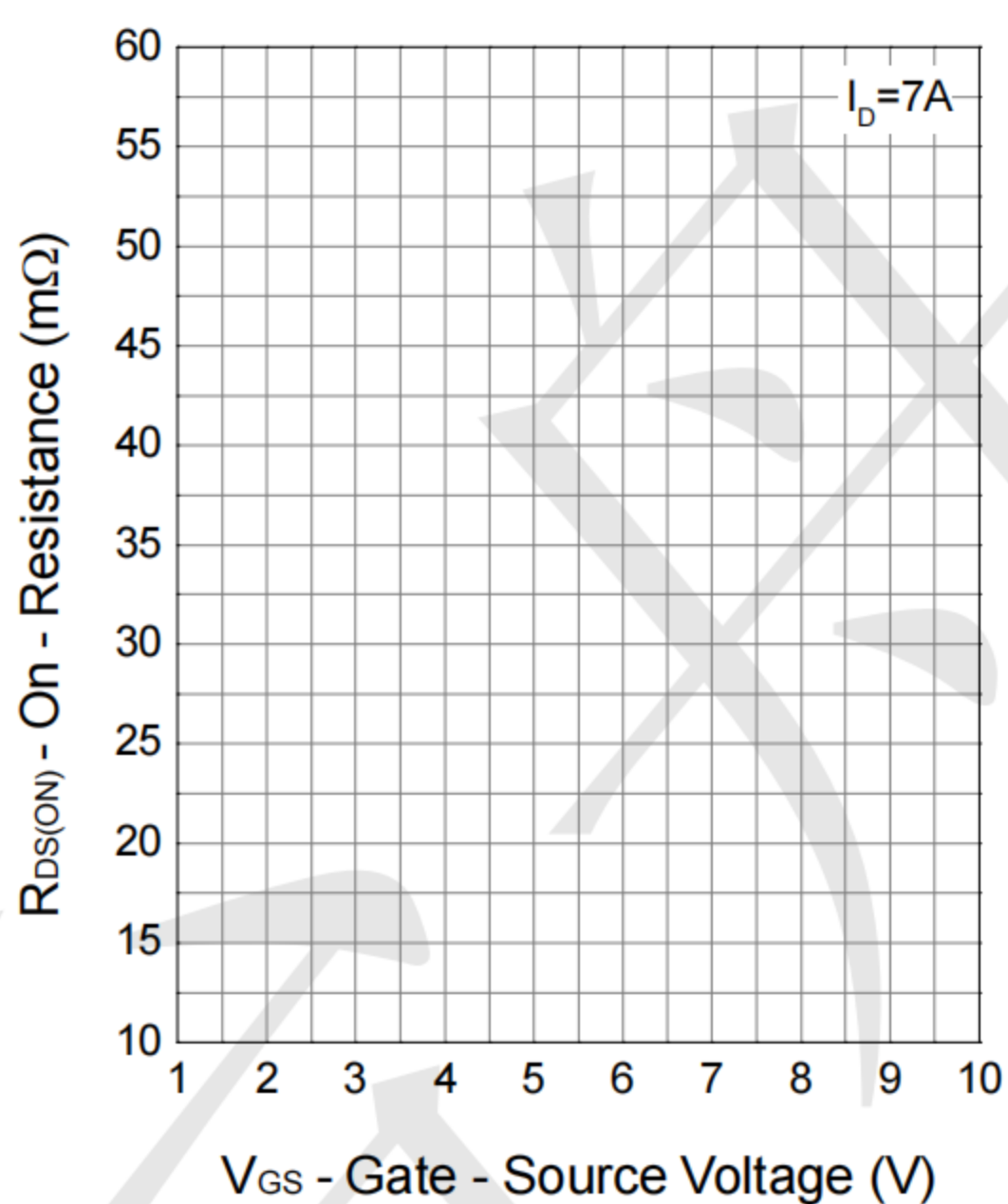
Output Characteristics



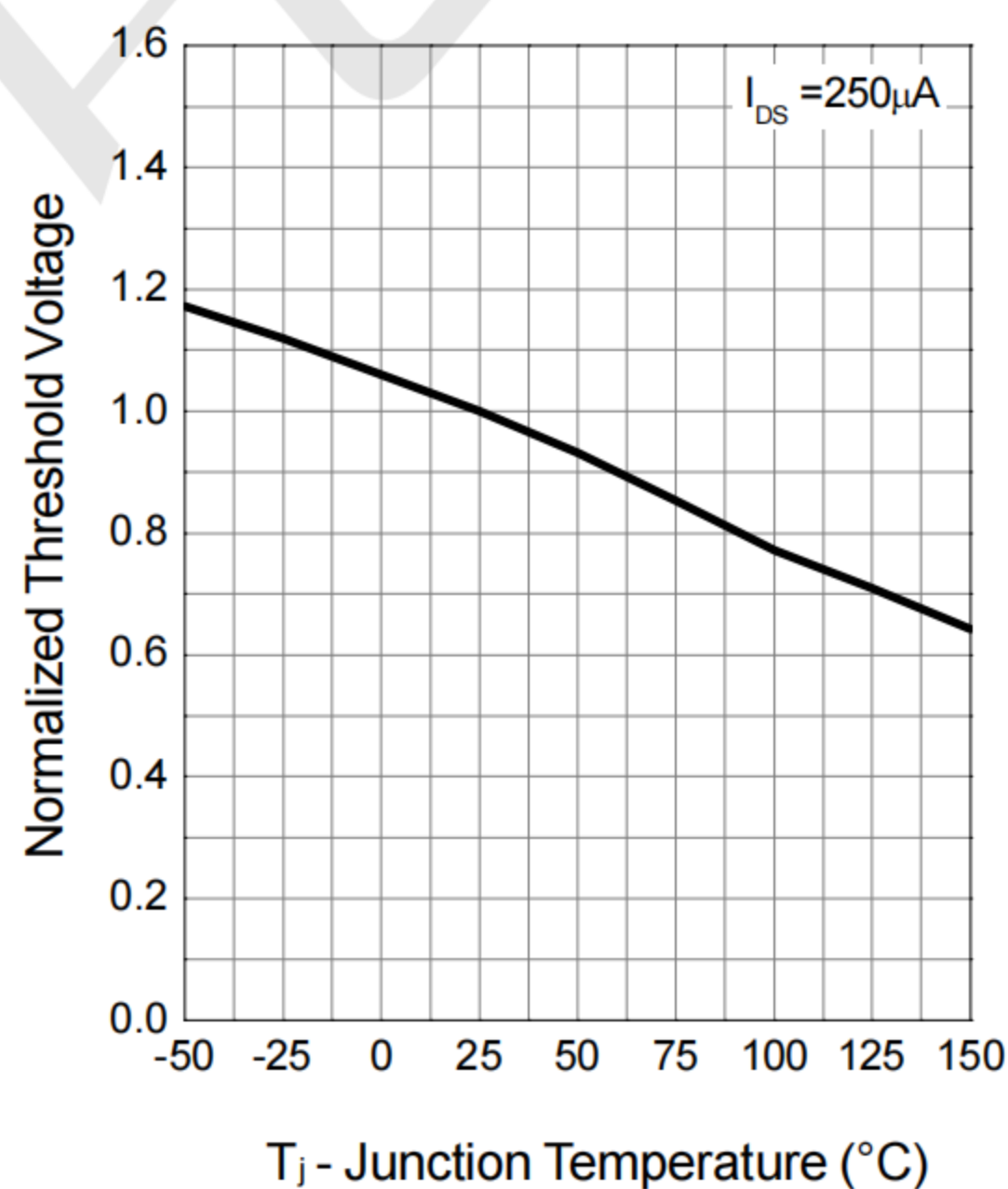
Drain-Source On Resistance



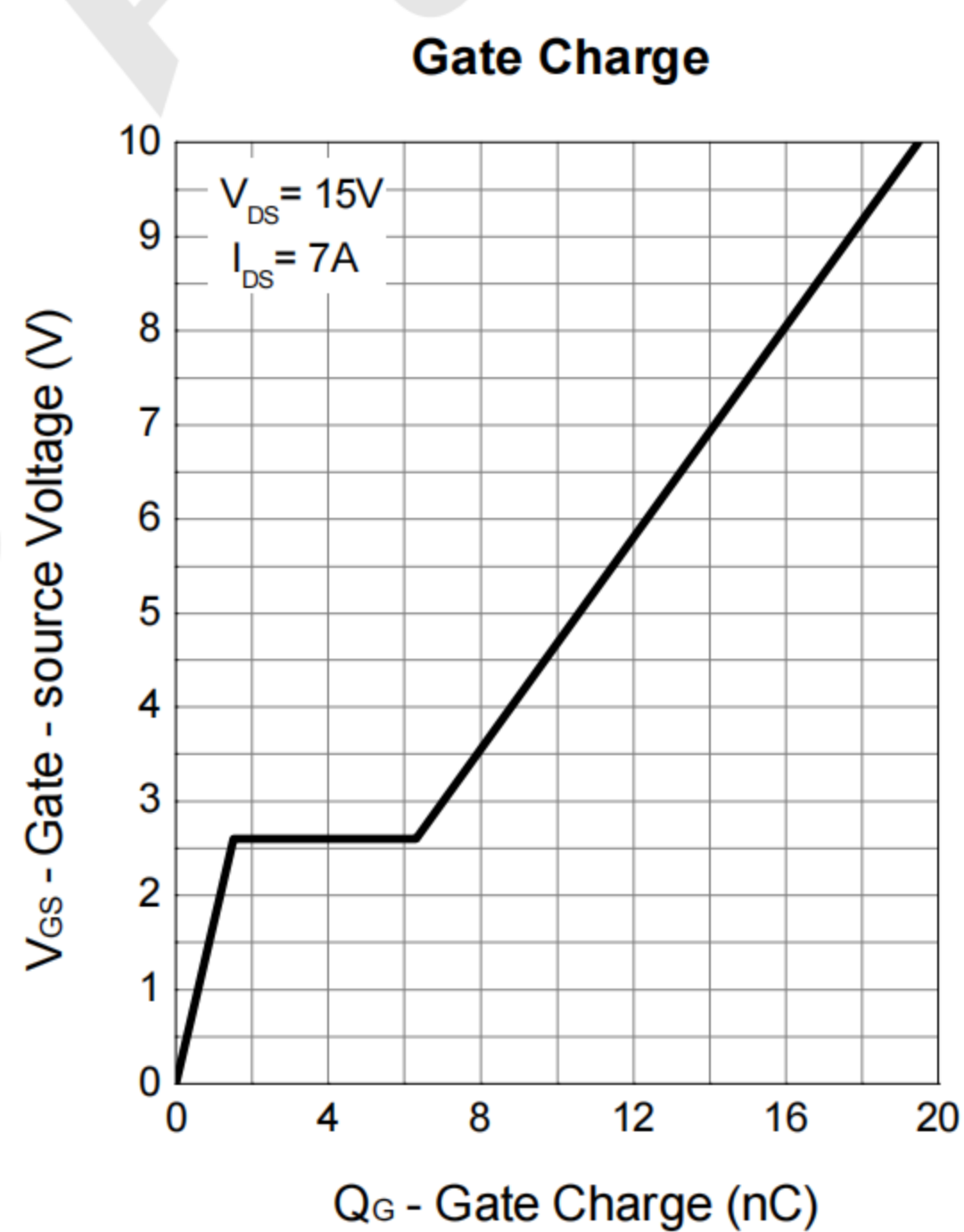
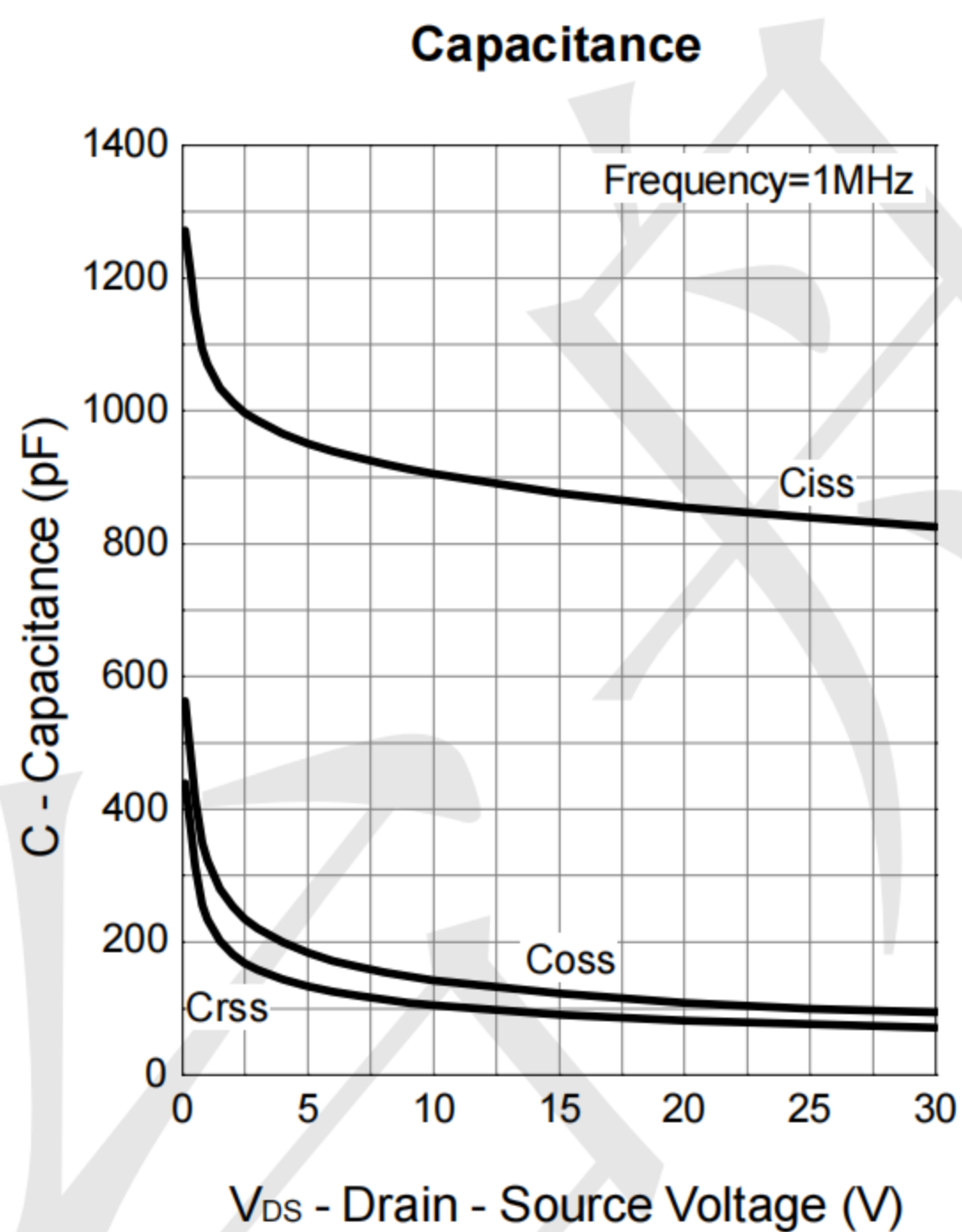
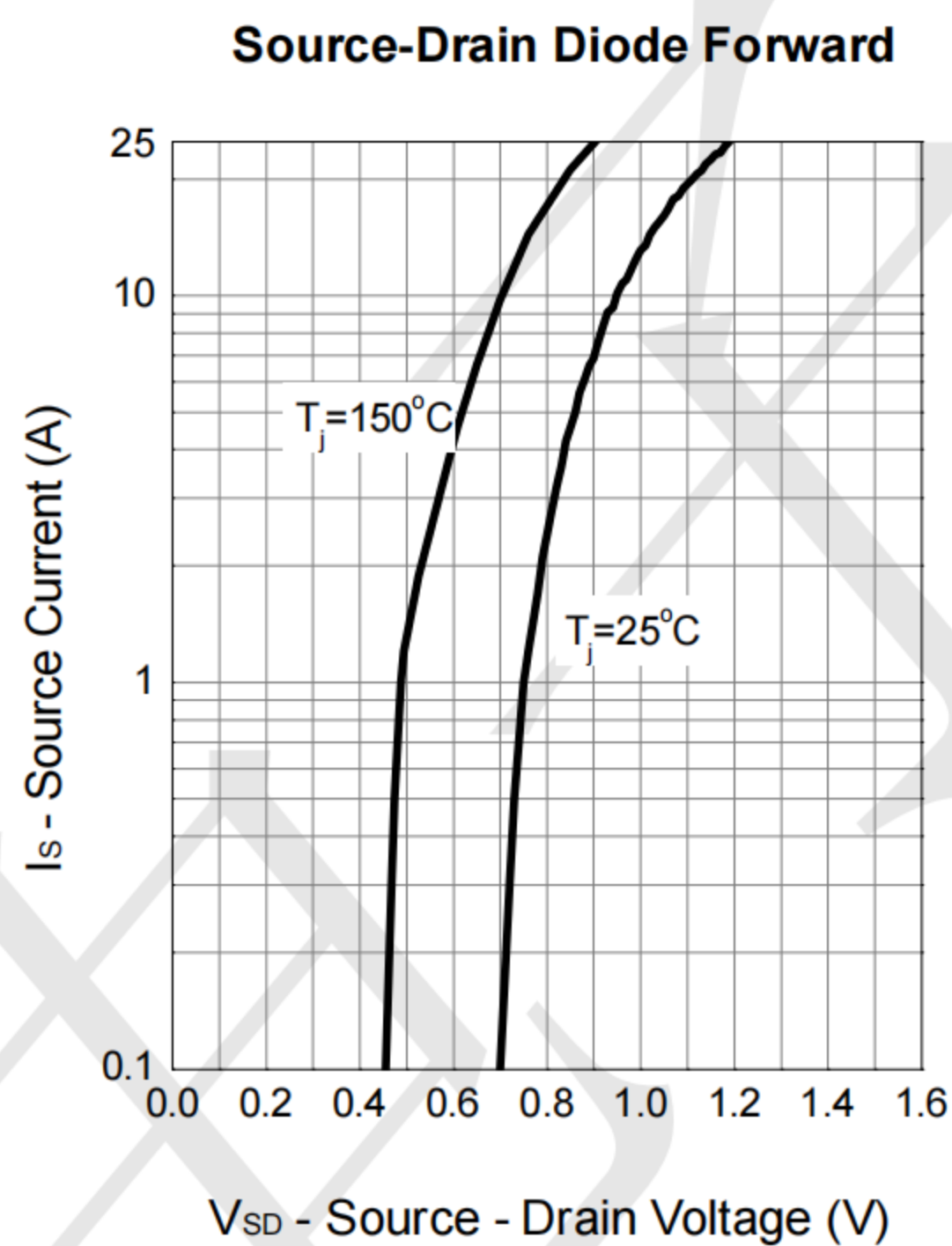
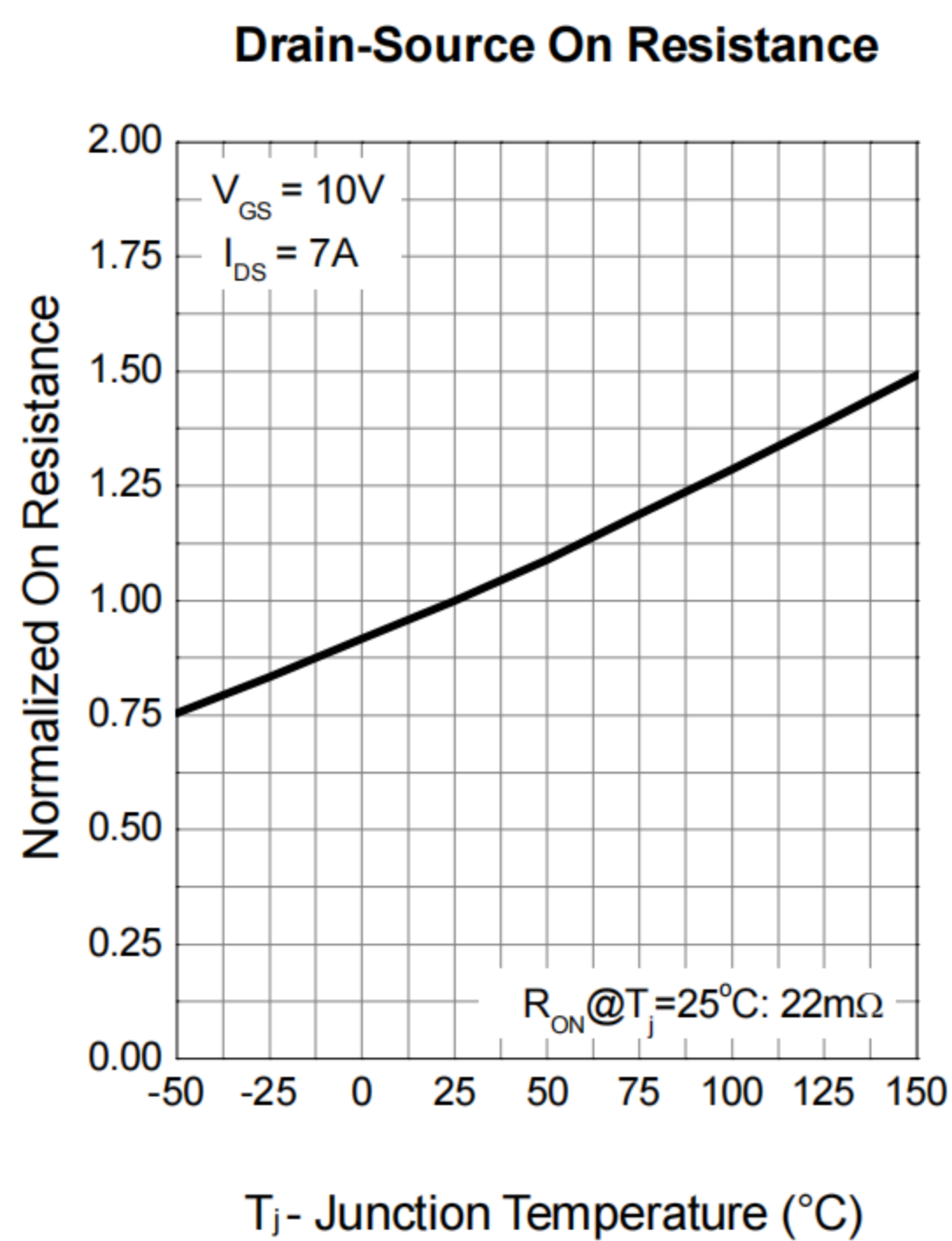
Drain-Source On Resistance



Gate Threshold Voltage



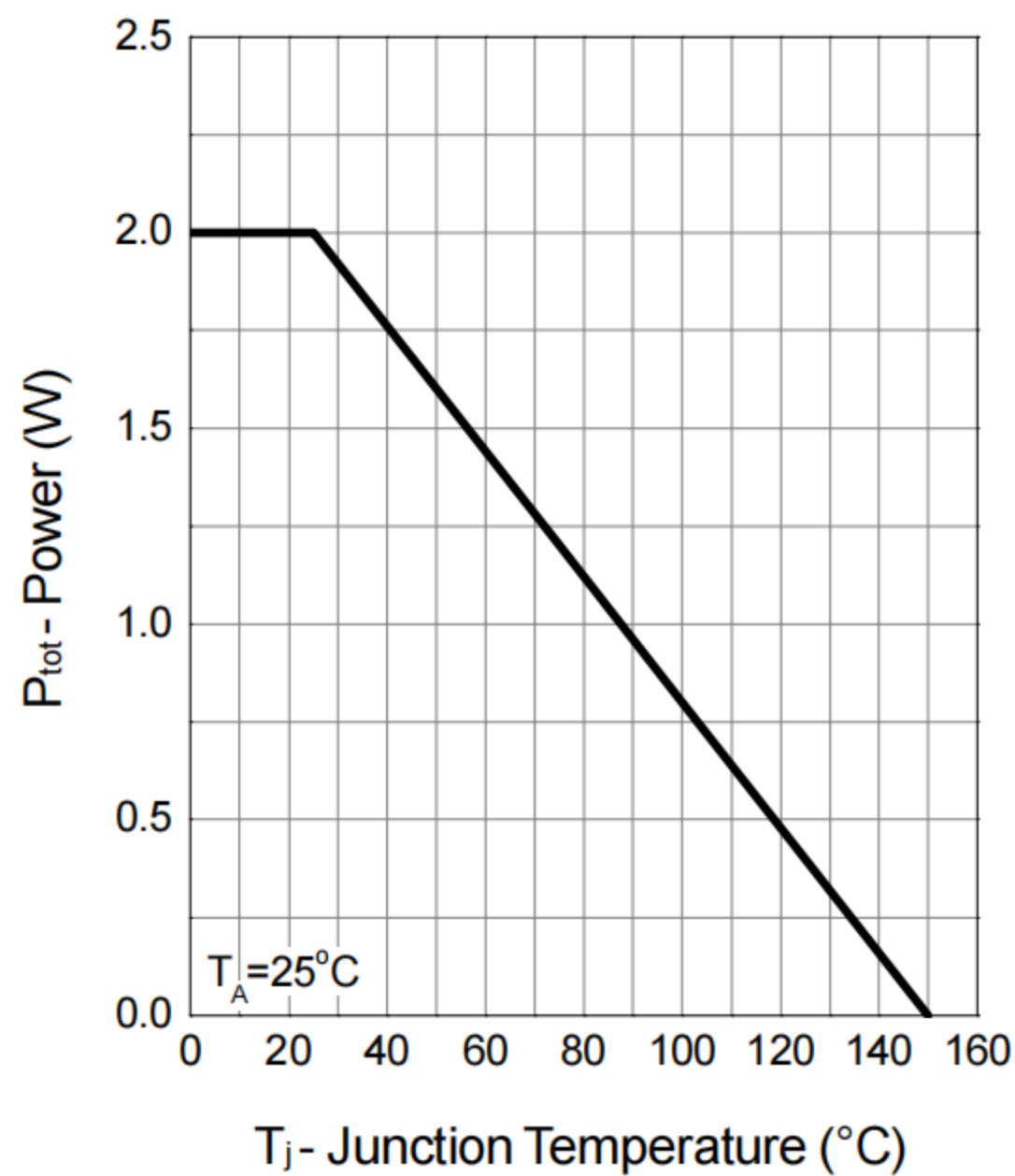
Q1-N-Channel



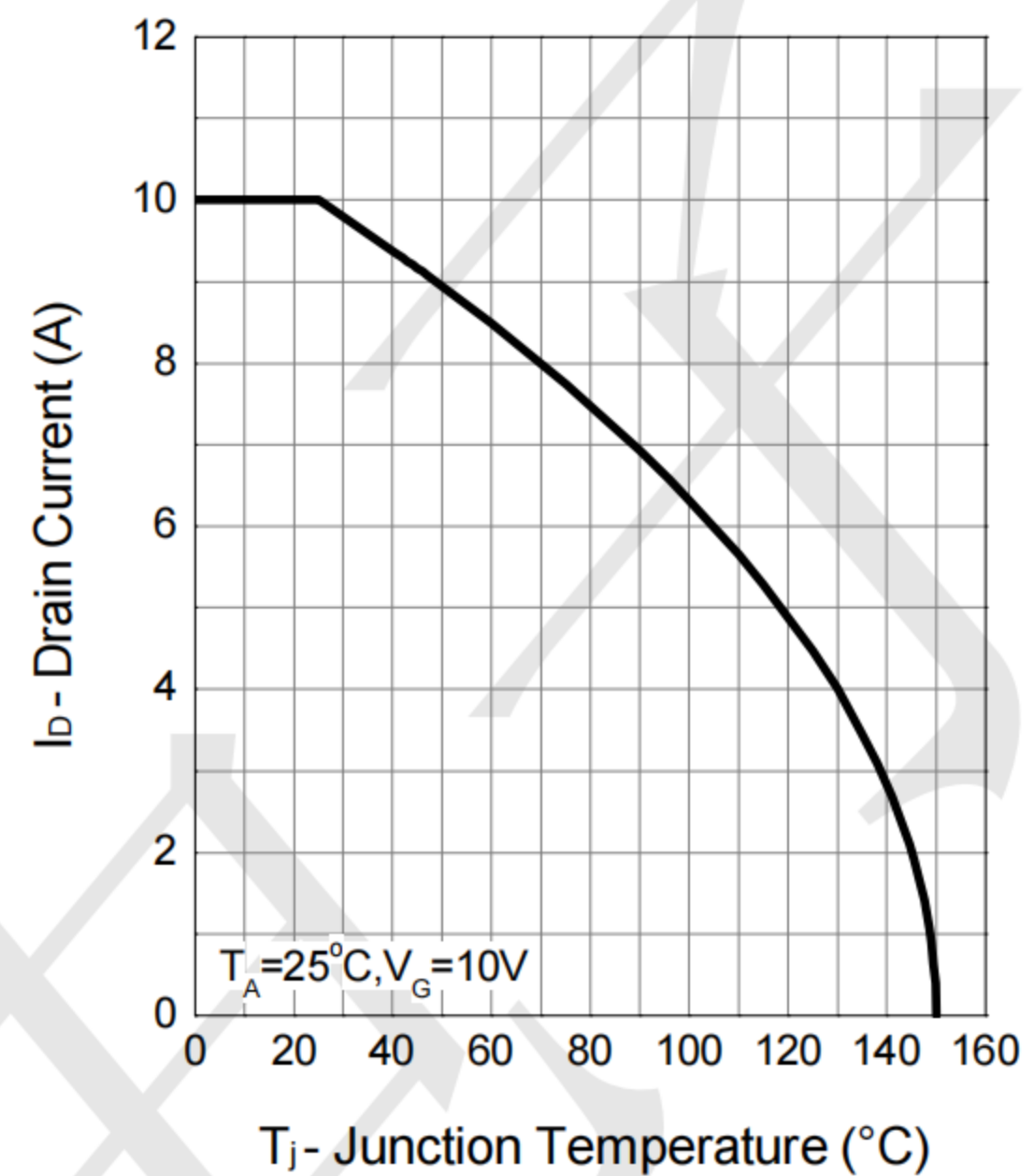
Typical Electrical and Thermal Characteristics

Q2-N-Channel

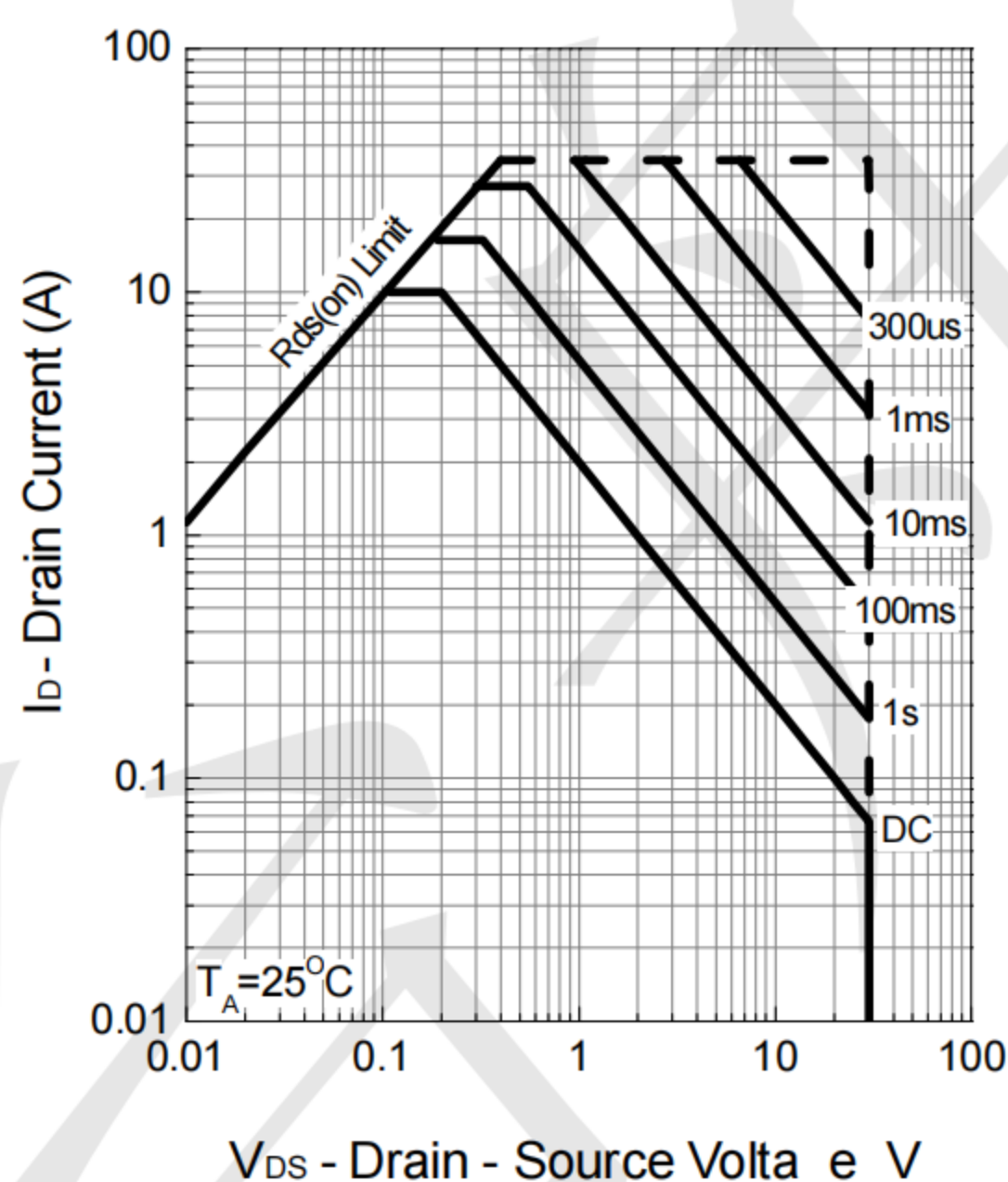
Power Dissipation



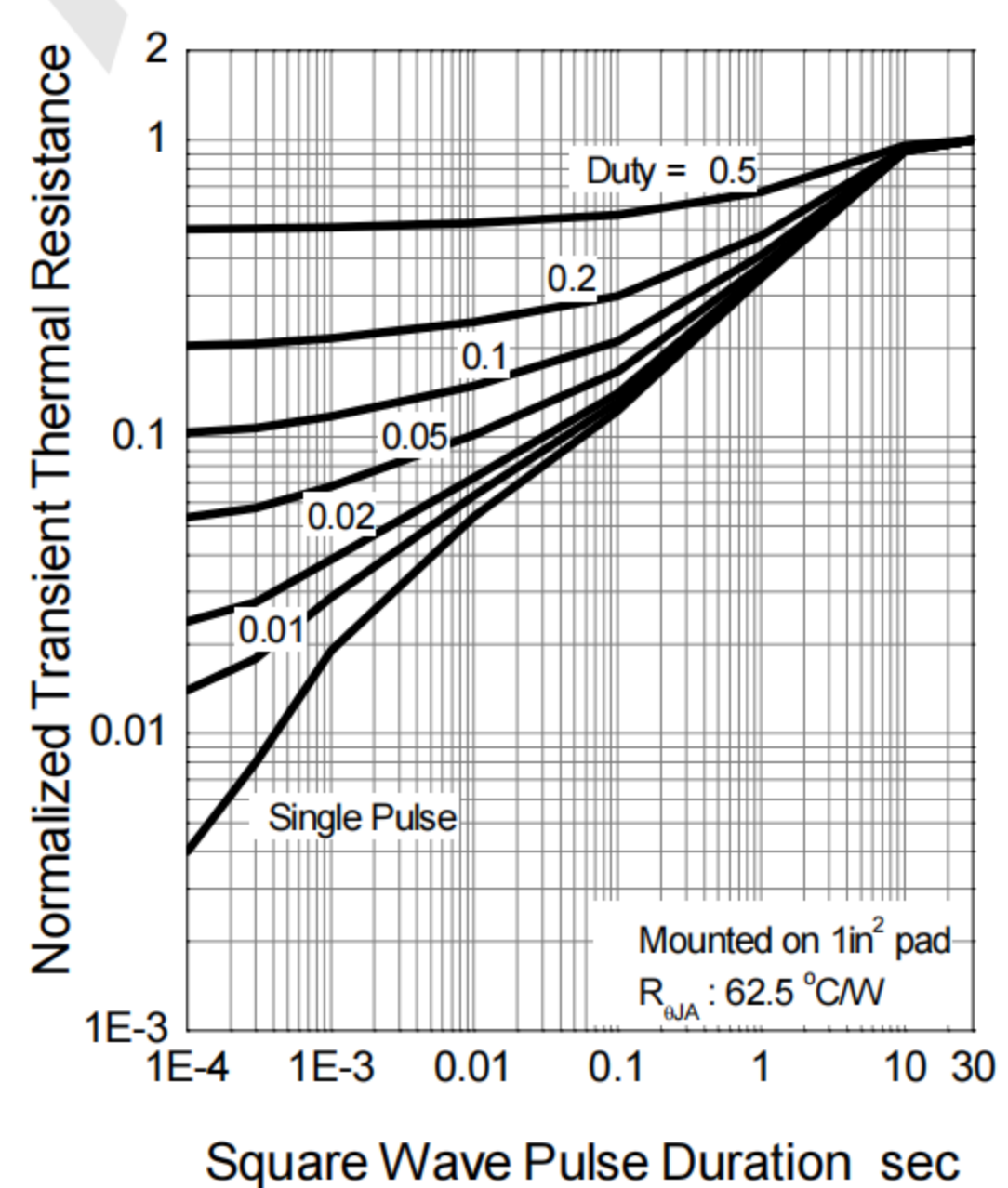
Drain Current



Safe Operation Area

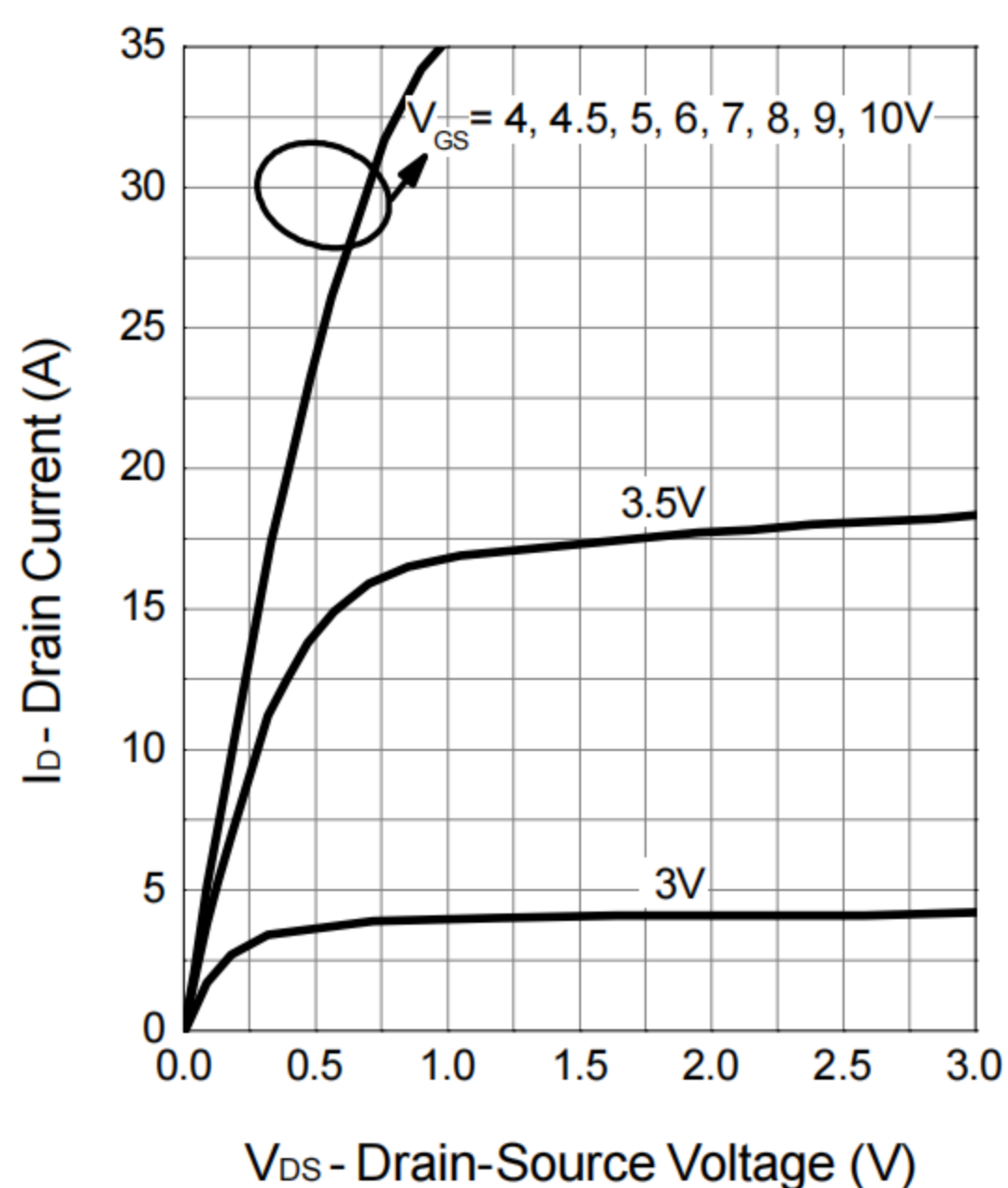


Thermal Transient Impedance

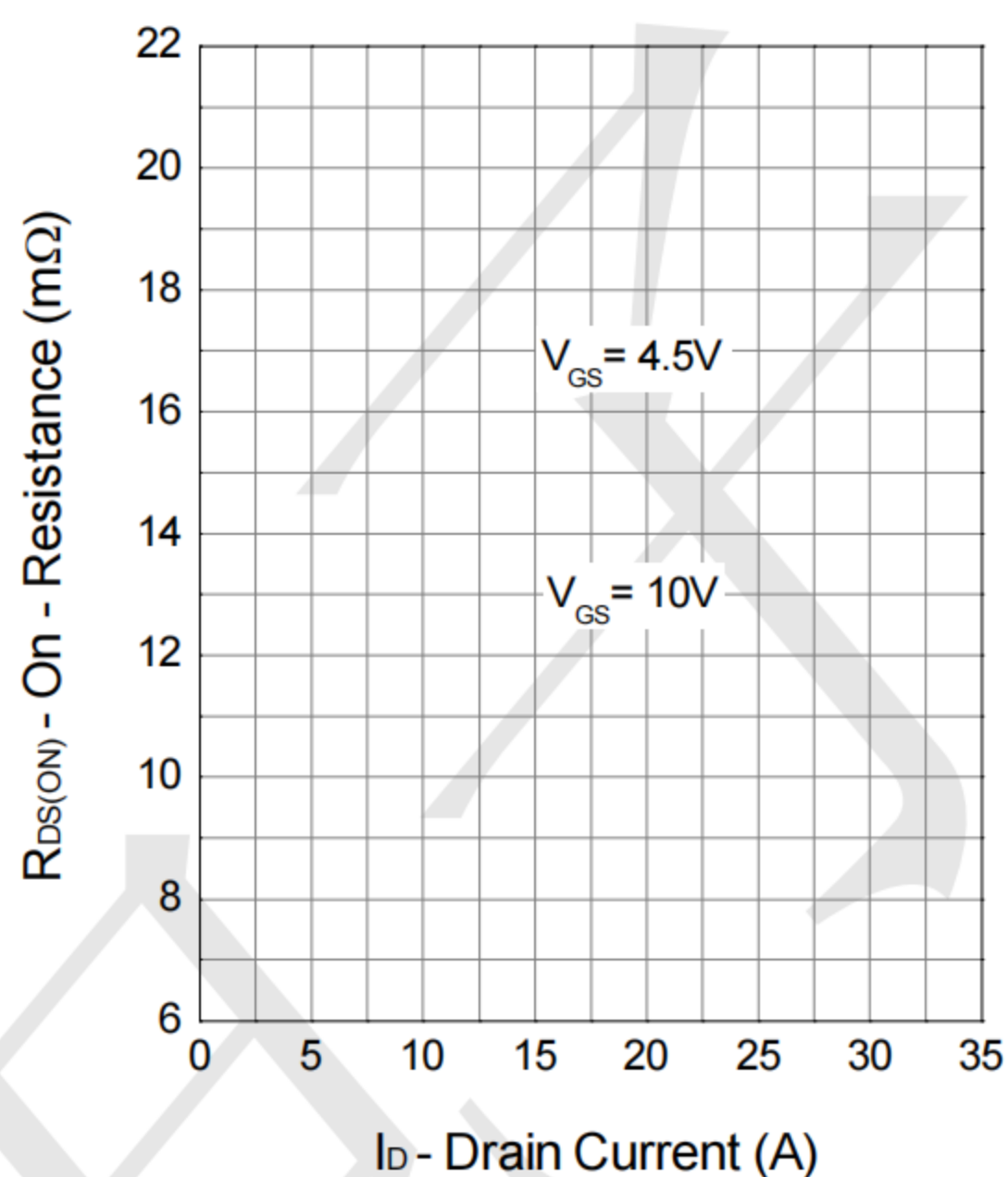


Q2-N-Channel

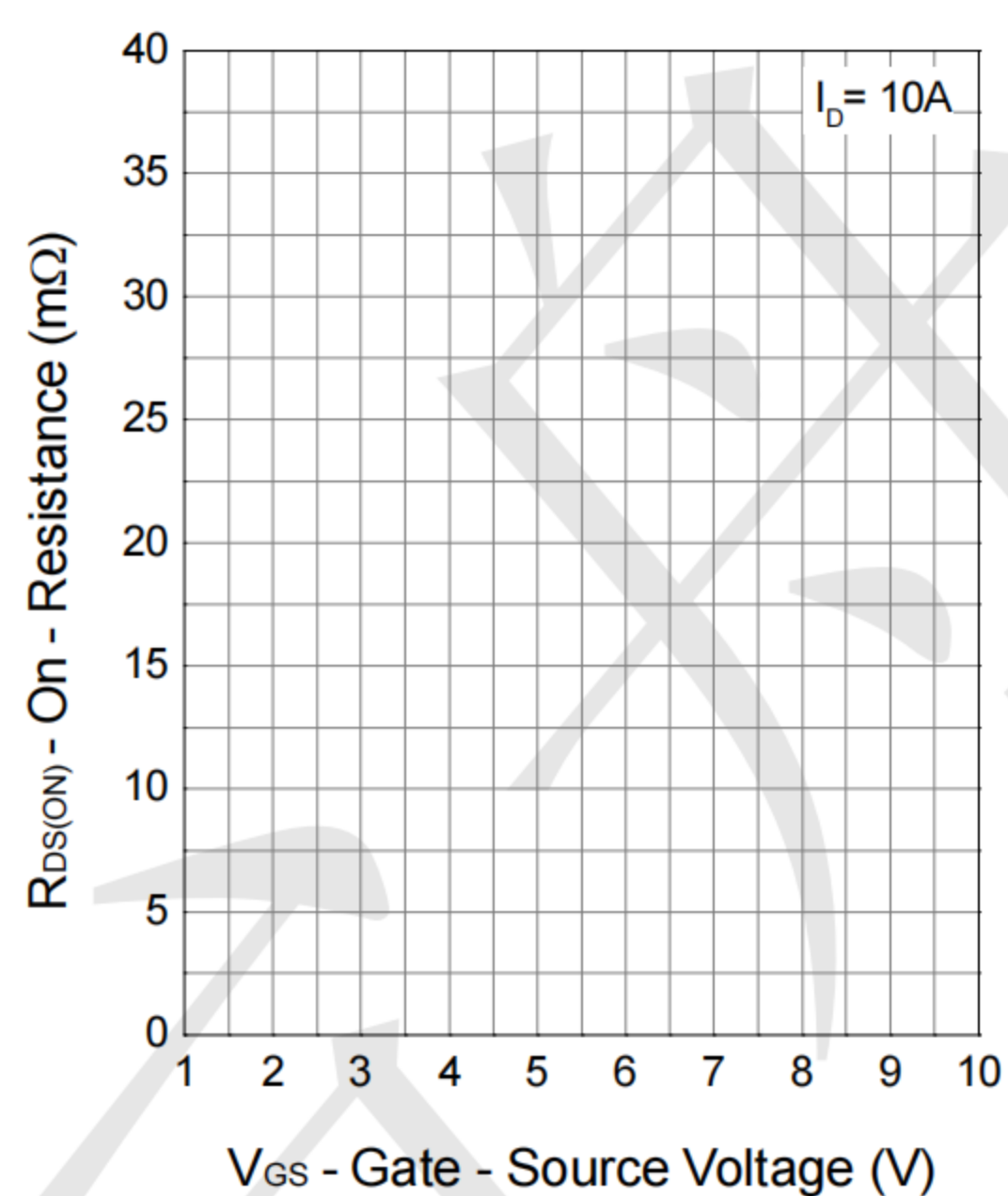
Output Characteristics



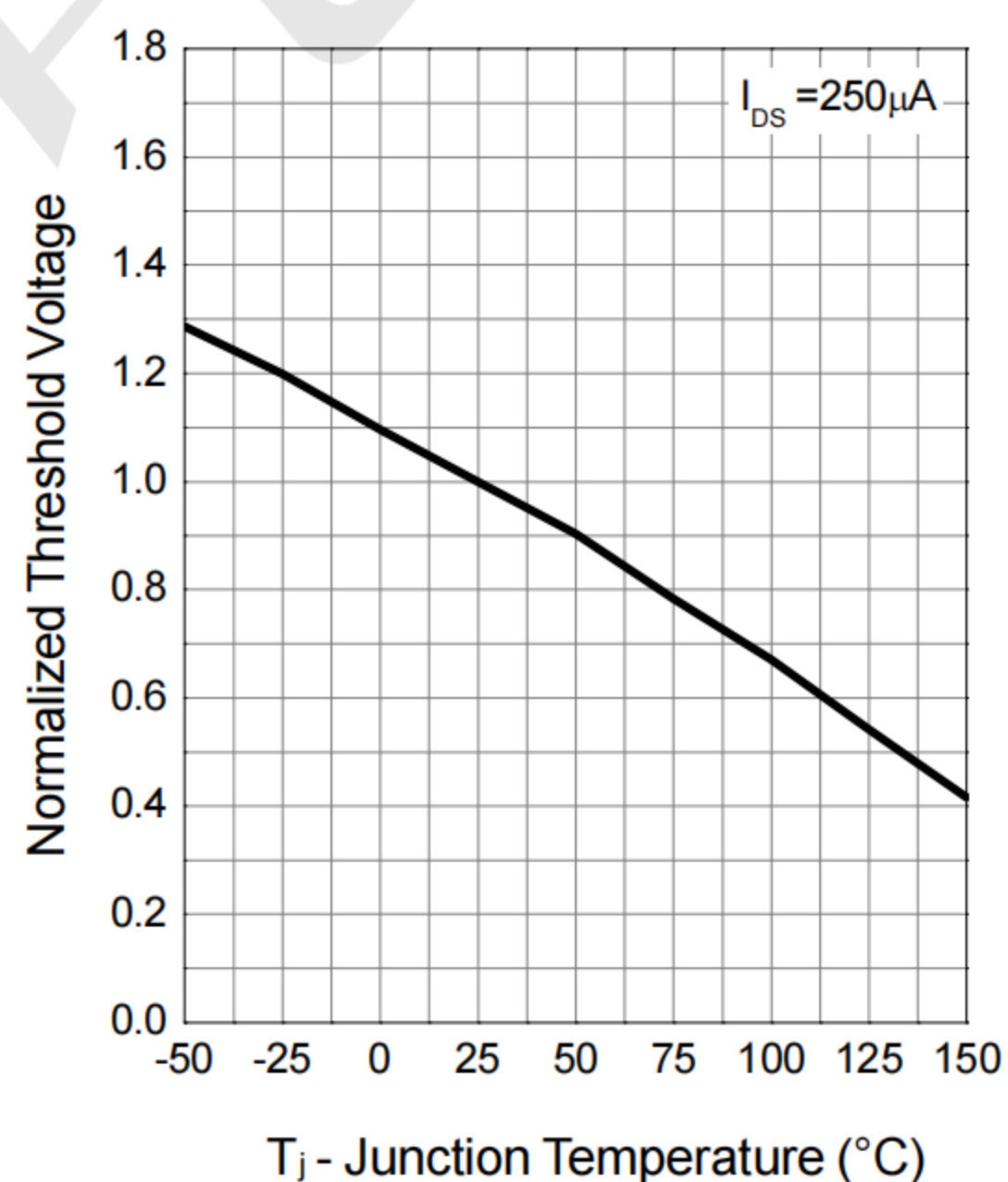
Drain-Source On Resistance



Drain-Source On Resistance

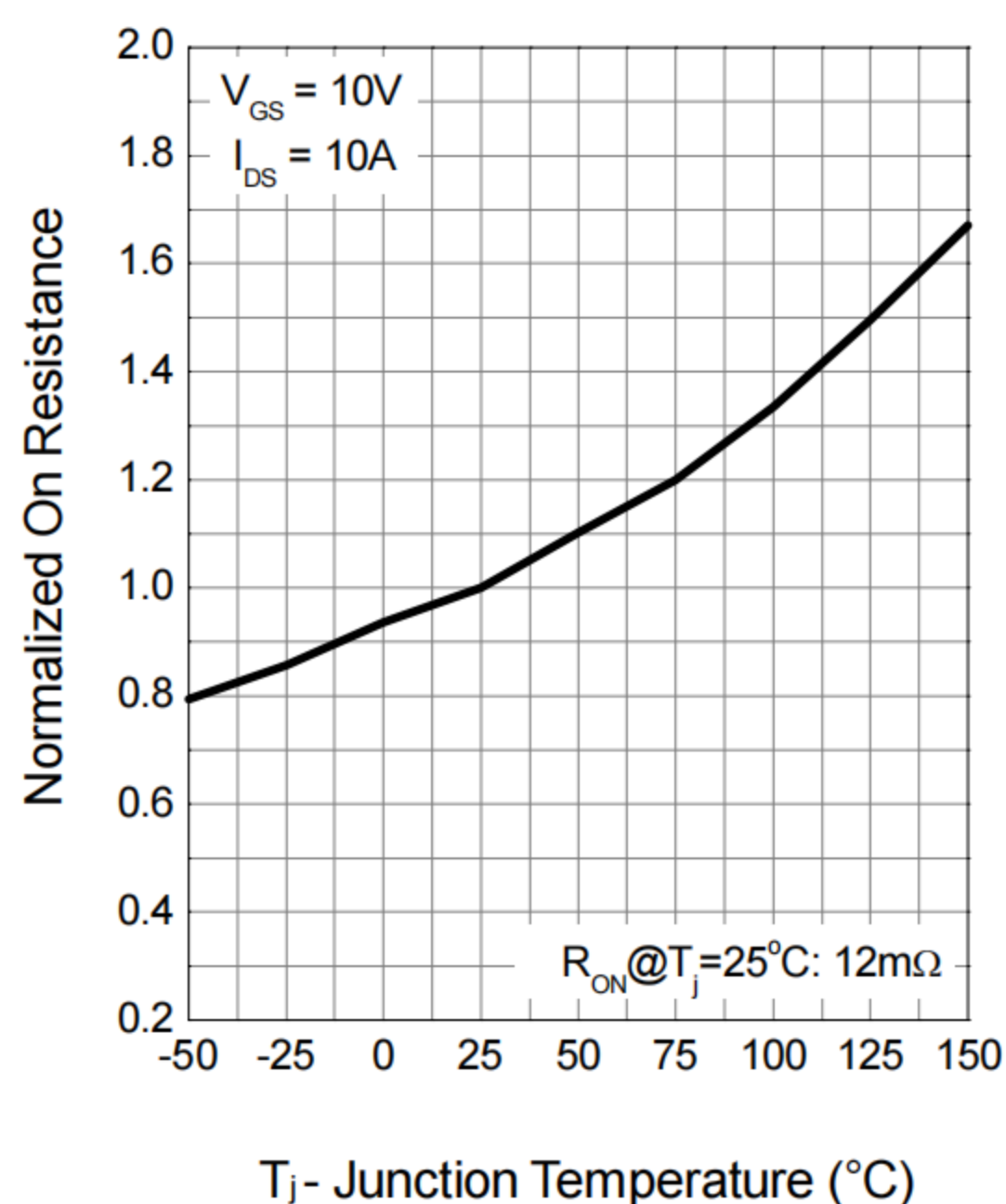


Gate Threshold Voltage

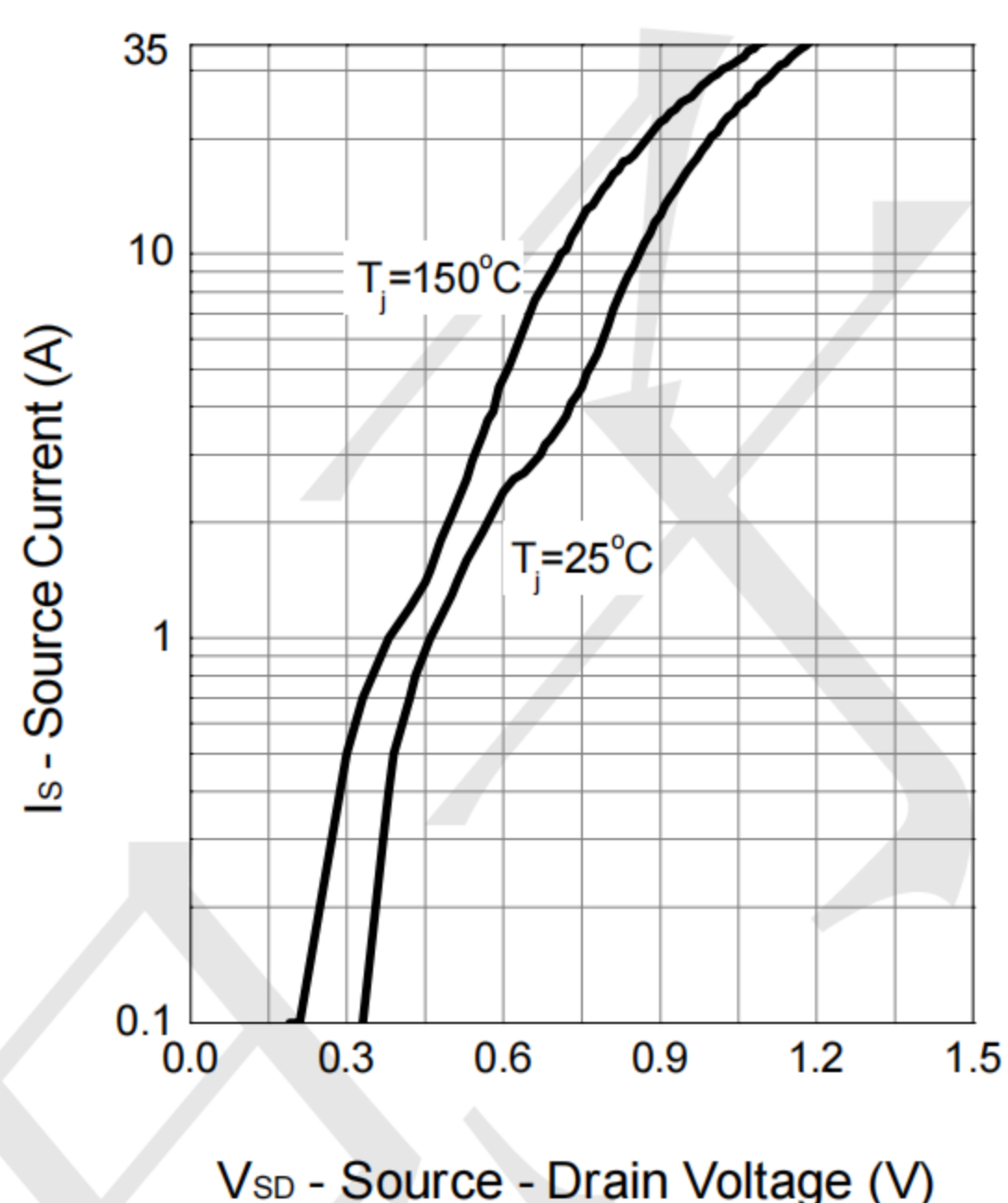


Q2-N-Channel

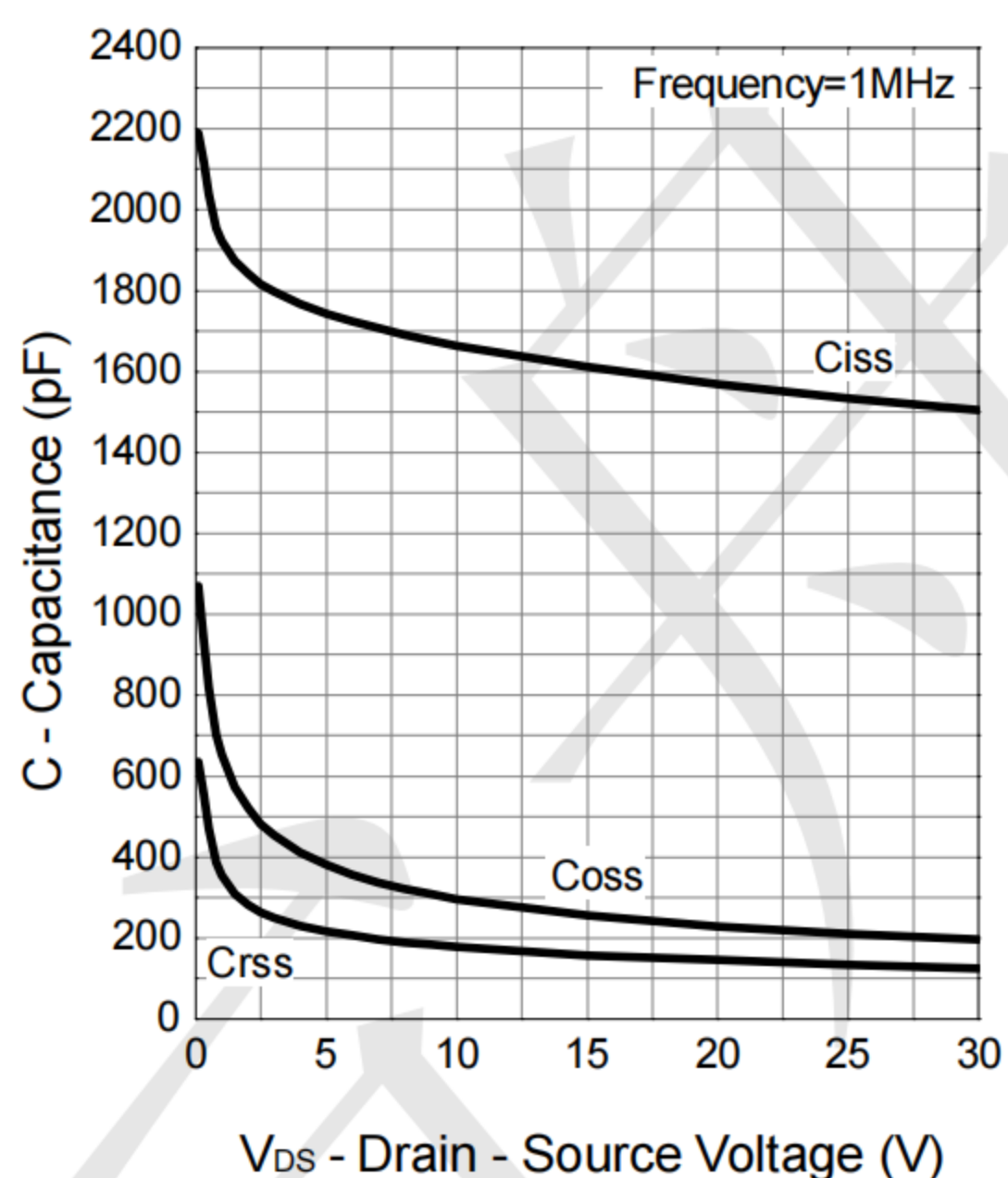
Drain-Source On Resistance



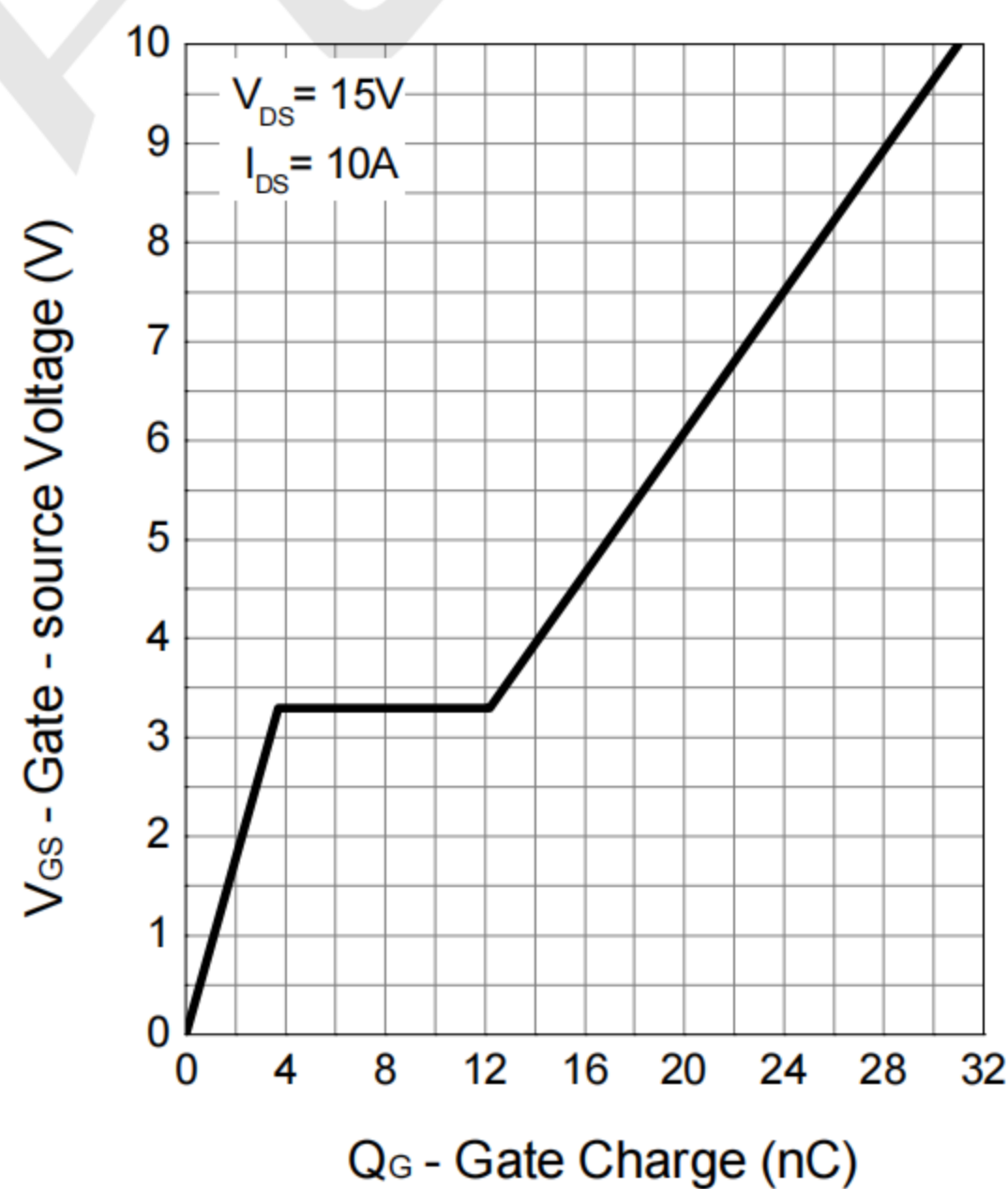
Source-Drain Diode Forward



Capacitance



Gate Charge



Typical Electrical and Thermal Characteristics Schottky Diode

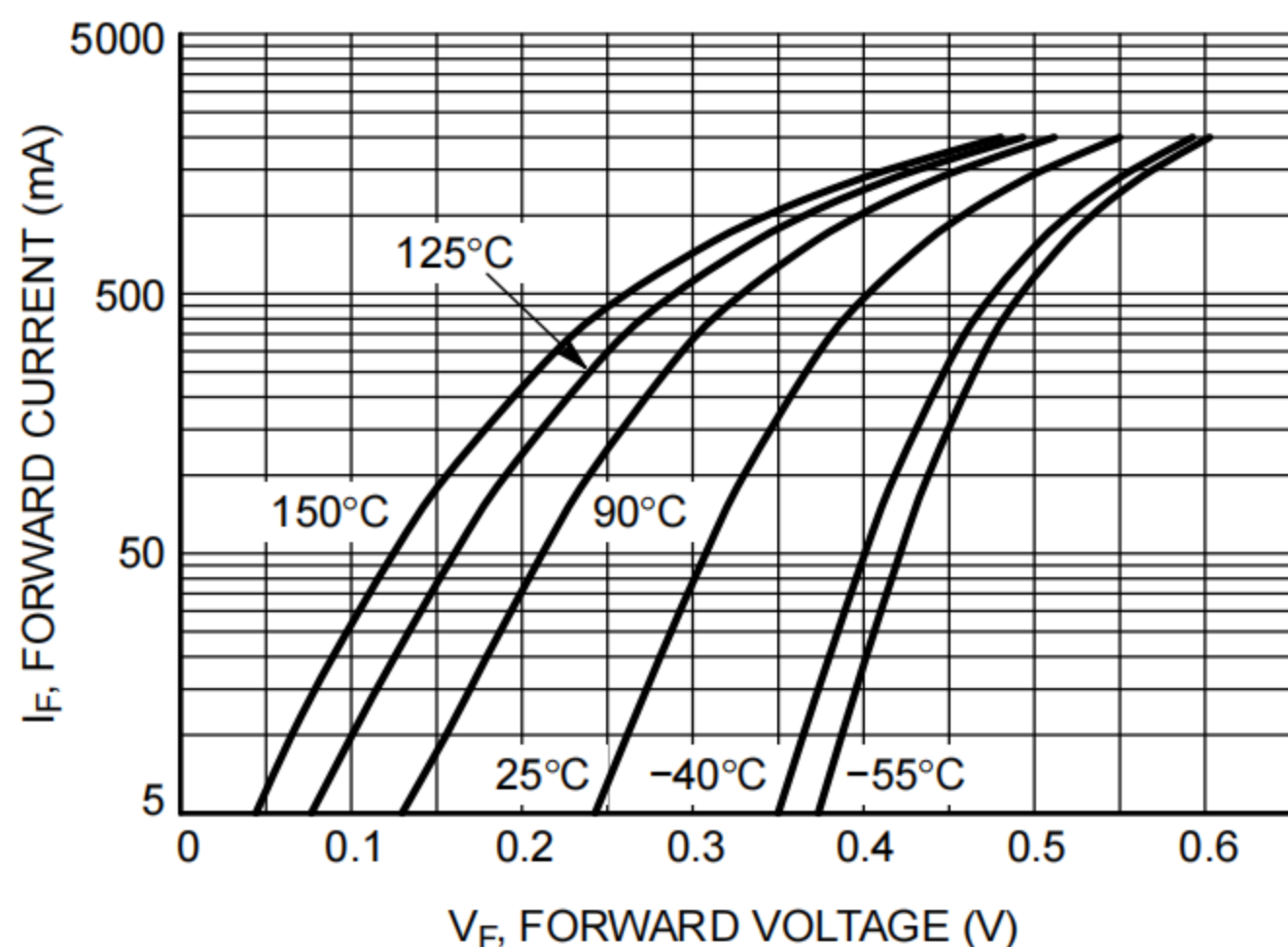


Figure 5. Forward Voltage

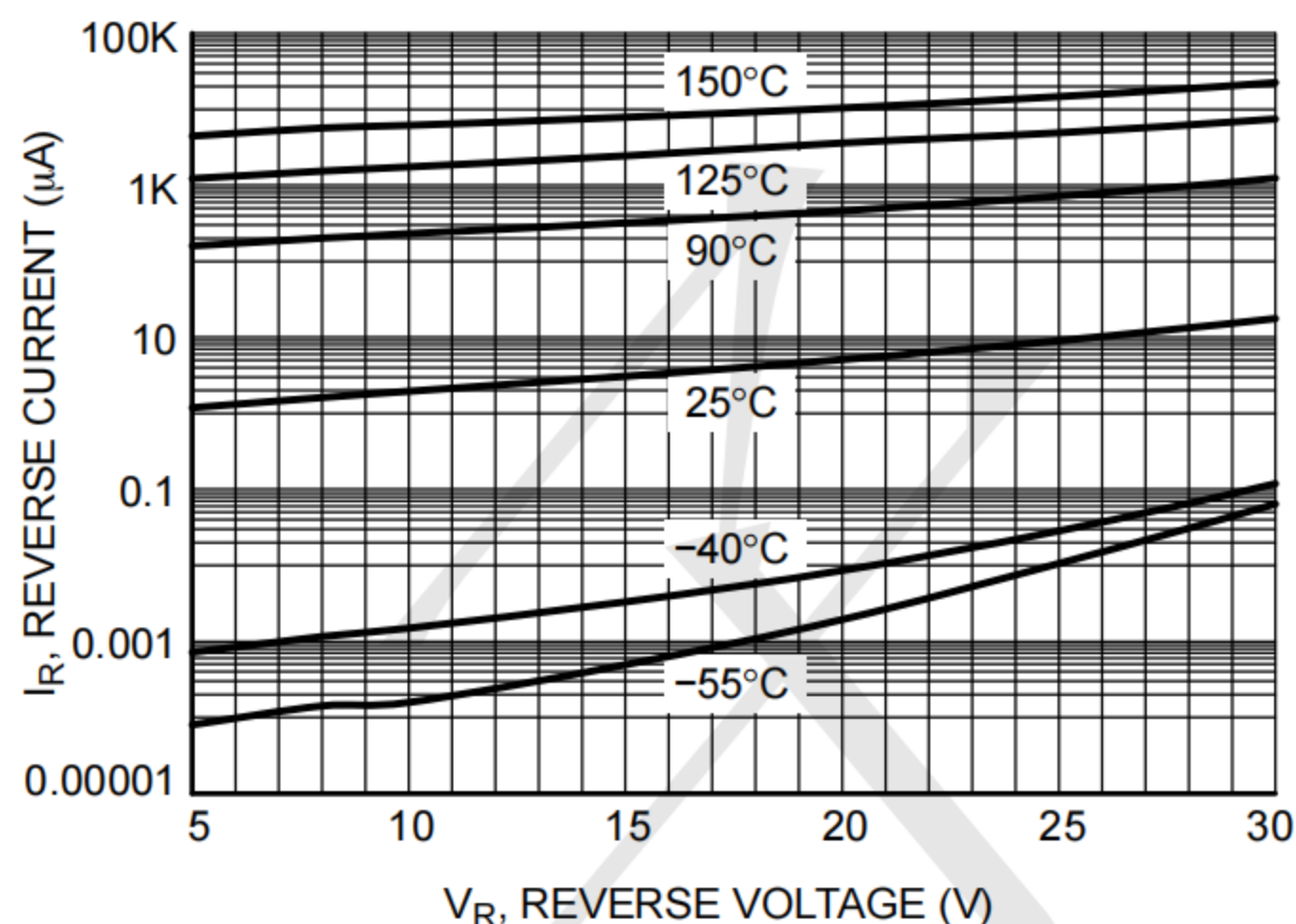


Figure 6. Leakage Current

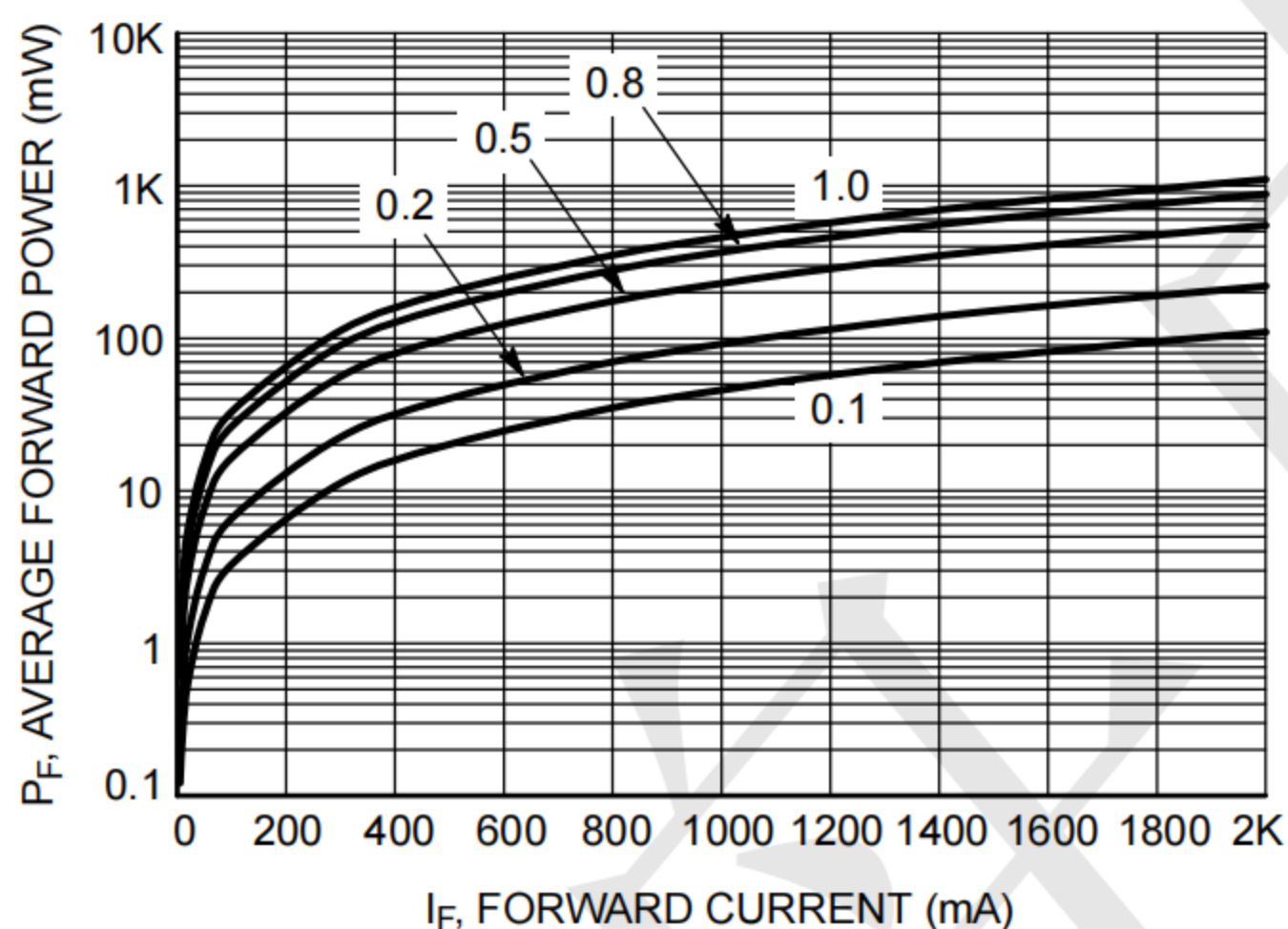


Figure 7. Average Forward Power Dissipation

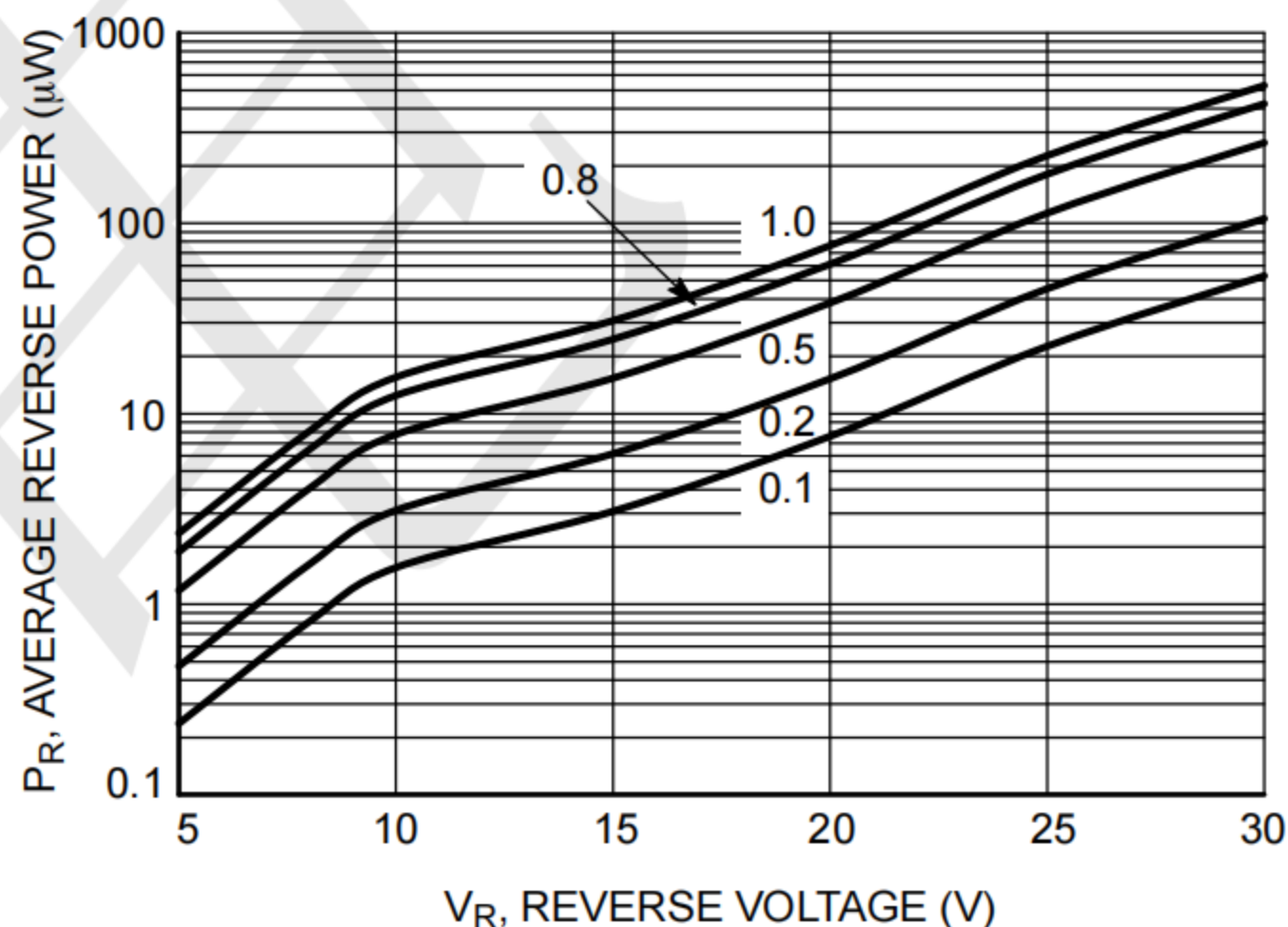


Figure 8. Average Reverse Power Dissipation

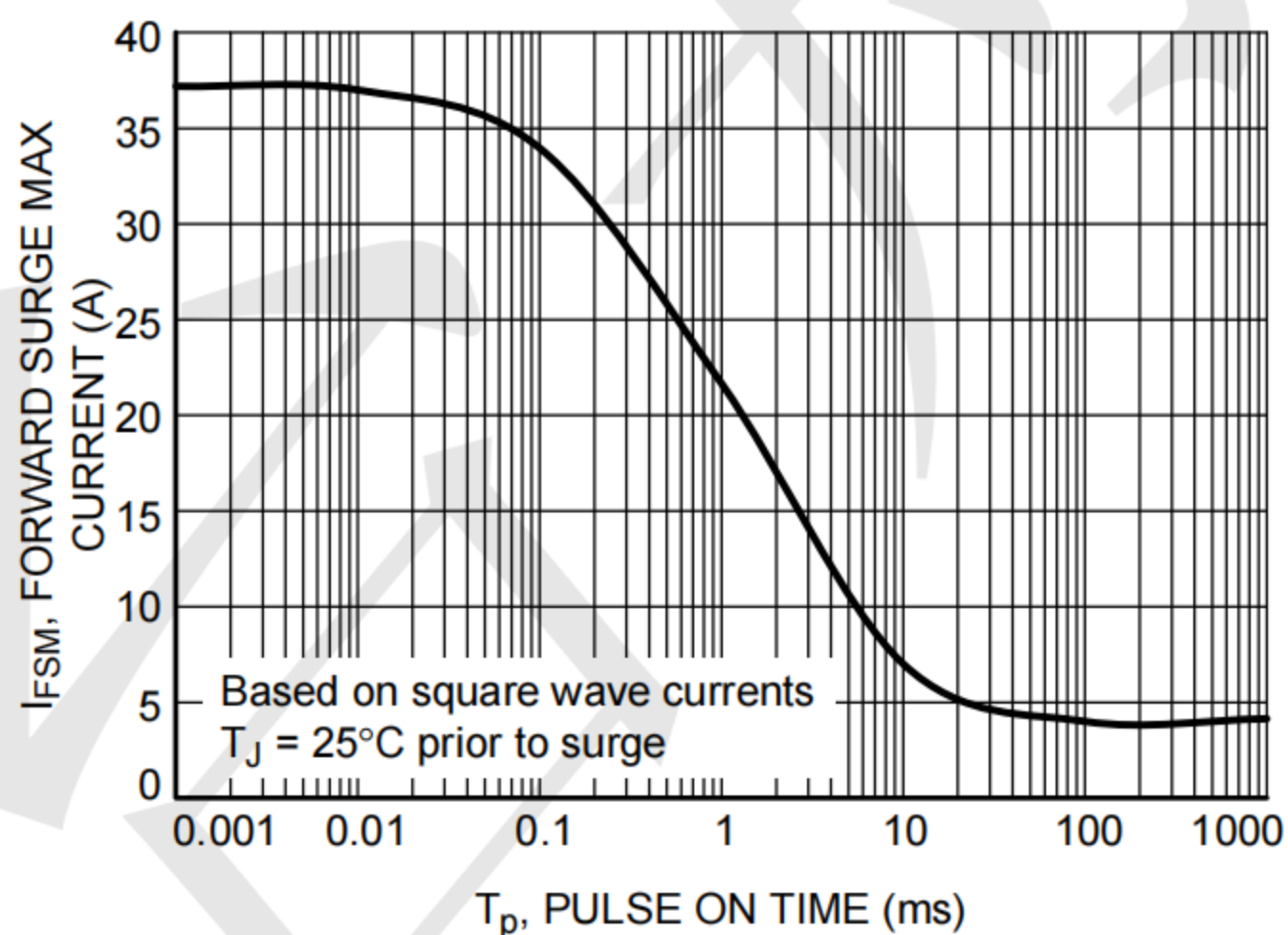
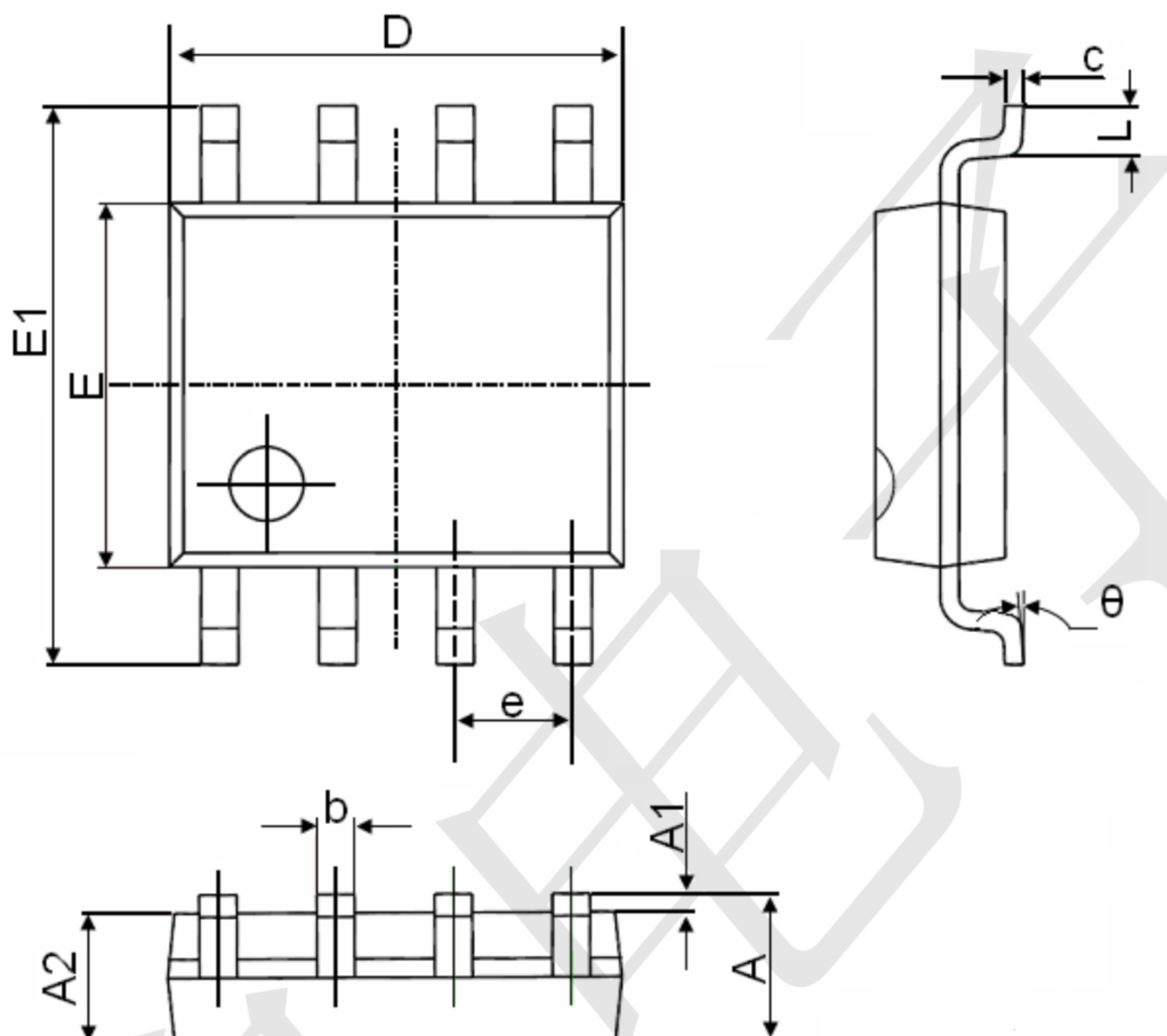


Figure 10. Forward Surge Maximum

SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°