

## Product Summary

- $V_{DS} = -20V, I_D = -6A$   
 $R_{DS(ON)} < 28m\Omega(max) @ V_{GS} = -2.5V$   
 $R_{DS(ON)} < 20m\Omega(max) @ V_{GS} = -4.5V$

## Application

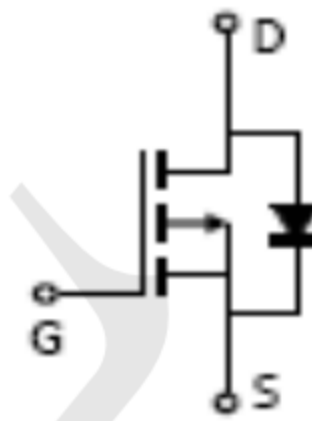
- Load/Power Switching
- Interfacing Switching
- Logic Level Shift

## Package and Pin Configuration

SOT-23



## Circuit diagram



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current -Continuous	$I_D$	-6	A
Drain Current -Pulsed <sup>(Note 1)</sup>	$I_{DM}$	-24	A
Maximum Power Dissipation	$P_D$	1.8	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	°C

## Thermal Characteristic

Thermal Resistance, Junction-to-Ambient <sup>(Note 2)</sup>	$R_{\theta JA}$	69	°C/W
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**Electrical Characteristics (TA=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-12V, V_{GS}=0V$	-	-	-1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.55	-1.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-6A$	-	18	20	m $\Omega$
		$V_{GS}=-2.5V, I_D=-5A$	-	22	28	
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-6A$	-	20	-	S
<b>Dynamic Characteristics (Note 4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-6V, V_{GS}=0V,$ $F=1.0MHz$	-	1730	-	PF
Output Capacitance	$C_{oss}$		-	320	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	210	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-6V, I_D=-1A,$ $R_L=6\Omega, V_{GEN}=-4.5V, R_g=6\Omega$	-	20	-	nS
Turn-on Rise Time	$t_r$		-	35	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	90	-	nS
Turn-Off Fall Time	$t_f$		-	70	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=-6V, I_D=-6A, V_{GS}=-4.5V$	-	19.5	-	nC
Gate-Source Charge	$Q_{gs}$		-	4.1	-	nC
Gate-Drain Charge	$Q_{gd}$		-	5.2	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=-1.0A$	-	-	-1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	-6	A



Typical Electrical and Thermal Characteristics

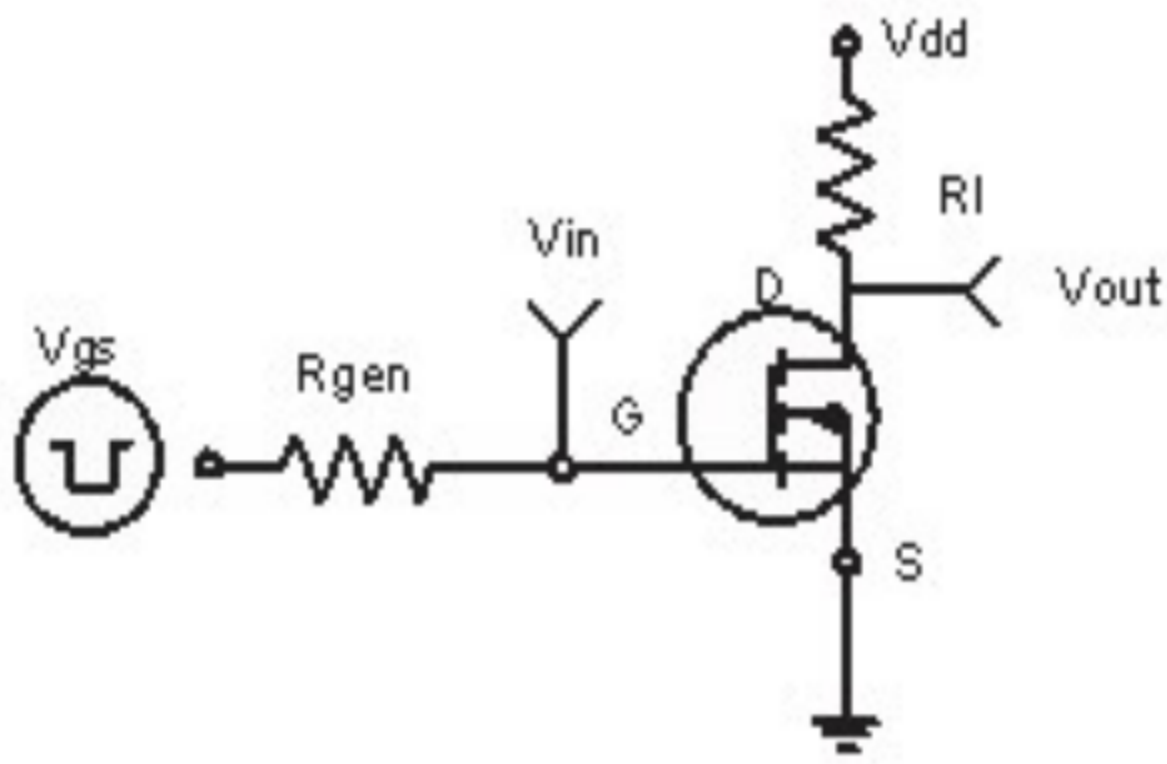


Figure 1: Switching Test Circuit

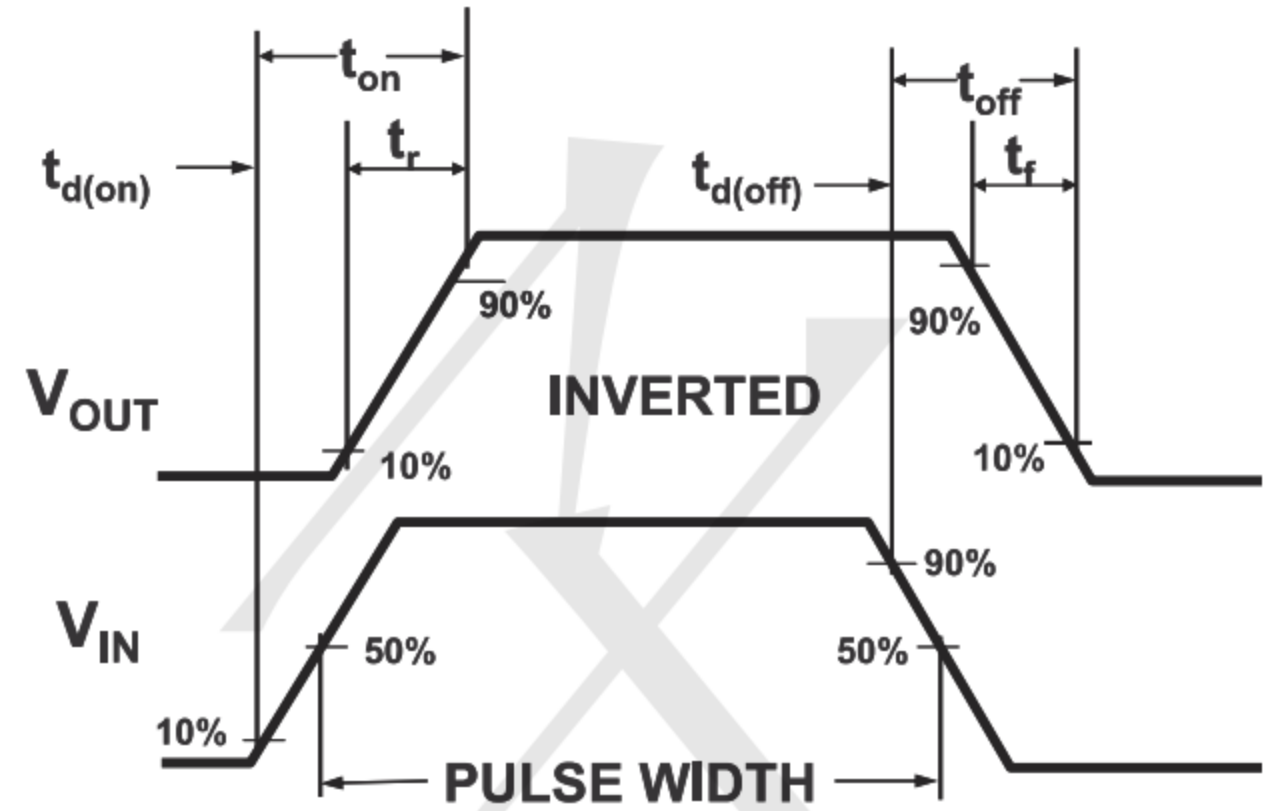
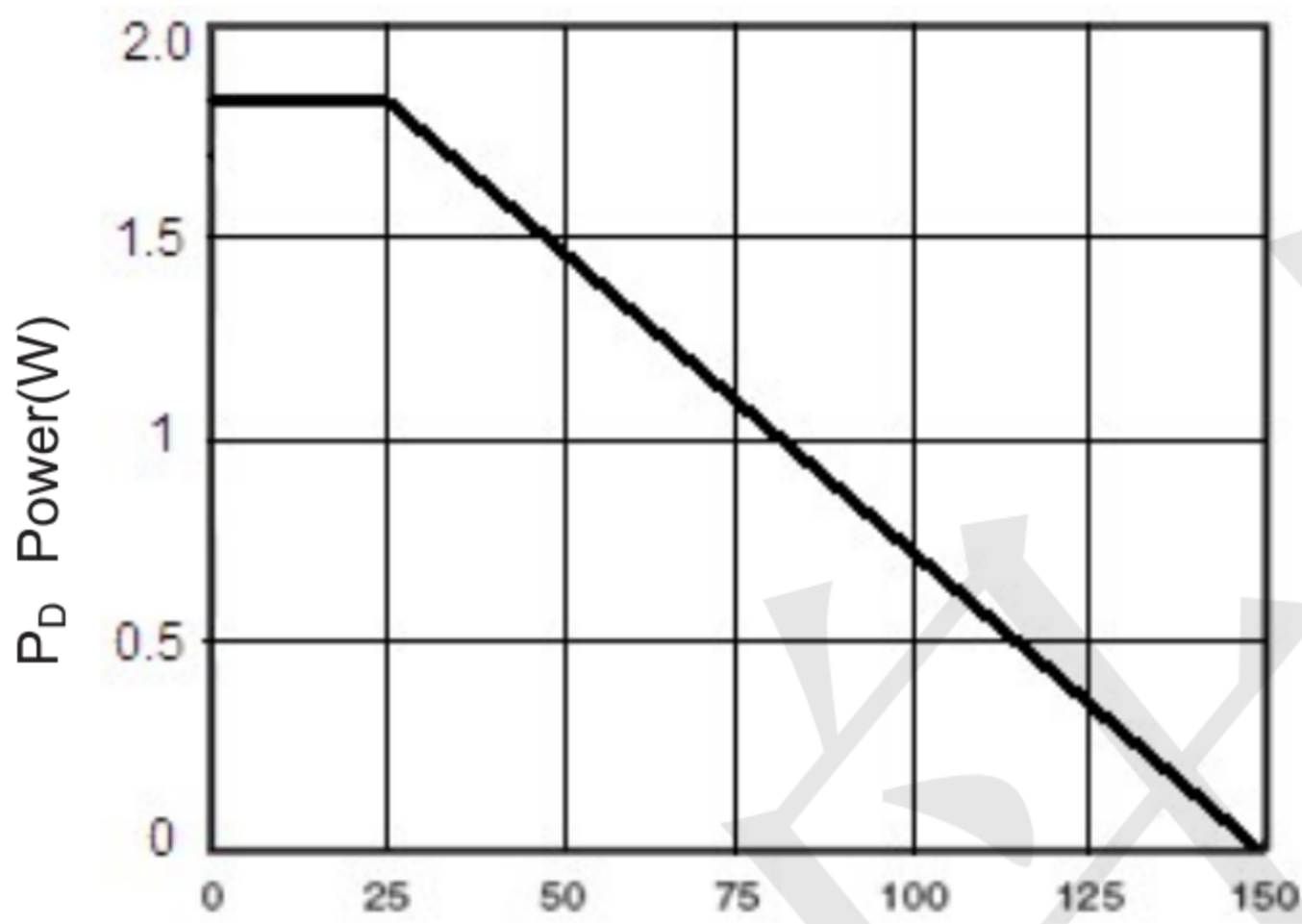
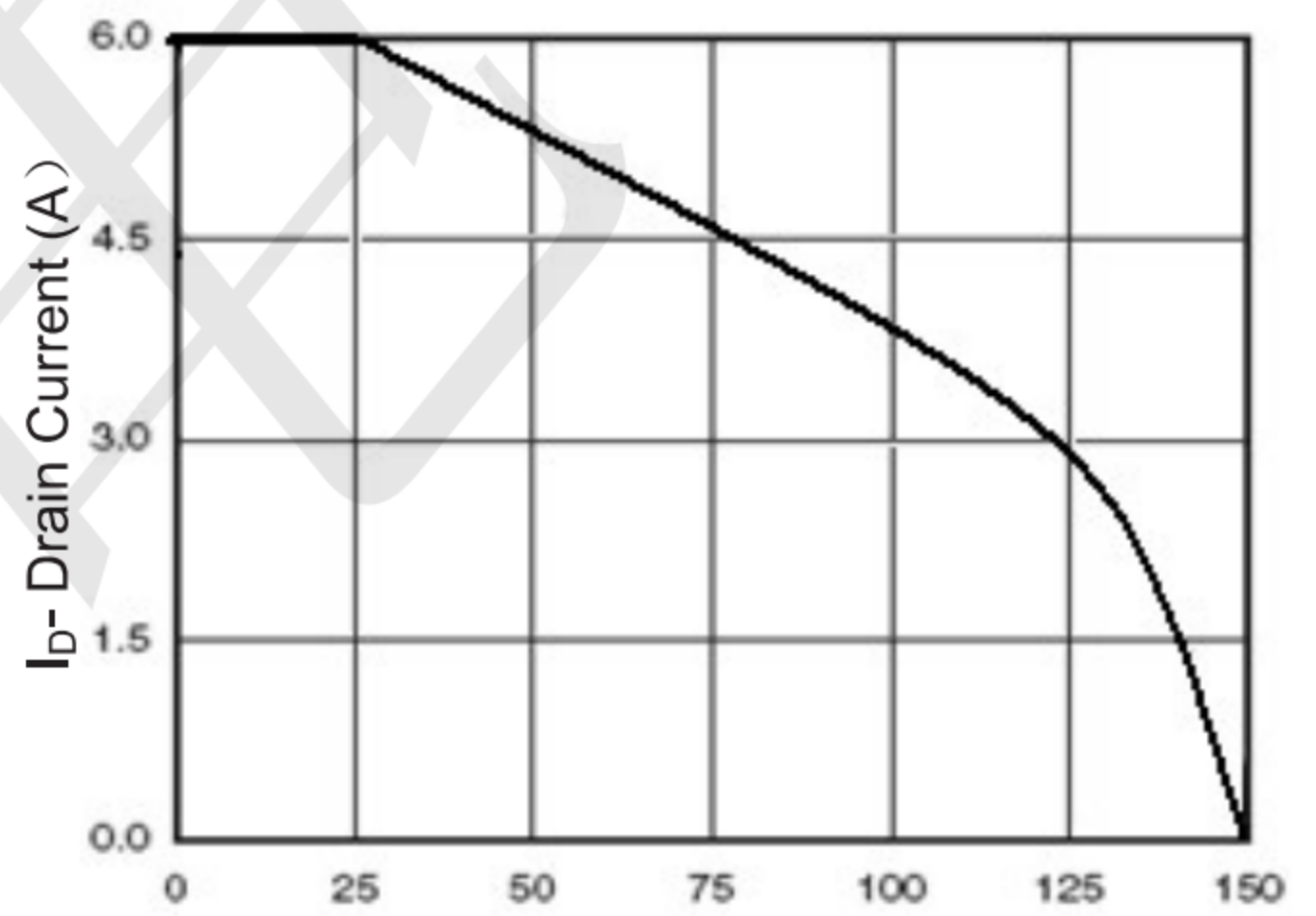


Figure 2: Switching Waveforms



T<sub>J</sub>-Junction Temperature(°C)

Figure 3 Power Dissipation



T<sub>J</sub>-Junction Temperature(°C)

Figure 4 Drain Current

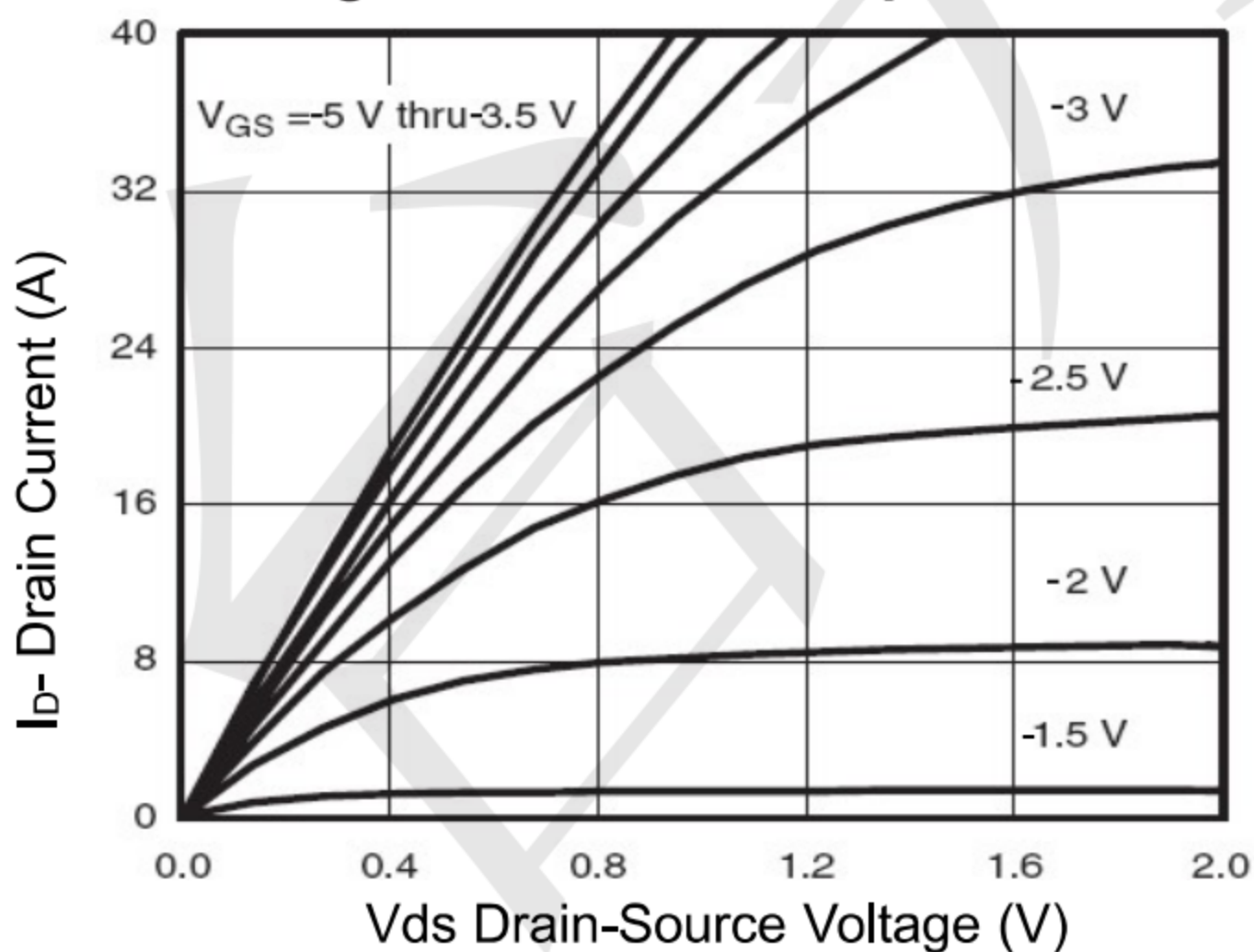


Figure 5 Output Characteristics

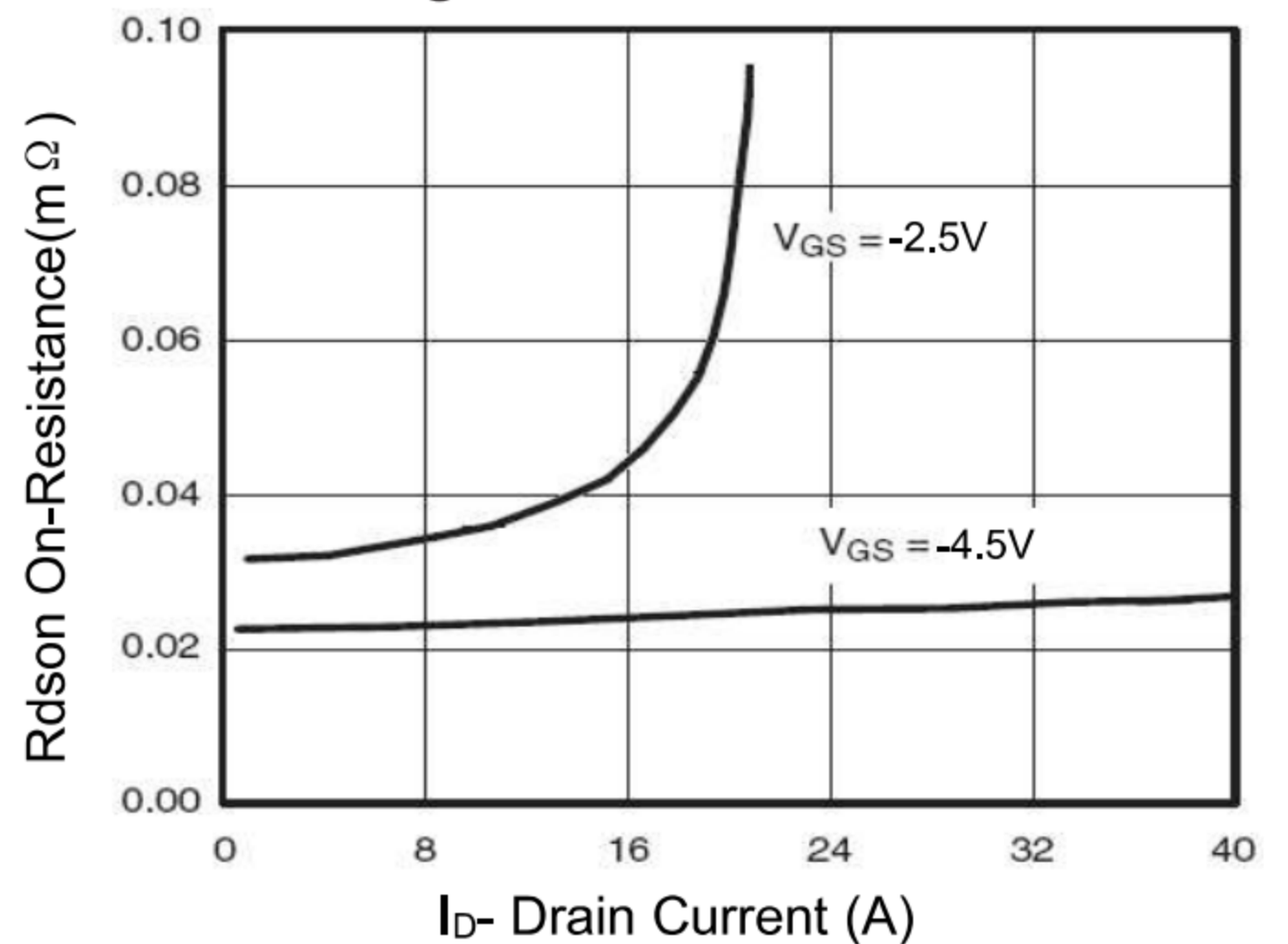


Figure 6 Drain-Source On-Resistance

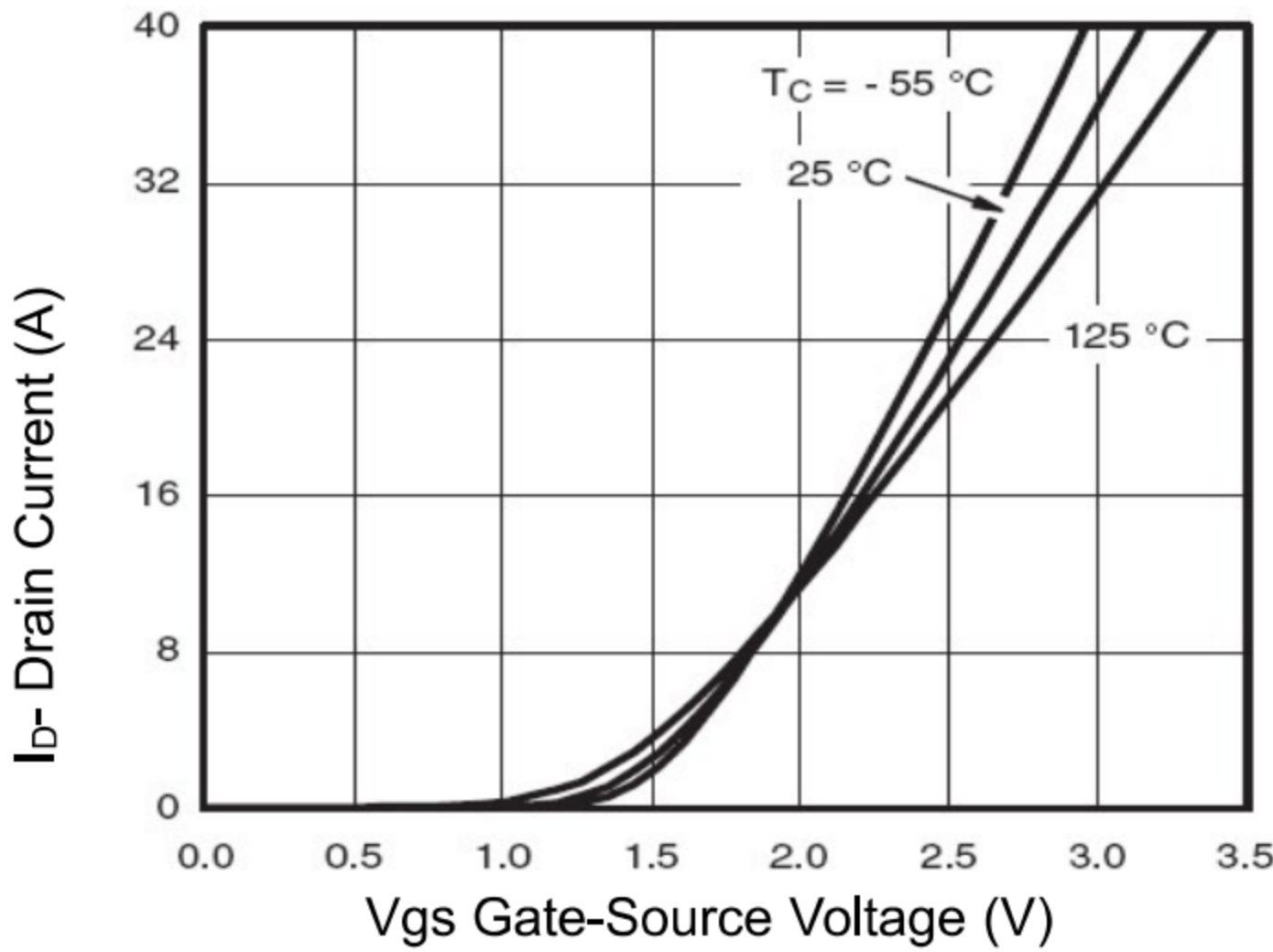


Figure 7 Transfer Characteristics

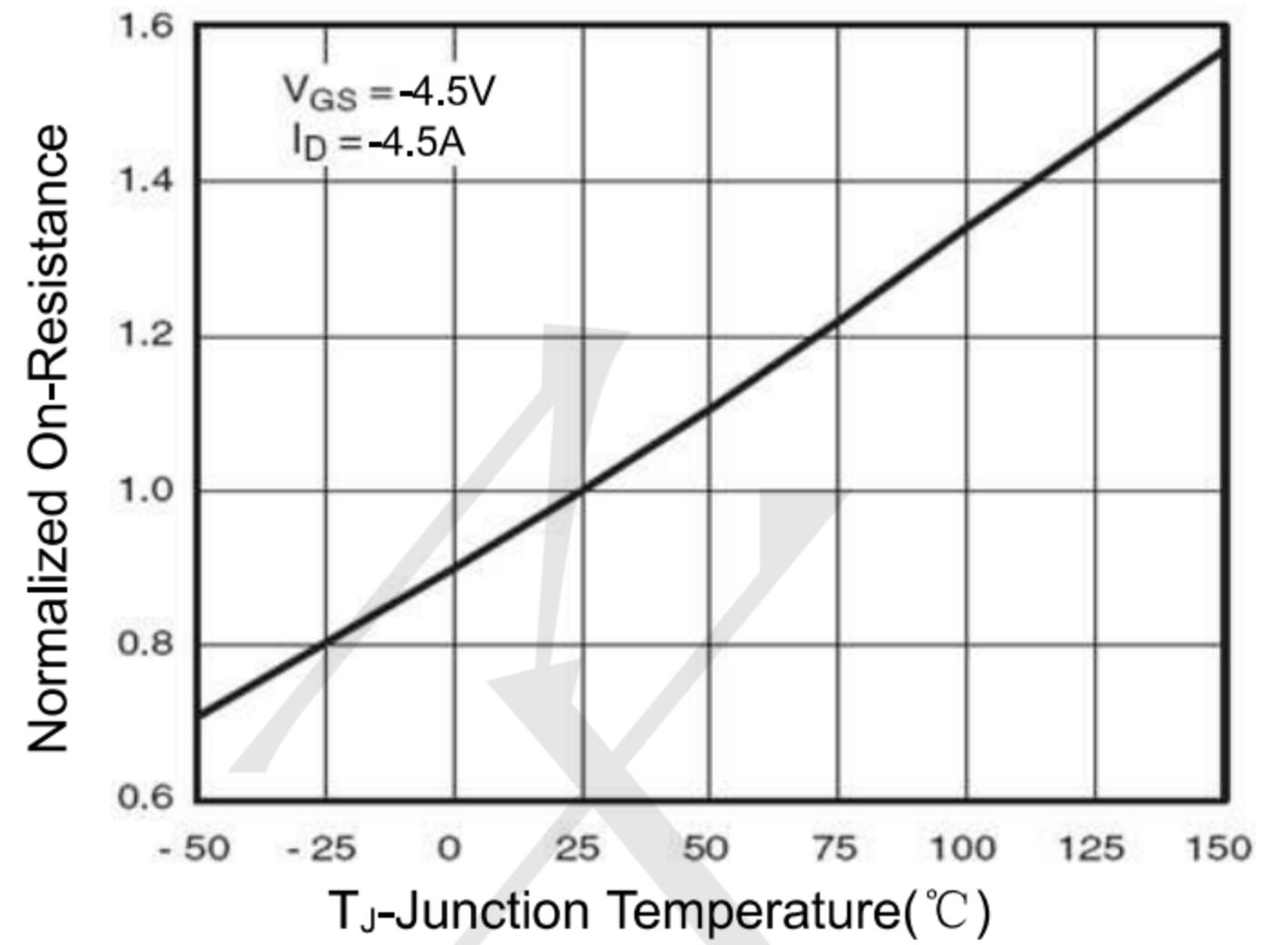


Figure 8 Drain-Source On-Resistance

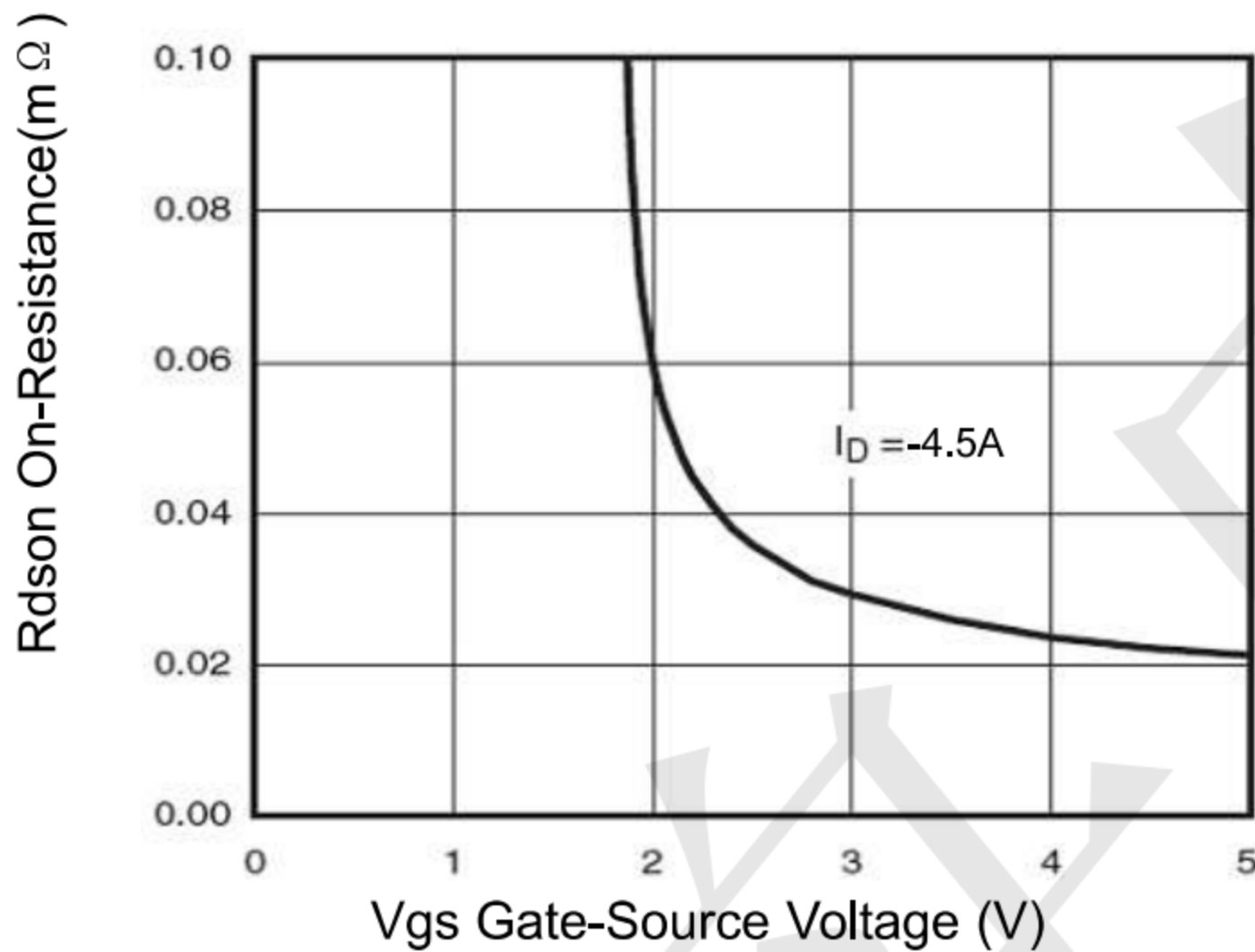


Figure 9 Rdson vs VGS

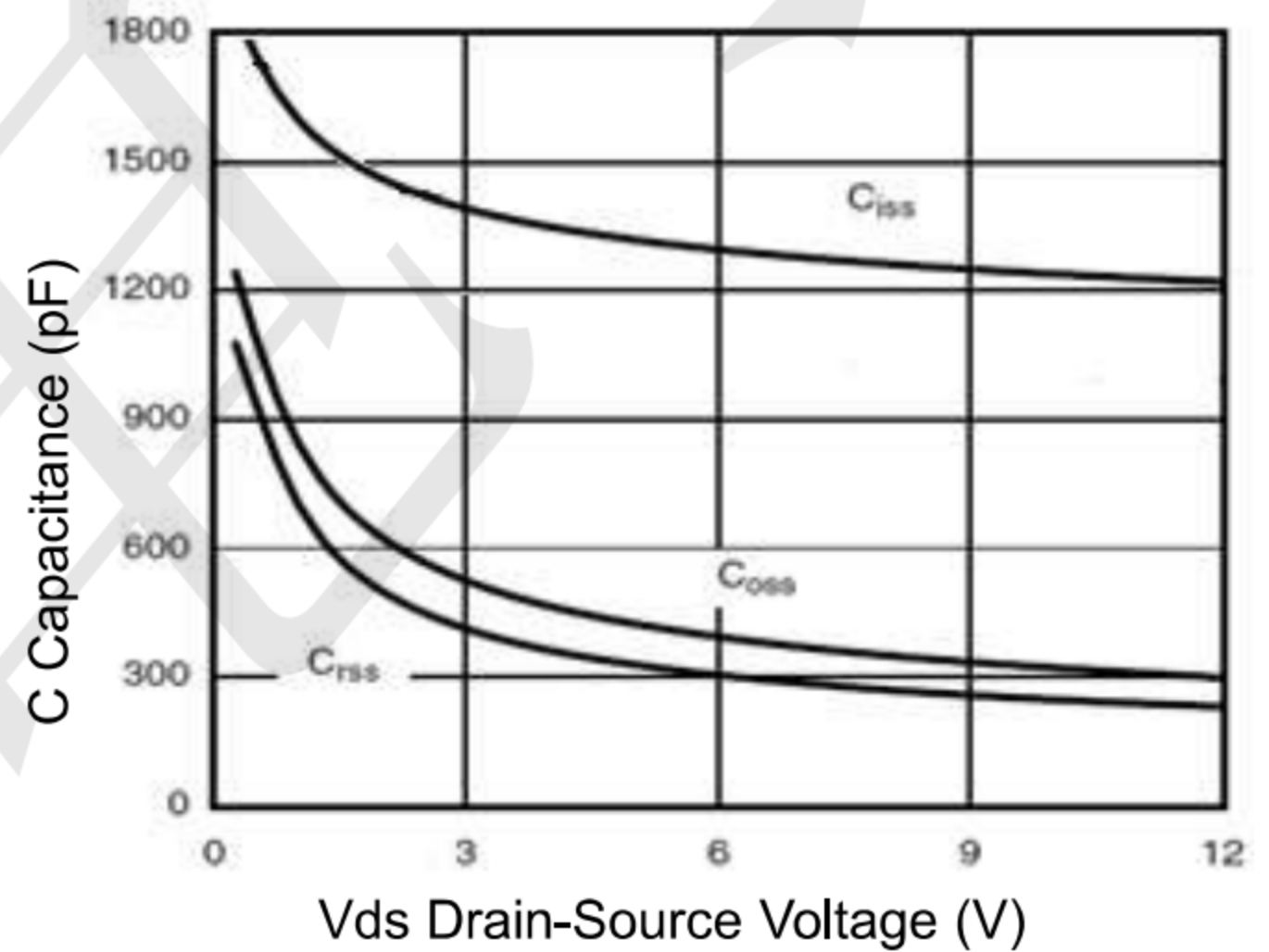


Figure 10 Capacitance vs Vds

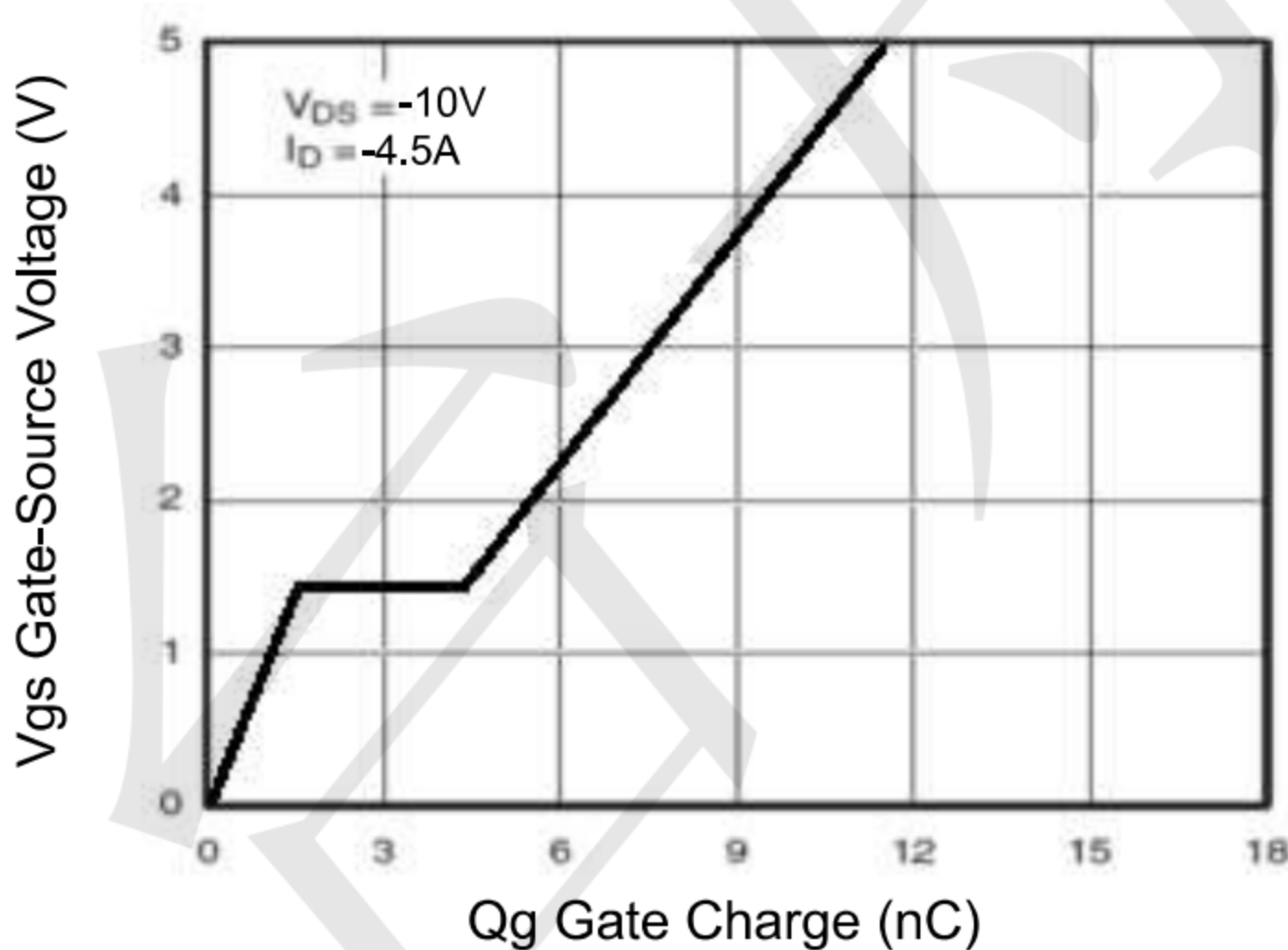


Figure 11 Gate Charge

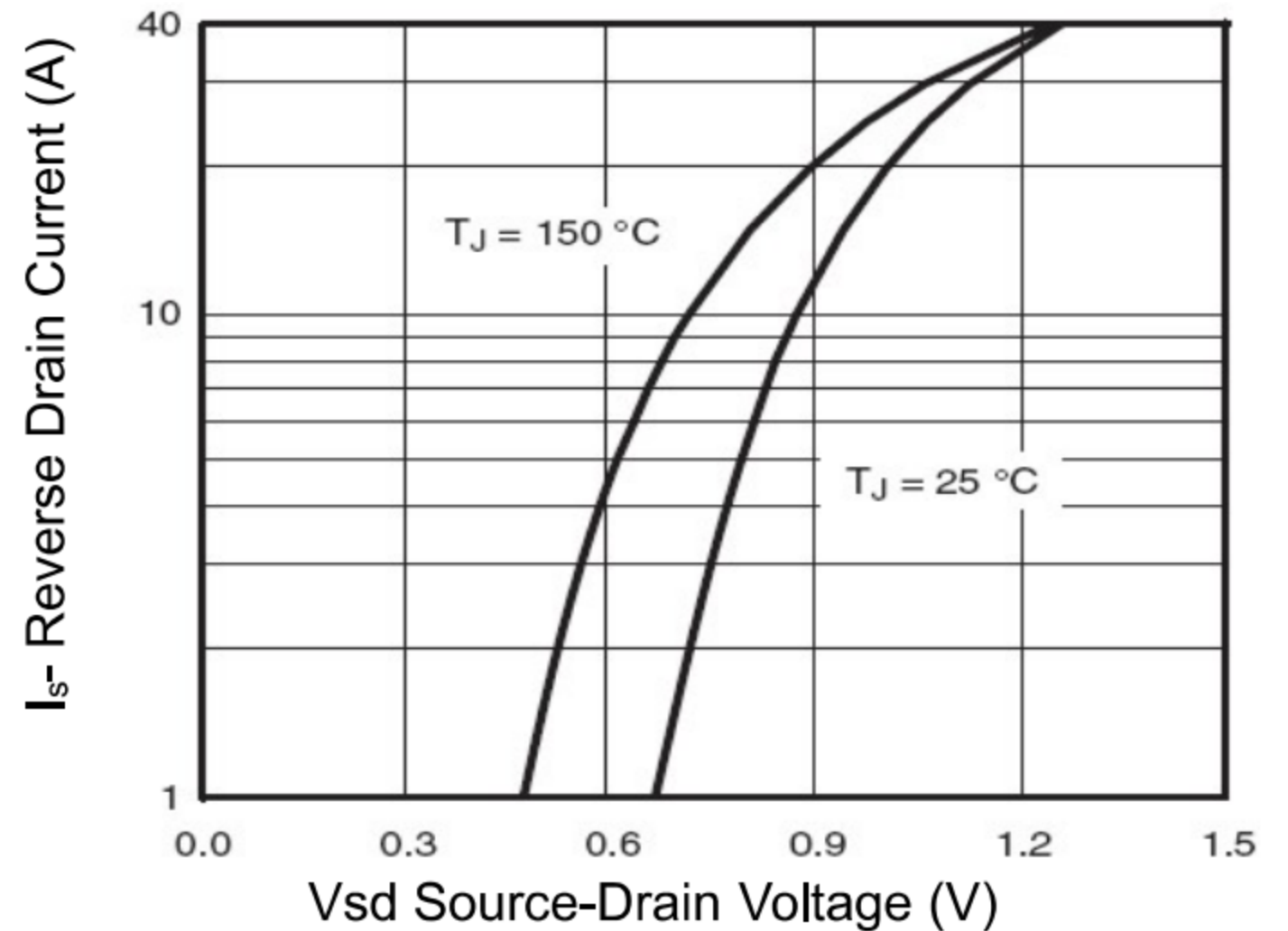


Figure 12 Source- Drain Diode Forward

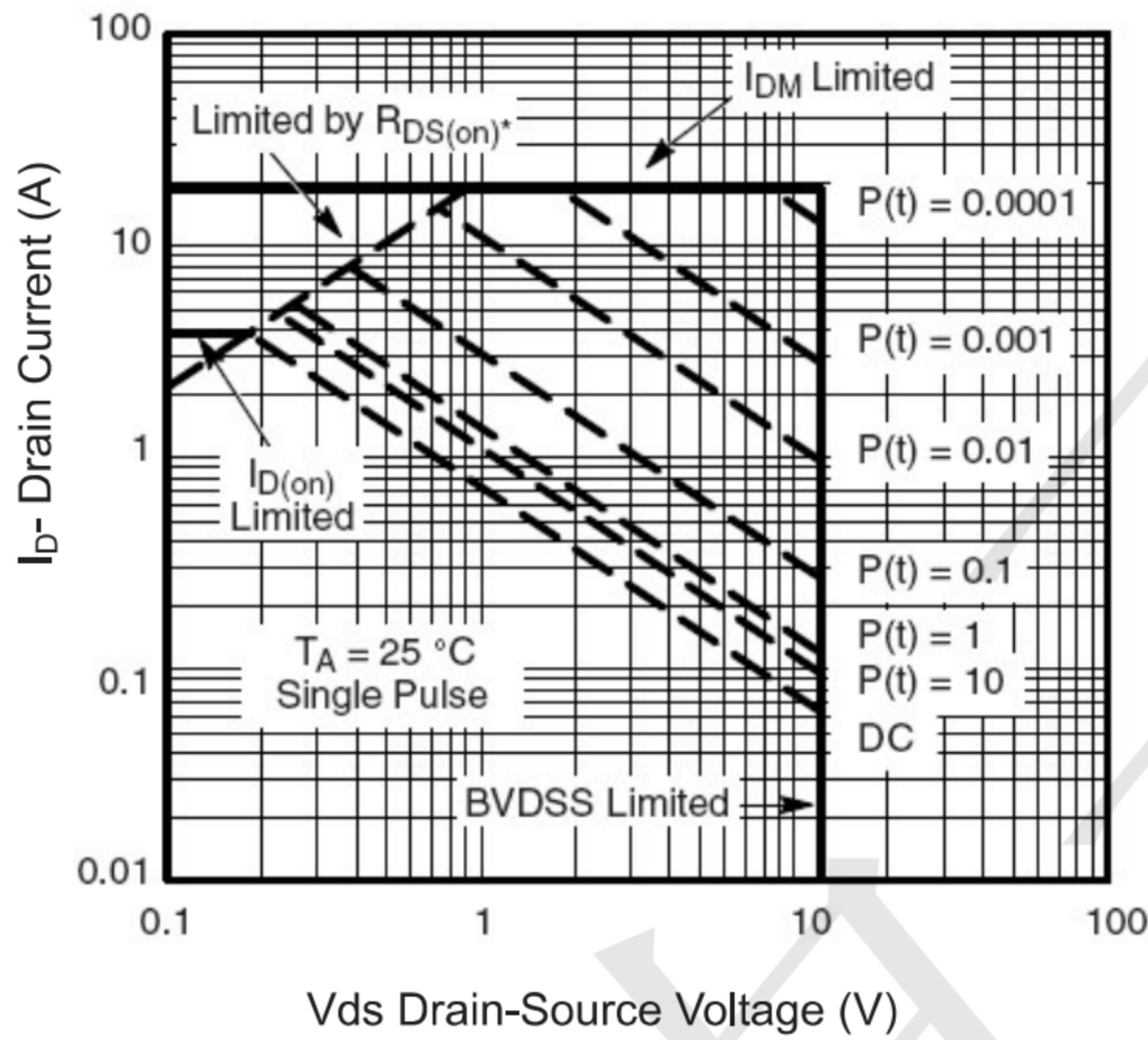


Figure 13 Safe Operation Area

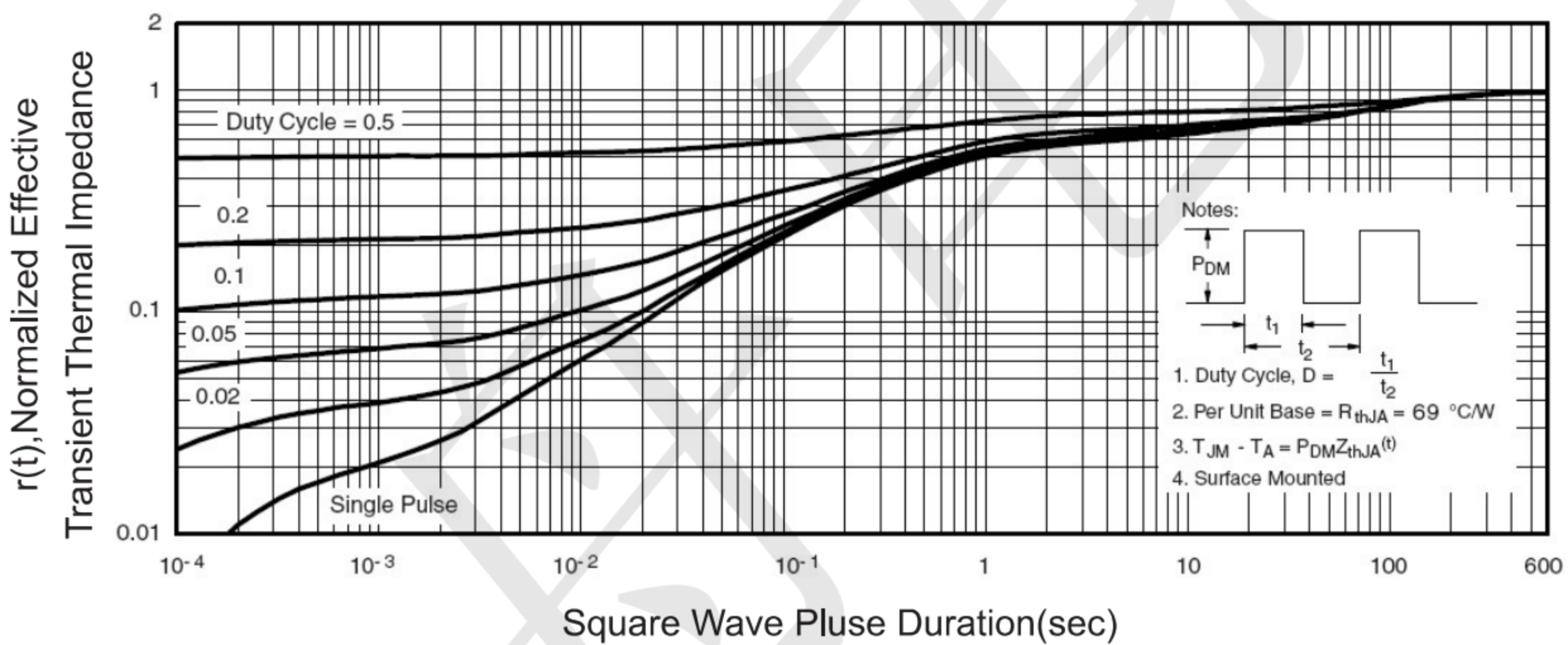


Figure 14 Normalized Maximum Transient Thermal Impedance



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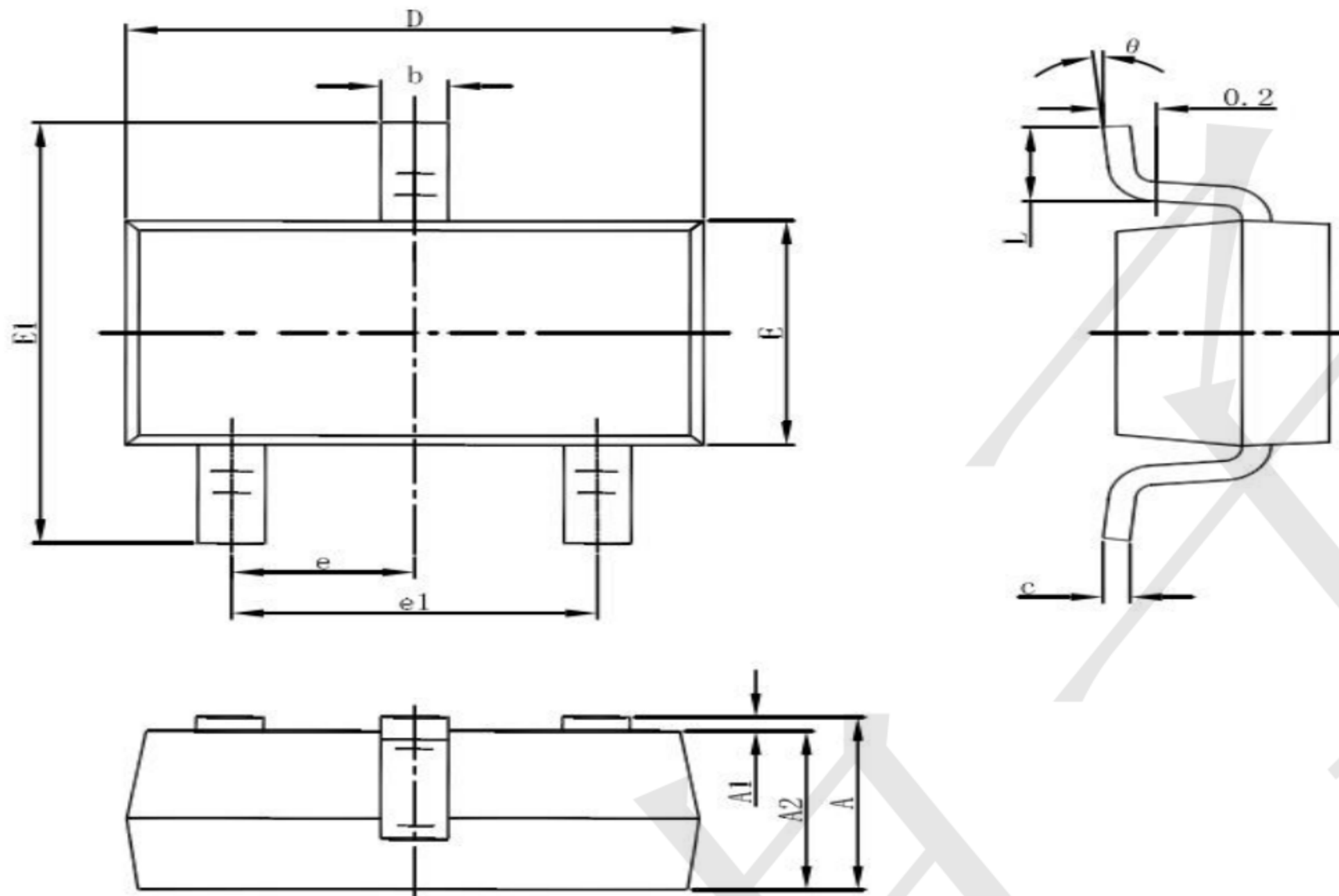
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# SI2333CDS

20V P-Channel Enhancement Mode MOSFET

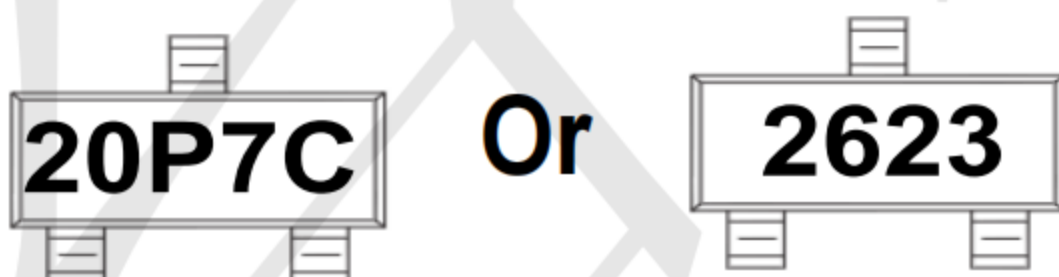
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### 3-pin SOT23-3 Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
theta	0°	8°	0°	8°

### Marking:



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