

Description

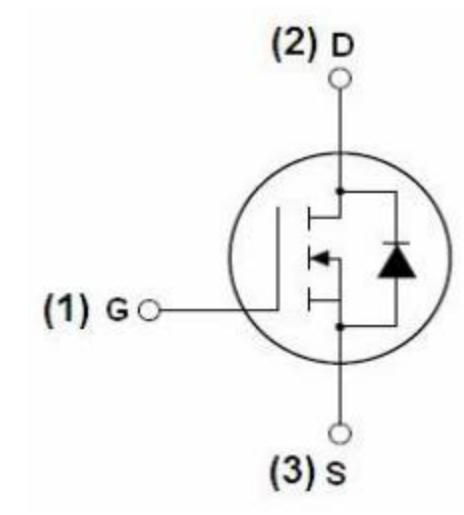
The QH10N10 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$, low gate charge. This device is suitable for use in Synchronous-recification application.

General Features

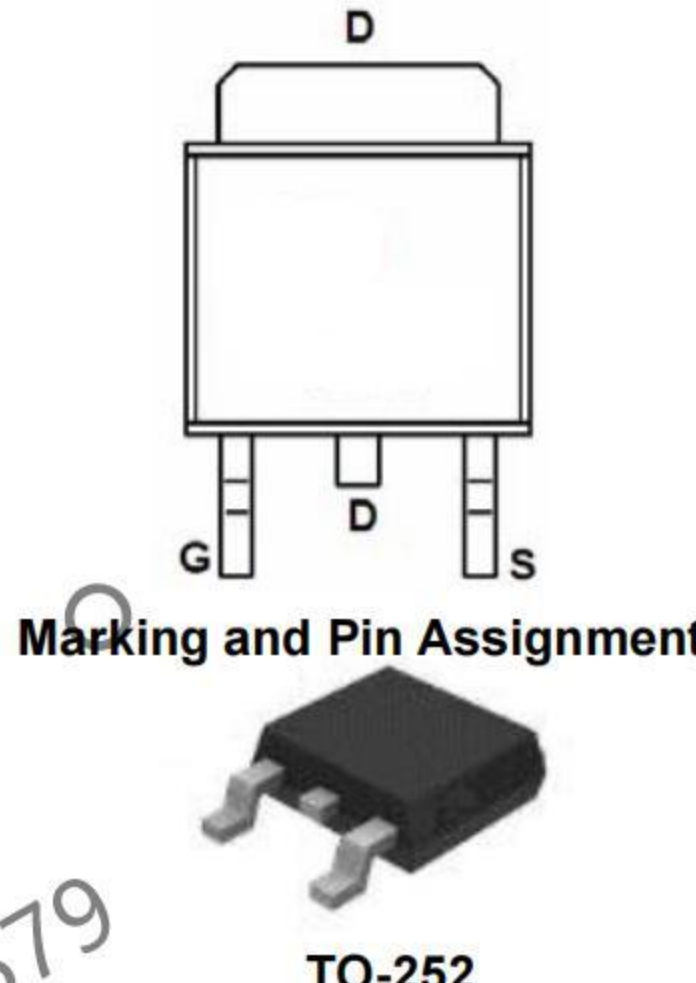
- High power and current handing capability
- Lead free product is acquired
- Surface mount package
- RoHS Compliant

Application

- Consumer electronic power supply
- Isolated DC/DC converter
- Motor control



Schematic Diagram



Marking and Pin Assignment

TO-252

Ordering Information

Part Number	Marking	Case	Packaging
QH10N10	GT10N10	TO-252	2500pcs/Reel

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	7	A
Drain Current-Pulsed (Note 1)	I_{DM}	21	A
Maximum Power Dissipation	P_D	17	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-case	$R_{\theta JC}$	7.4	°C/W
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	73.5	°C/W

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100	110	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$	-	-	1	μA

Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.5	2	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=3.5A$	-	115	140	m Ω
		$V_{GS}=4.5V, I_D=3.5A$	-	150	175	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=15V, I_D=2A$	3	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{ISS}	$V_{DS}=50V, V_{GS}=0V,$ $F=1.0MHz$	-	206	-	PF
Output Capacitance	C_{OSS}		-	28.9	-	PF
Reverse Transfer Capacitance	C_{RSS}		-	1.4	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=50V, I_D=5A$ $V_{GS}=10V, R_{GEN}=2\Omega$	-	14.7	-	nS
Turn-on Rise Time	t_r		-	3.5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	20.9	-	nS
Turn-Off Fall Time	t_f		-	2.7	-	nS
Total Gate Charge	Q_g	$V_{DS}=50V, I_D=5A,$ $V_{GS}=10V$	-	4.3	-	nC
Gate-Source Charge	Q_{gs}		-	1.5	-	nC
Gate-Drain Charge	Q_{gd}		-	1.1	-	nC
Gate plateau voltage	$V_{plateau}$			5.0		V
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=7A$	-	-	1.2	V
Diode Forward Current (Note 2)	I_S	$V_{GS}<V_{th}$	-	-	7	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production



Typical Electrical And Thermal Characteristics

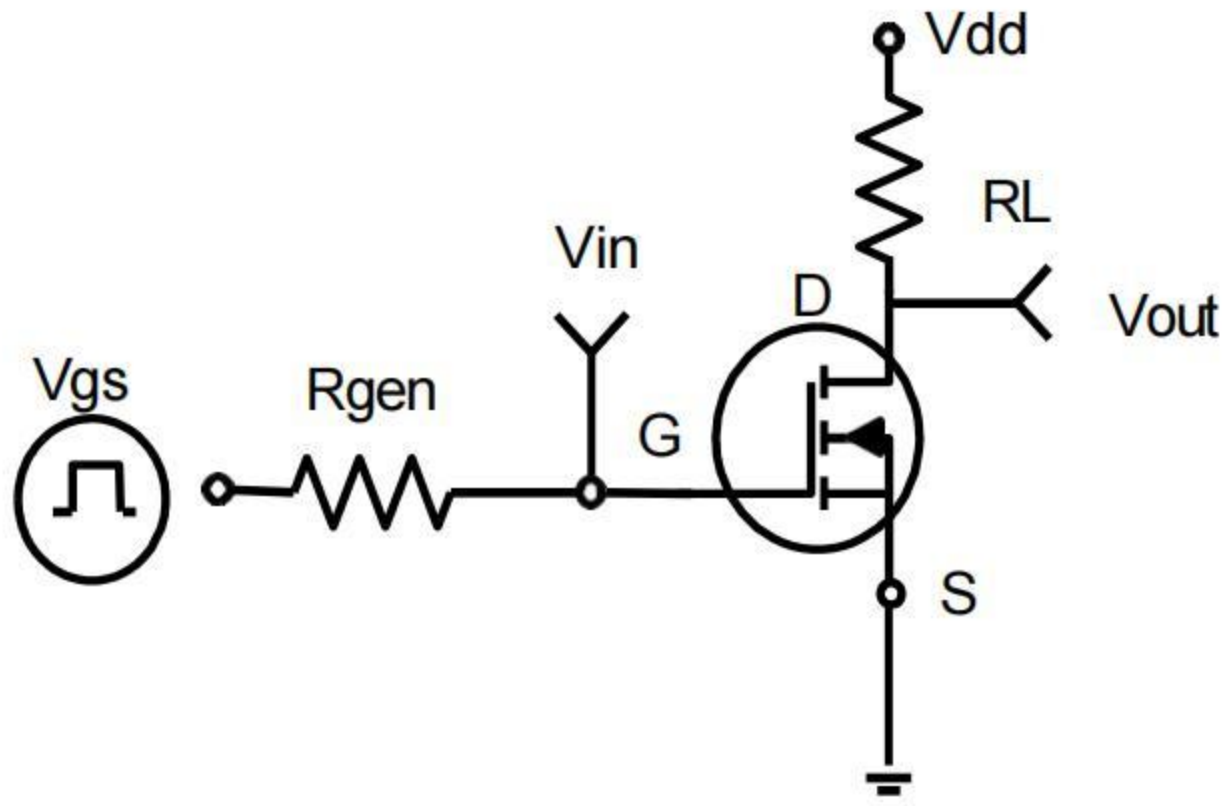


Figure 1: Switching Test Circuit

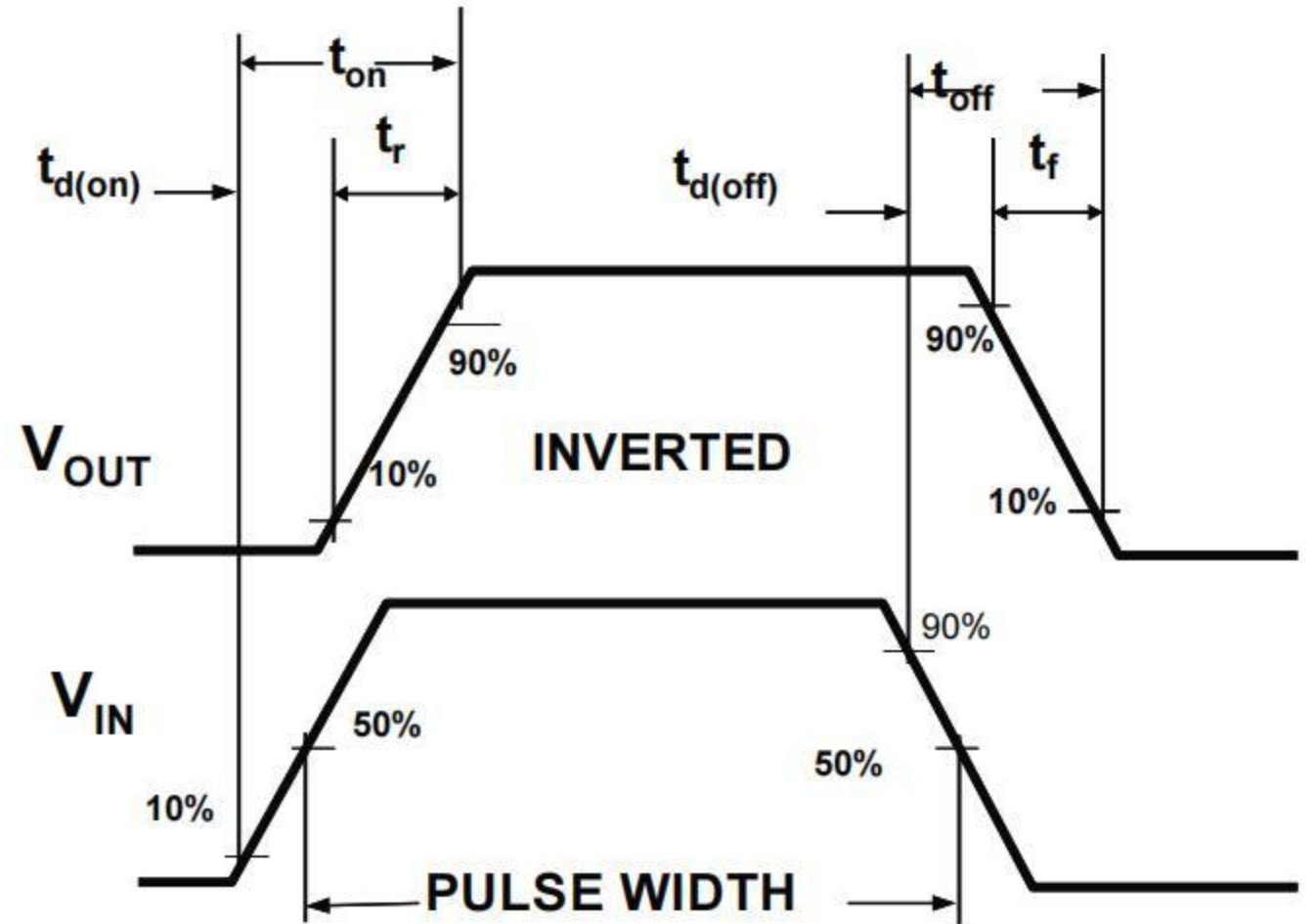


Figure 2: Switching Waveforms

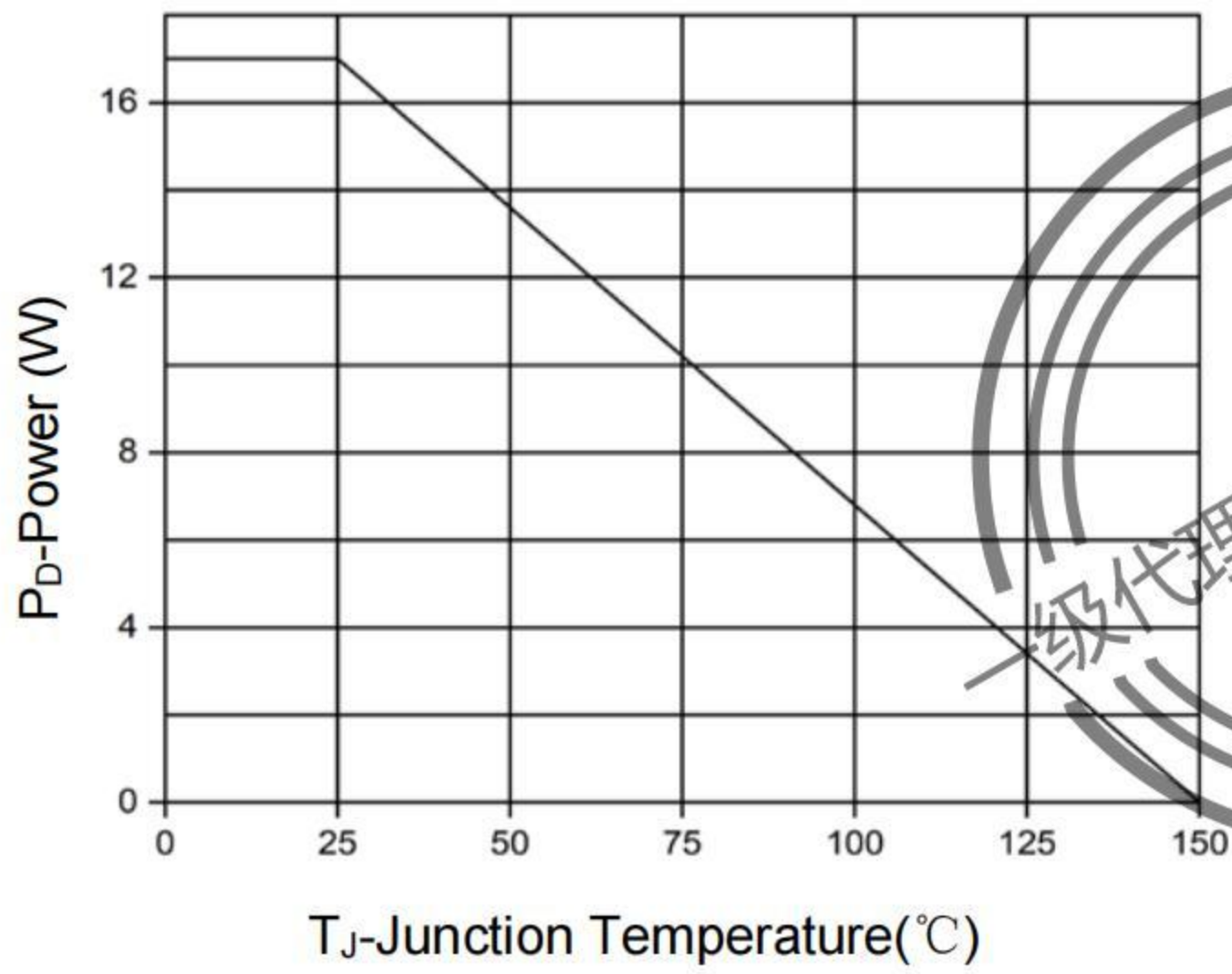


Figure 3 Power Dissipation

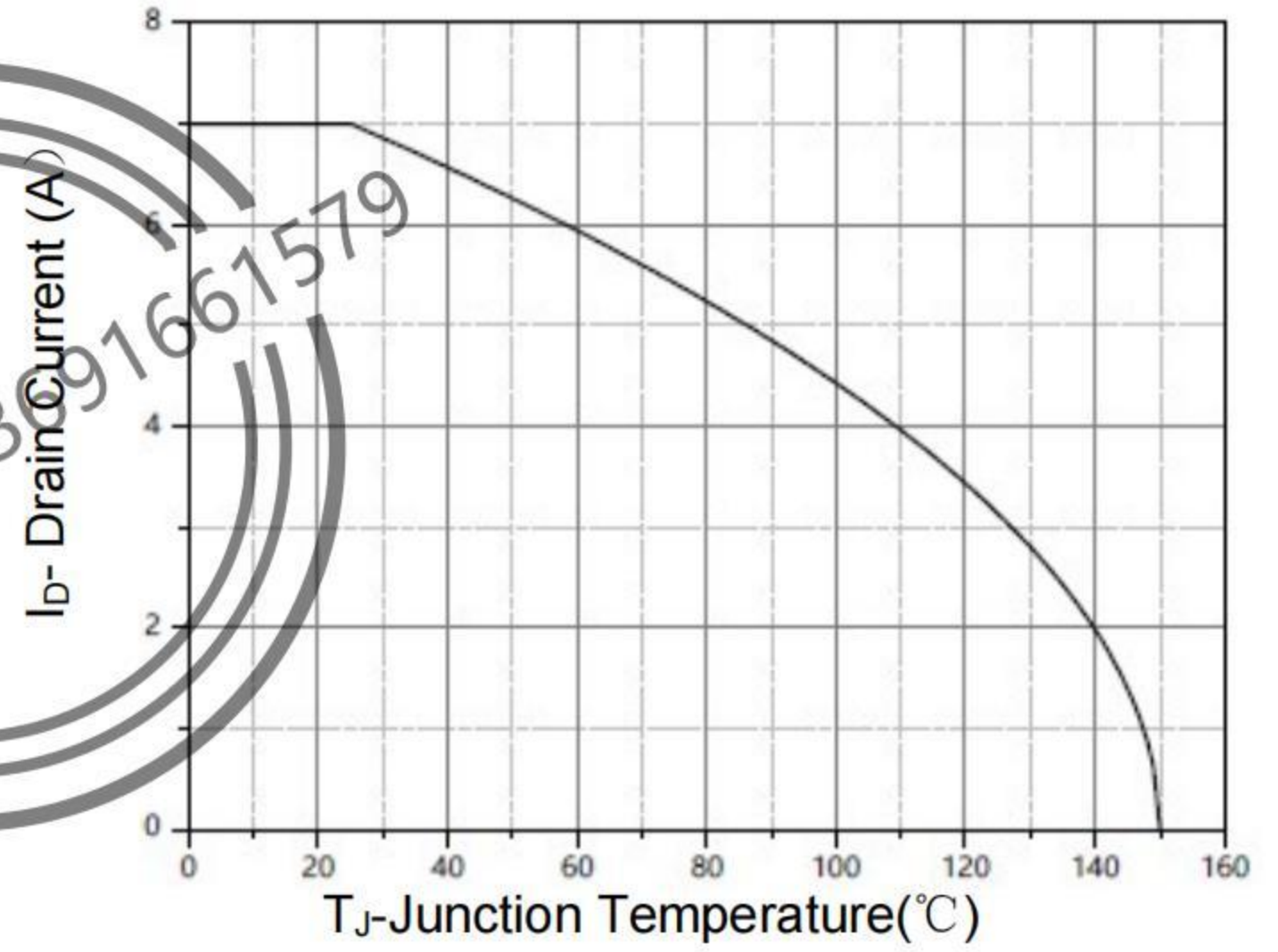


Figure 4 Drain Current

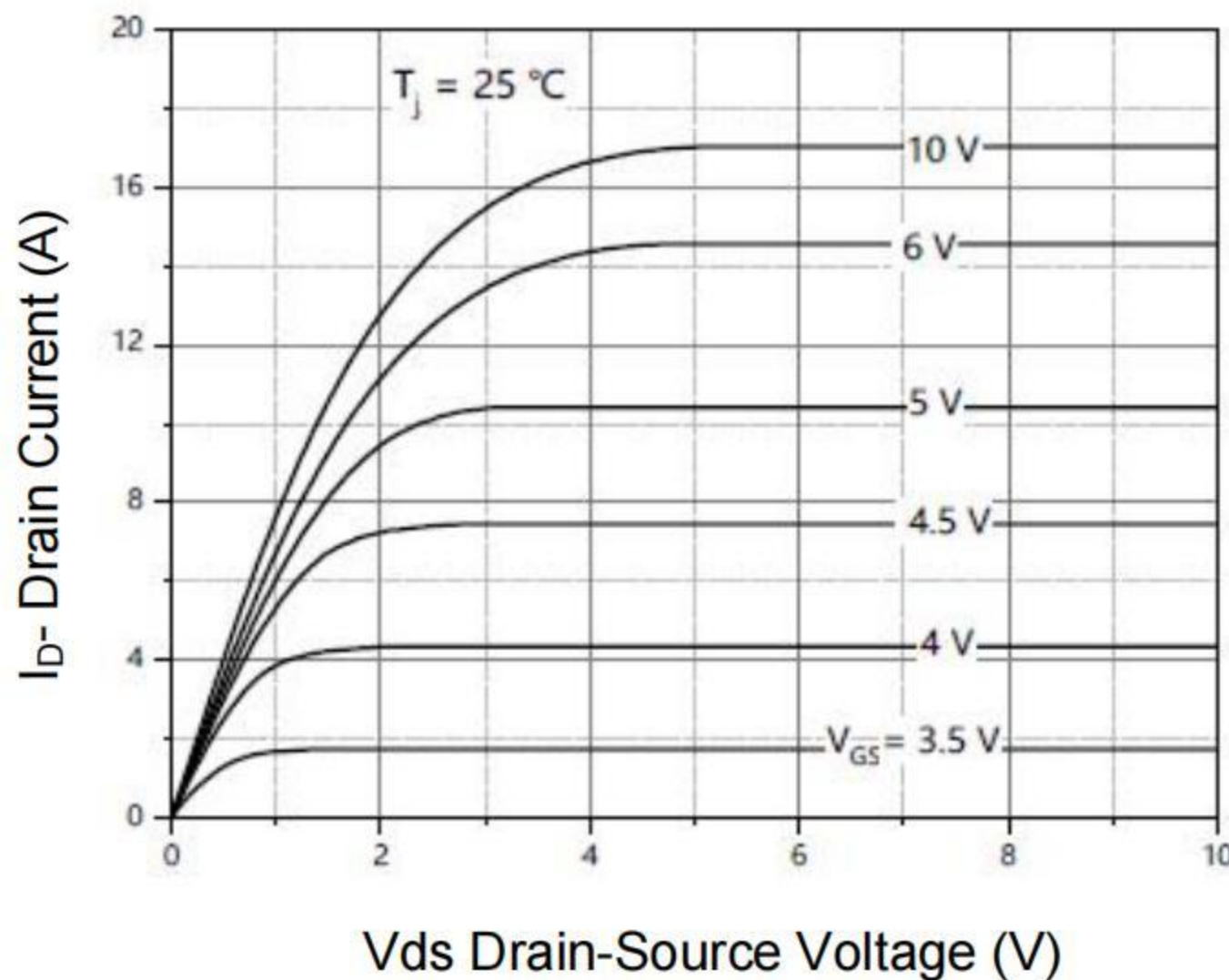


Figure 5 Output characteristics

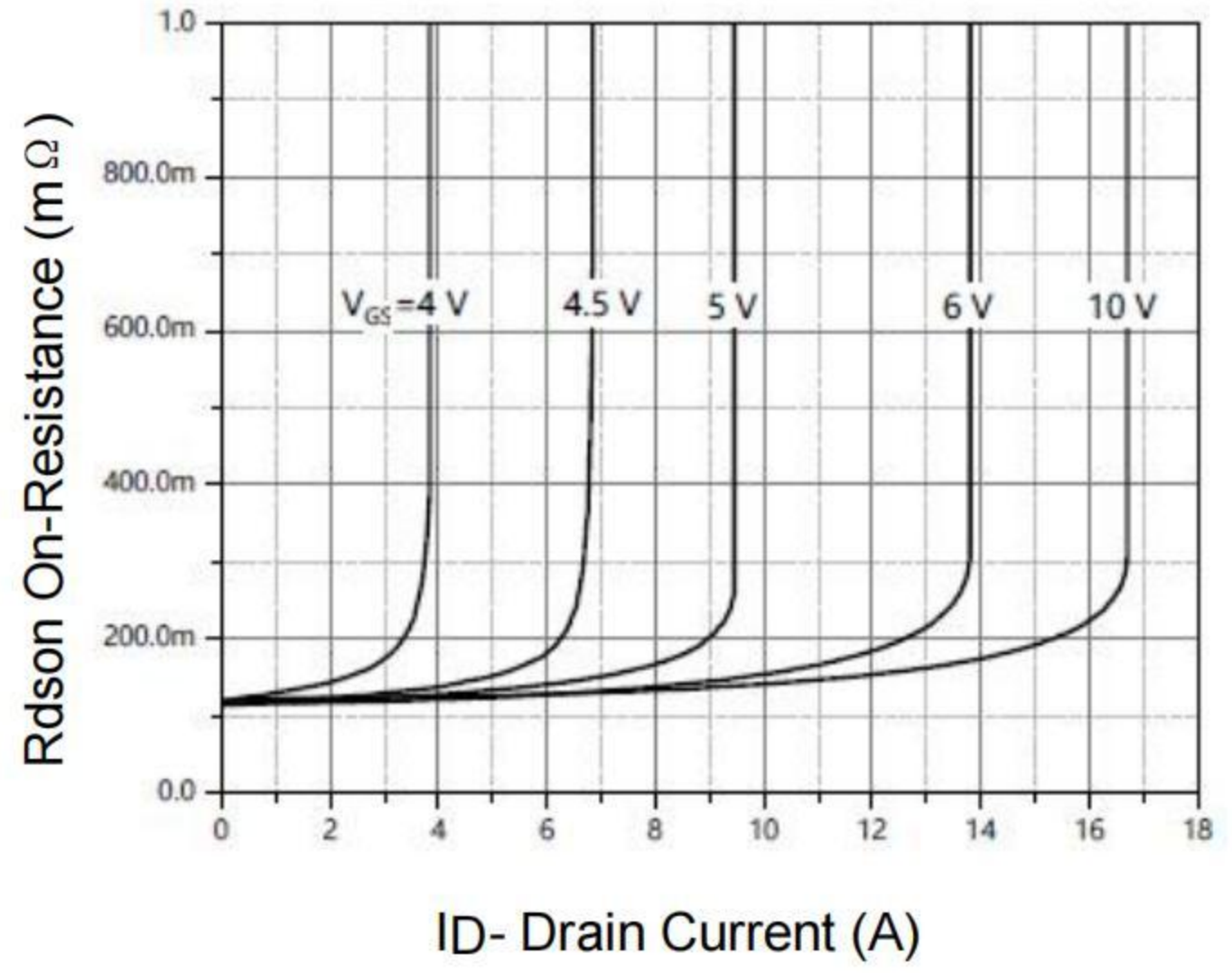


Figure 6 Drain-Source On-Resistance

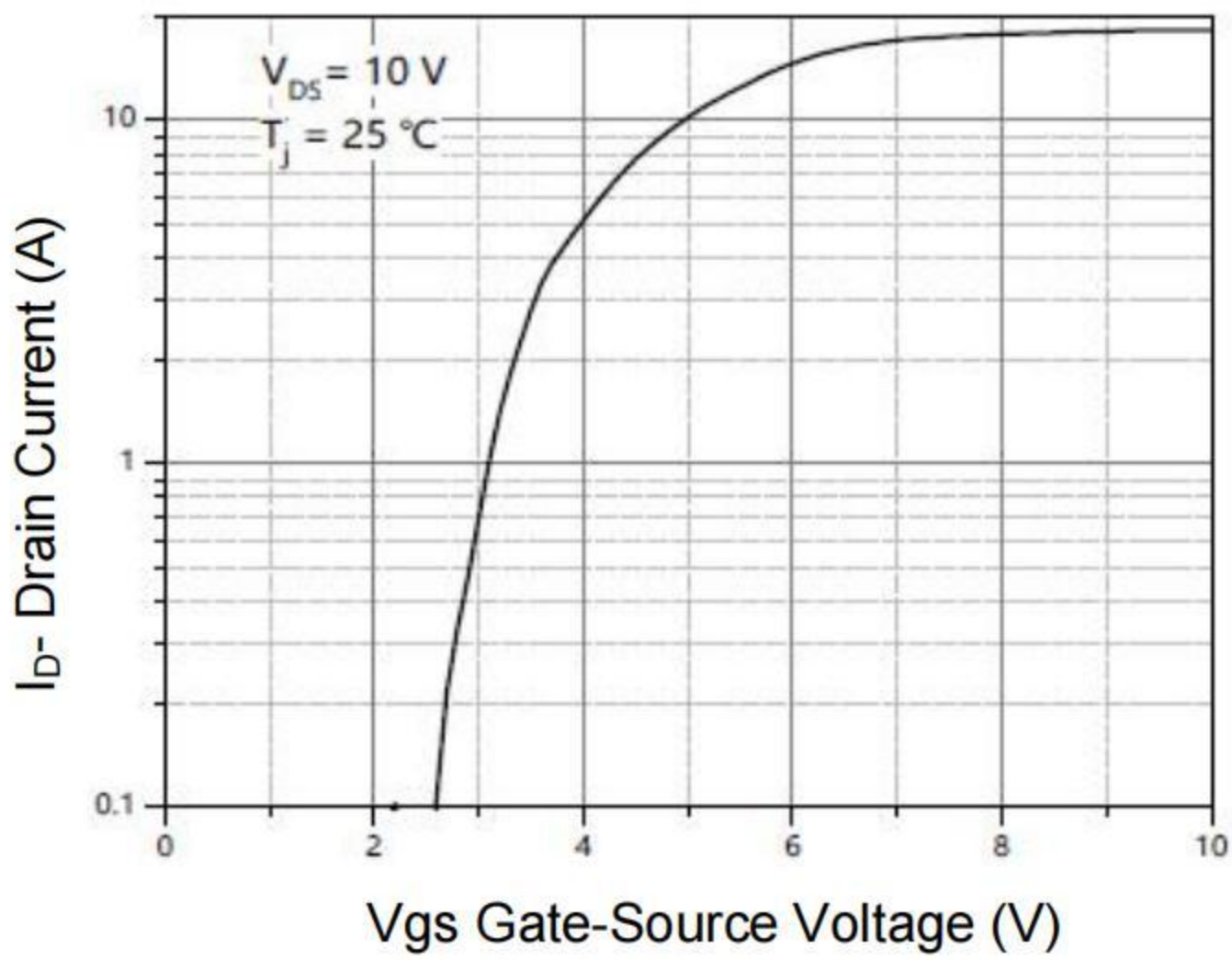


Figure 7 Transfer Characteristics

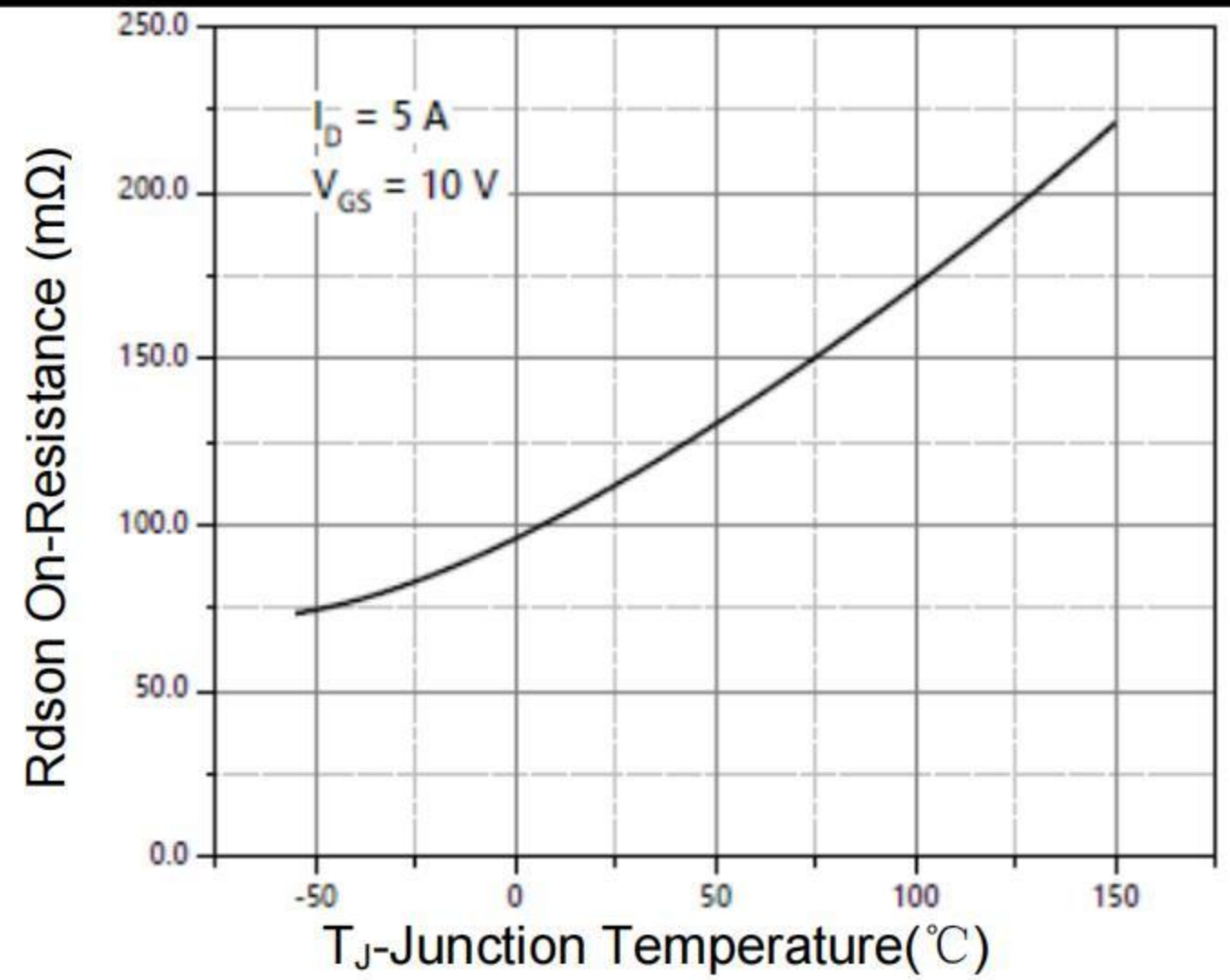


Figure 8 Drain-Source On-Resistance

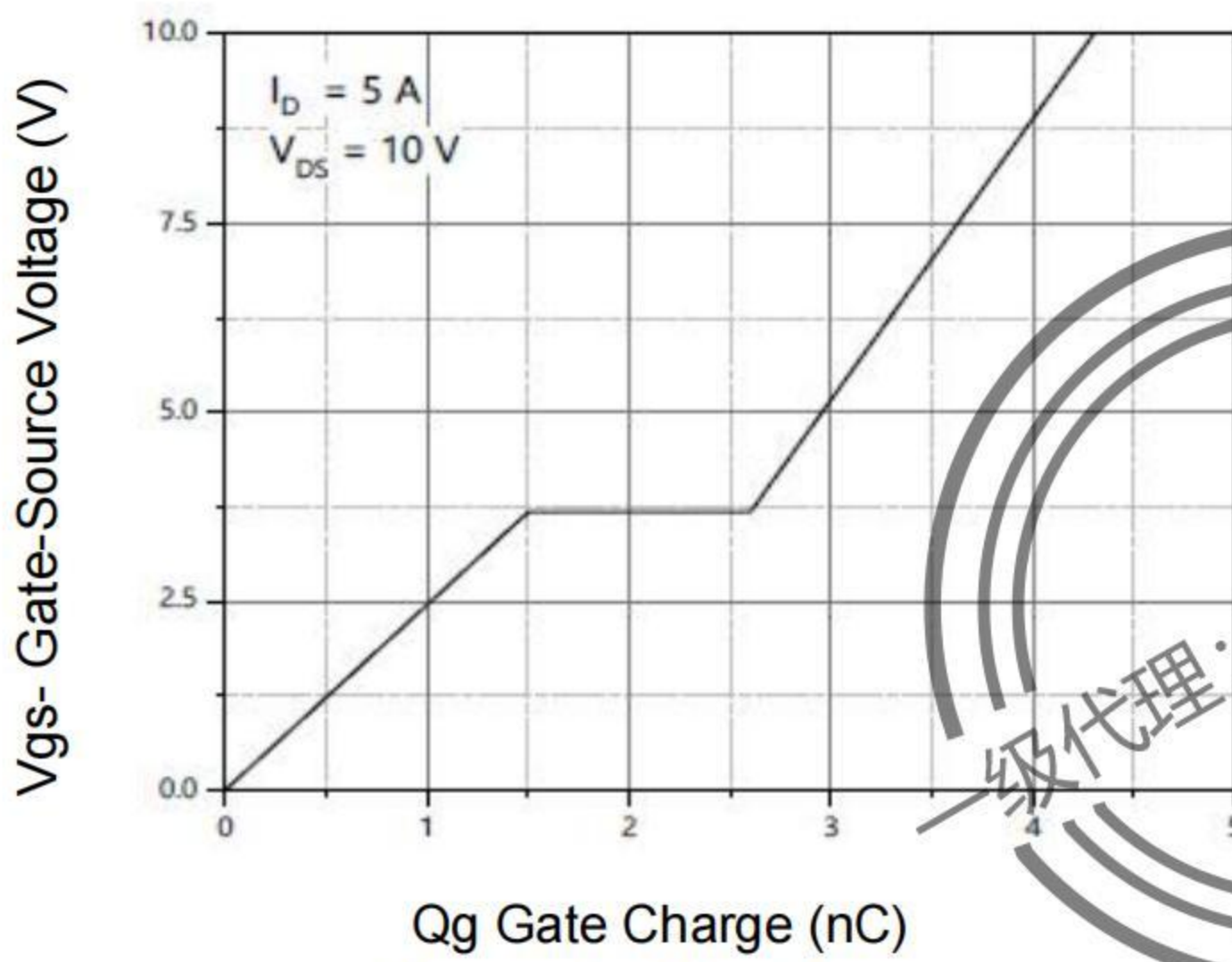


Figure 9 Gate Charge

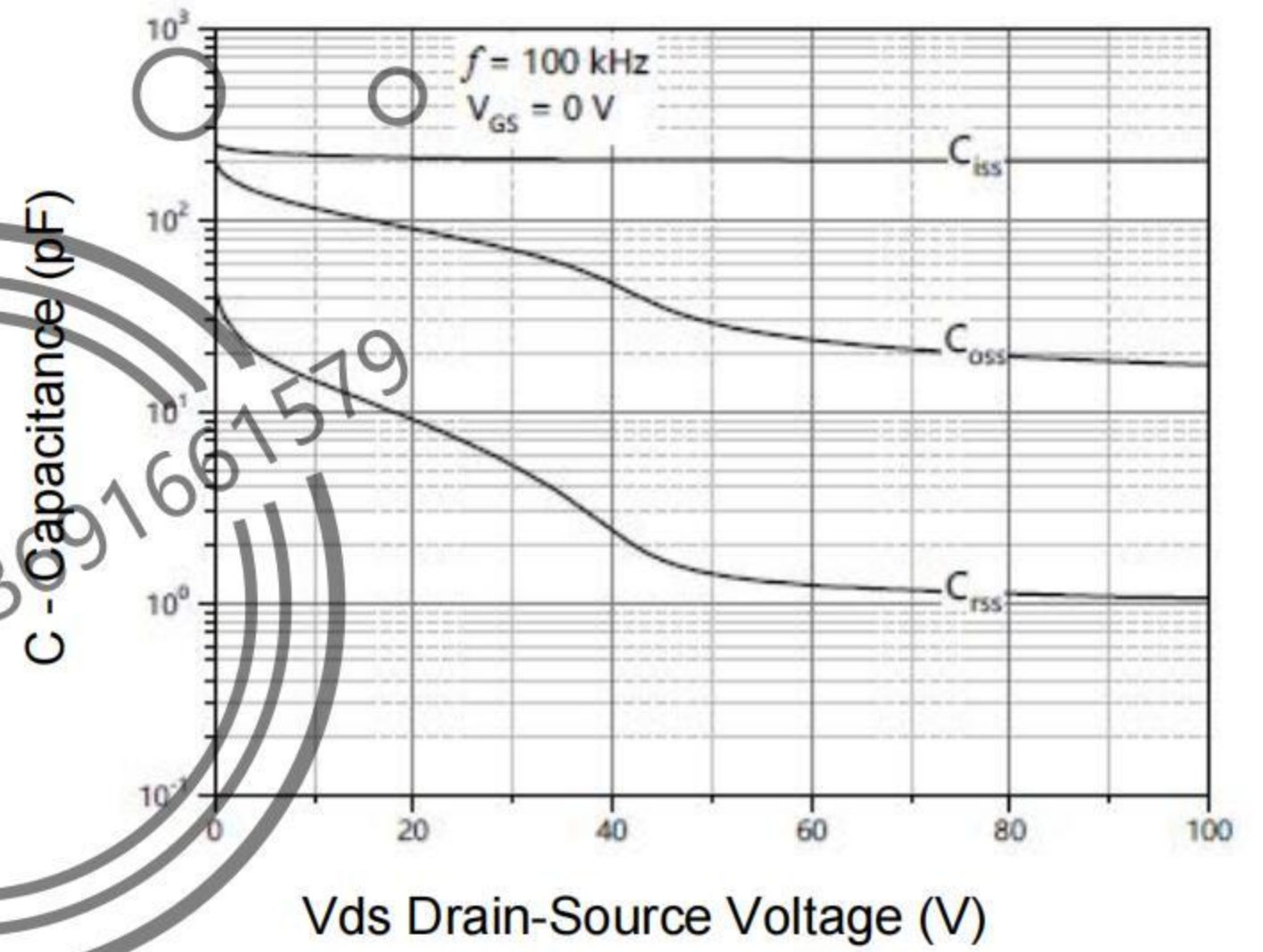


Figure 10 Capacitance vs Vds

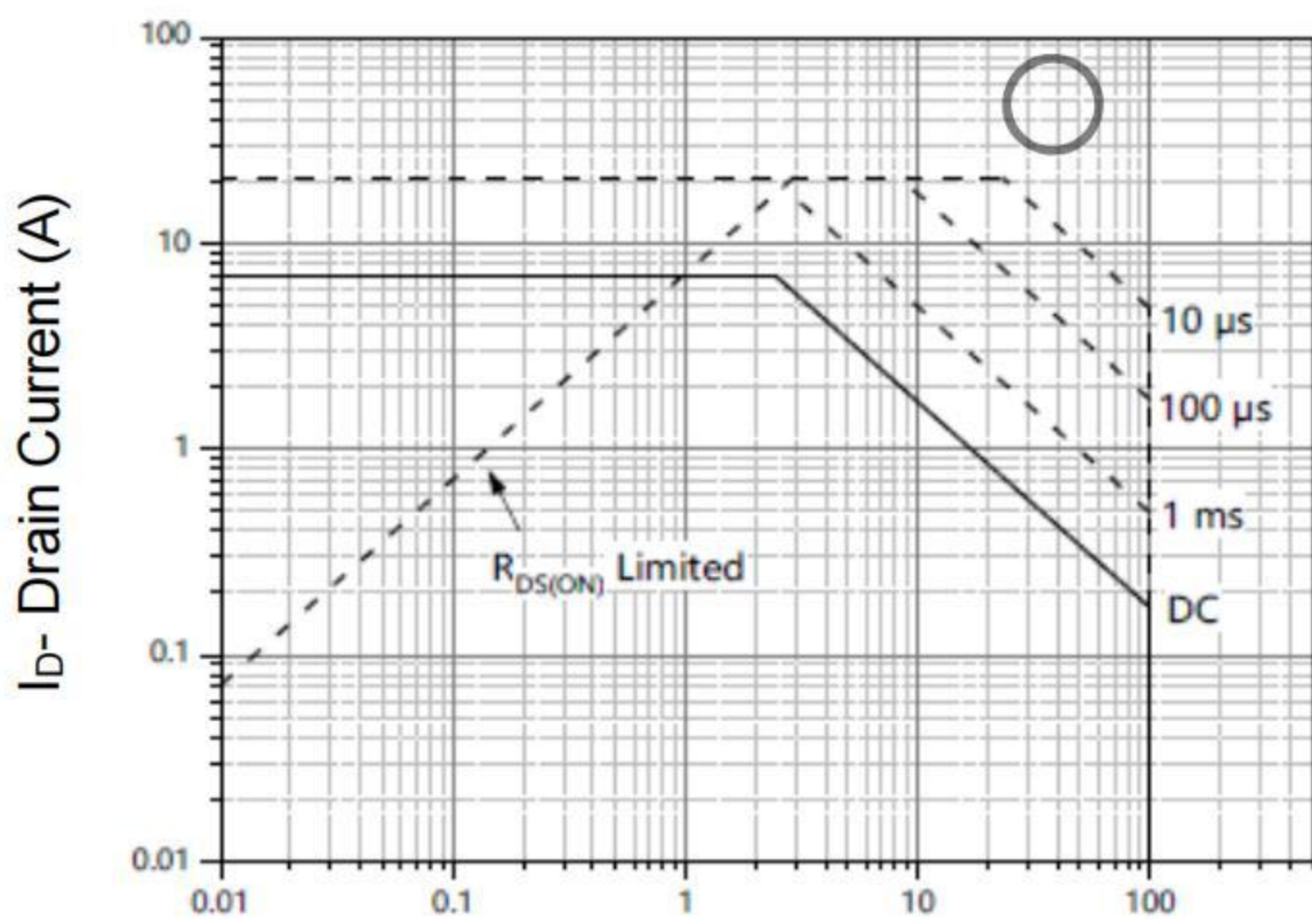


Figure 11 Safe Operation Area

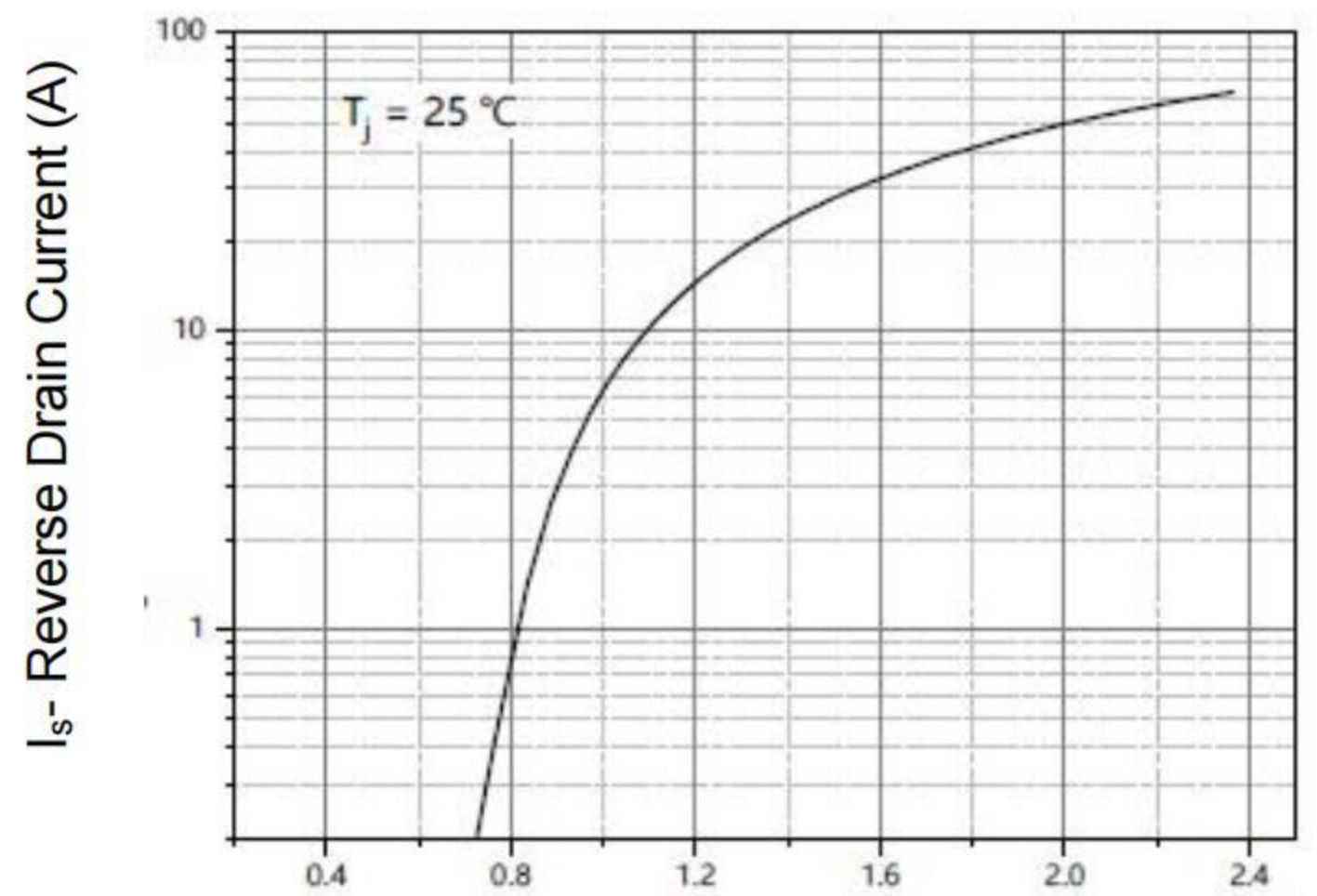
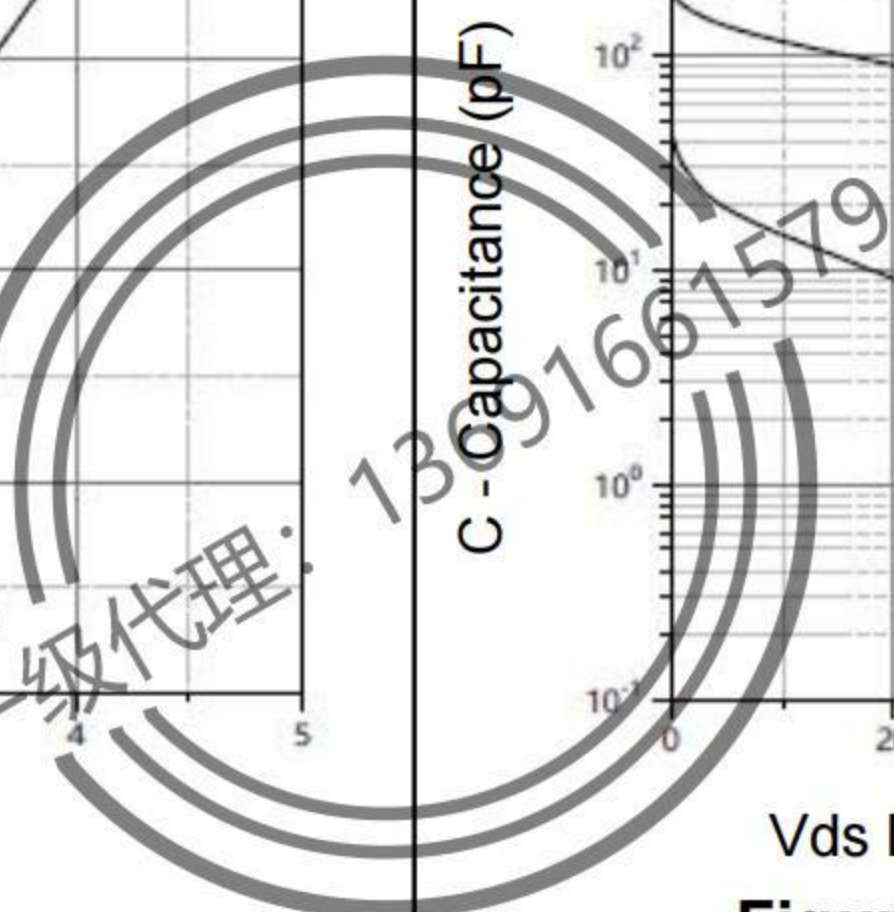


Figure 12 Source- Drain Diode Forward



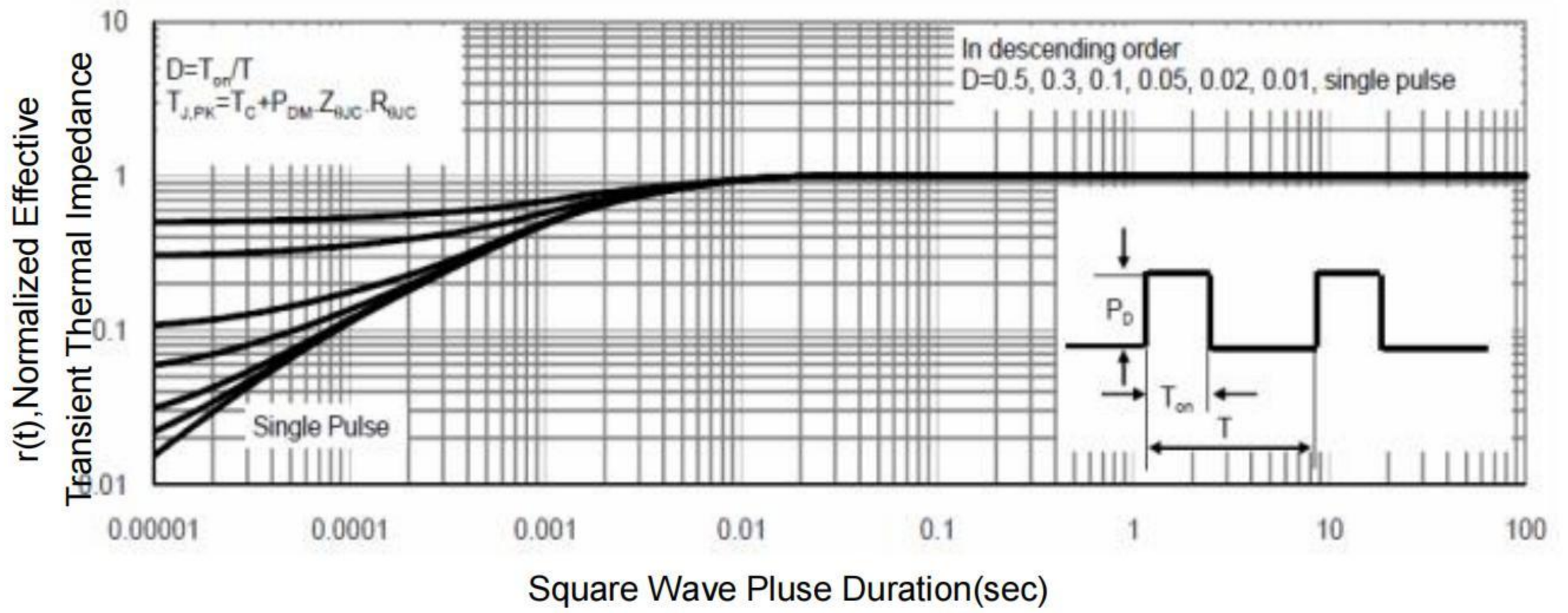
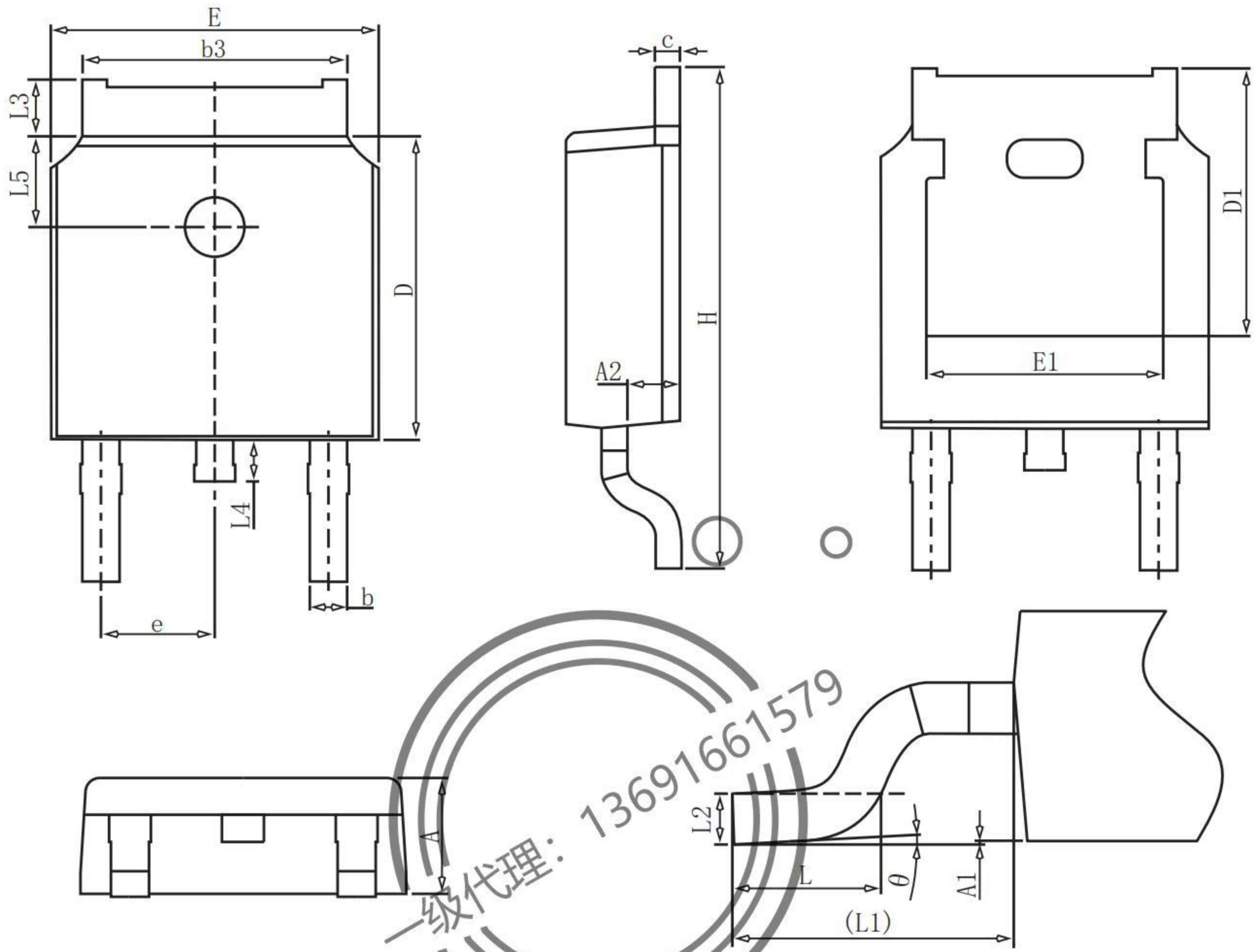


Figure 13 Normalized Maximum Transient Thermal Impedance



Package information



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.00	-	0.20
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.50
c	0.43	0.53	0.63
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	-	-
e	2.286BSC		
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1	2.90REF		
L2	0.51BSC		
L3	0.88	-	1.28
L4	0.50	-	1.00
L5	1.65	1.80	1.95
θ	0°	-	8°