

## N-Channel Enhancement Mode MOSFET

### GENERAL DESCRIPTION

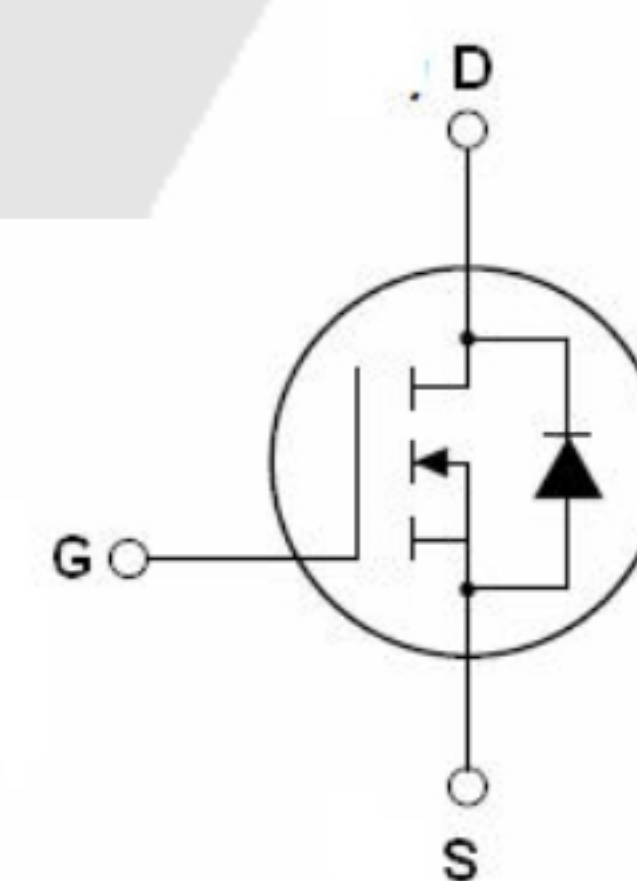
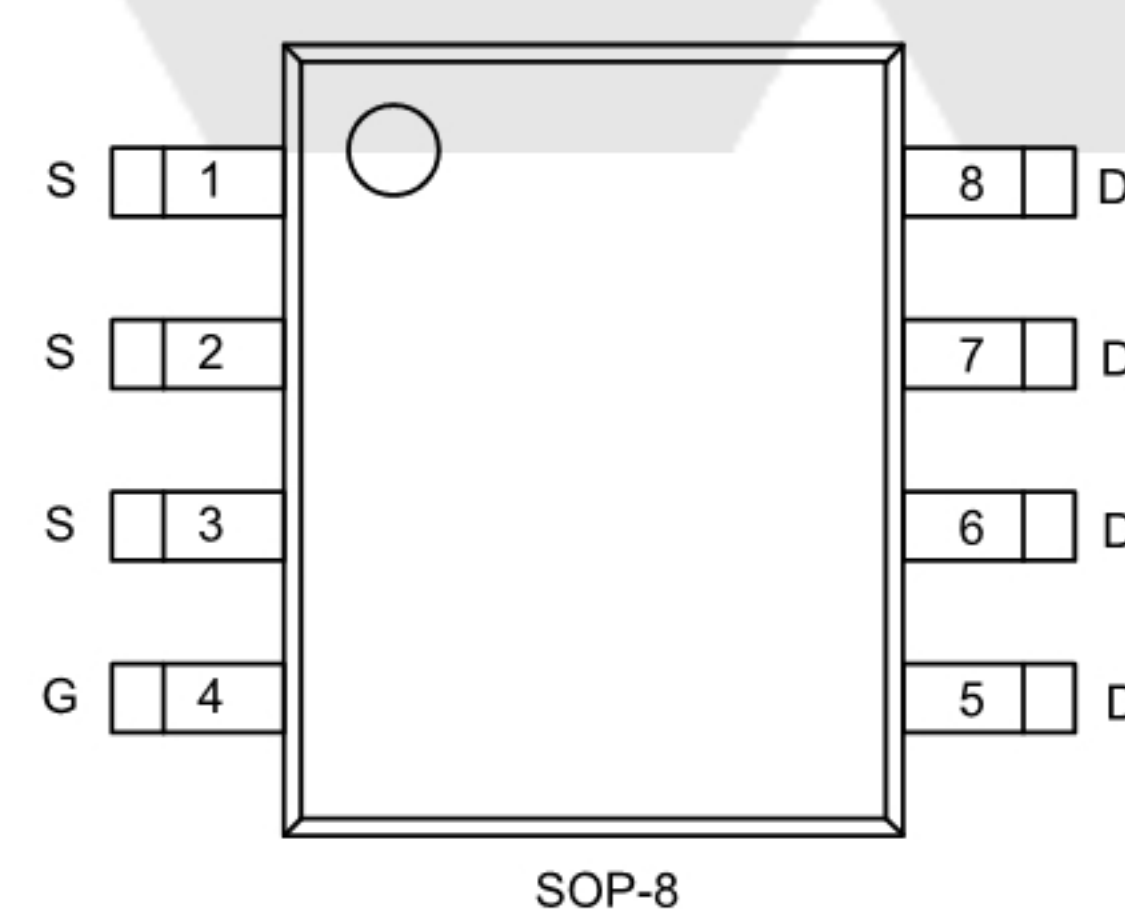
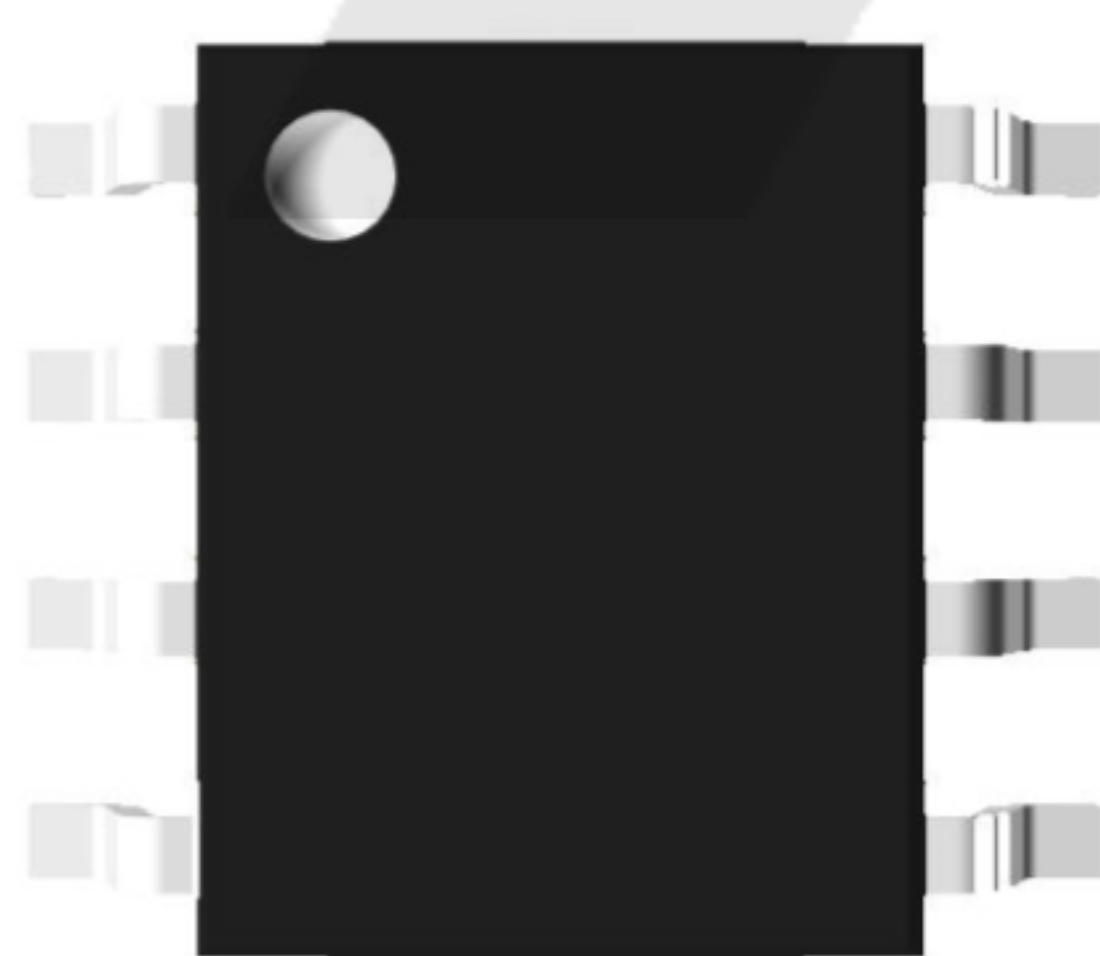
The PW4406 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications

### FEATURES

$V_{DS} = 30V$   $I_D = 18A$

$R_{DS(ON)} < 7m\Omega$  @  $V_{GS}=10V$

Available in a 8-Pin SOP Package



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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	18	A
Pulsed Drain Current	$I_{DM}$	72	A
Total Power Dissipation	PD	3	W
Storage Temperature Range	$T_{STG}$	-55 To 150	$^\circ C$
Operating Junction Temperature Range	$T_J$	-55 To 150	$^\circ C$
Thermal Resistance Junction-ambient <sup>NOTE2</sup>	$R_{\theta JA}$	42	$^\circ C/W$
Single pulse avalanche energy <sup>NOTE5</sup>	$E_{AS}$	204	mJ



## ELECTRICAL CHARACTERISTICS

(TA = 25°C, unless otherwise noted.)

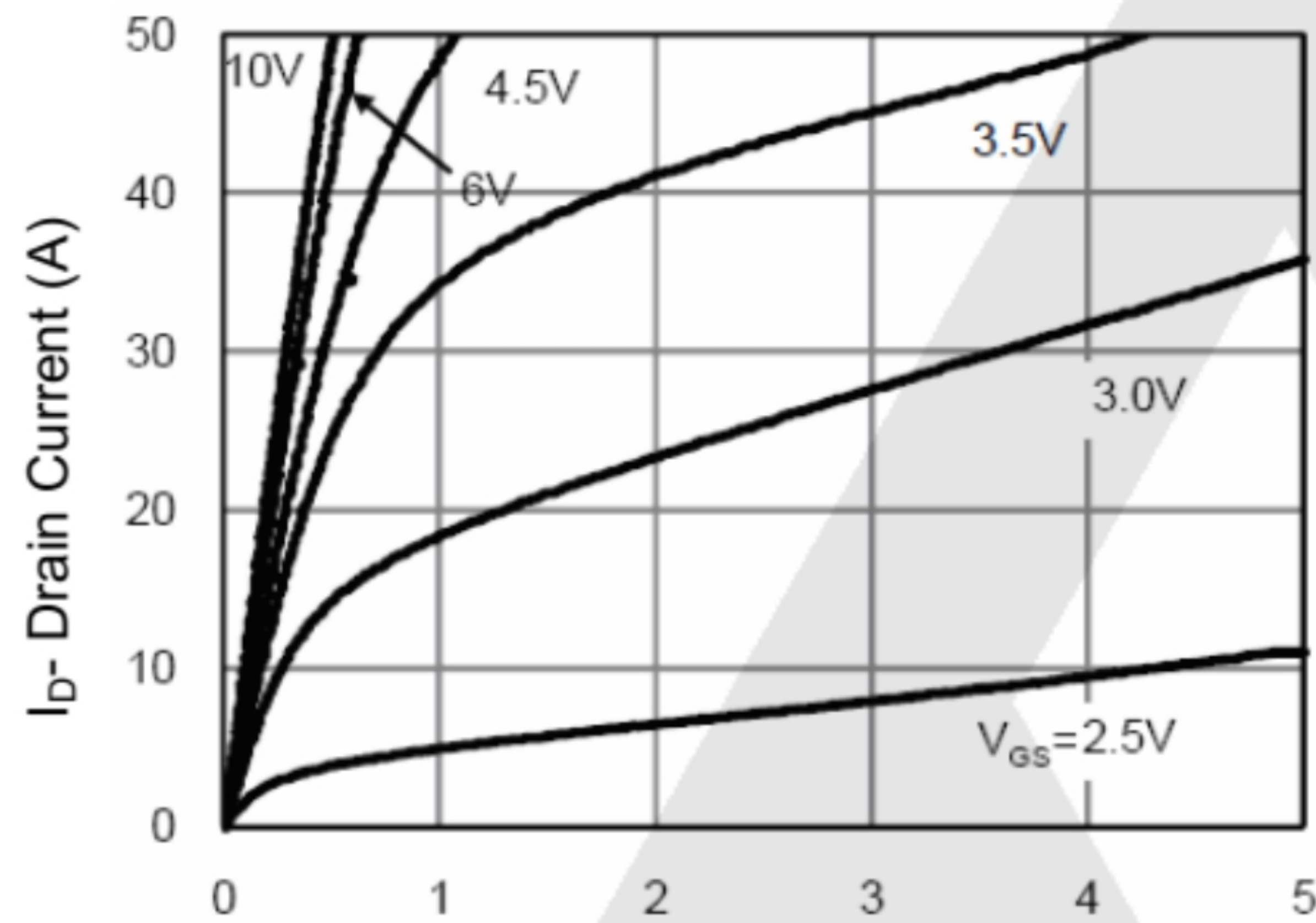
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	30	33		V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V			1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
Gate Threshold Voltage (Note 3)	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.7	1.1	1.4	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =12A		5.5	7	mΩ
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A		6.5	10	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =12A	5			S
Input Capacitance (Note4)	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, F=1.0MHz		2100		PF
Output Capacitance	C <sub>oss</sub>			460		PF
Reverse Transfer Capacitance	C <sub>rss</sub>			230		PF
Turn-on Delay Time (Note 4)	t <sub>d(on)</sub>	V <sub>DD</sub> =10V, I <sub>D</sub> =12A V <sub>GS</sub> =10V, R <sub>GEN</sub> =2.7Ω		20		nS
Turn-on Rise Time	t <sub>r</sub>			15		nS
Turn-Off Delay Time	t <sub>d(off)</sub>			60		nS
Turn-Off Fall Time	t <sub>f</sub>			10		nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =12A, V <sub>GS</sub> =10V		41		nC
Gate-Source Charge	Q <sub>gs</sub>			14		nC
Gate-Drain Charge	Q <sub>gd</sub>			11		nC
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =18A			1.2	V
Diode Forward Current (Note 2)	I <sub>S</sub>				18	A

### Note :

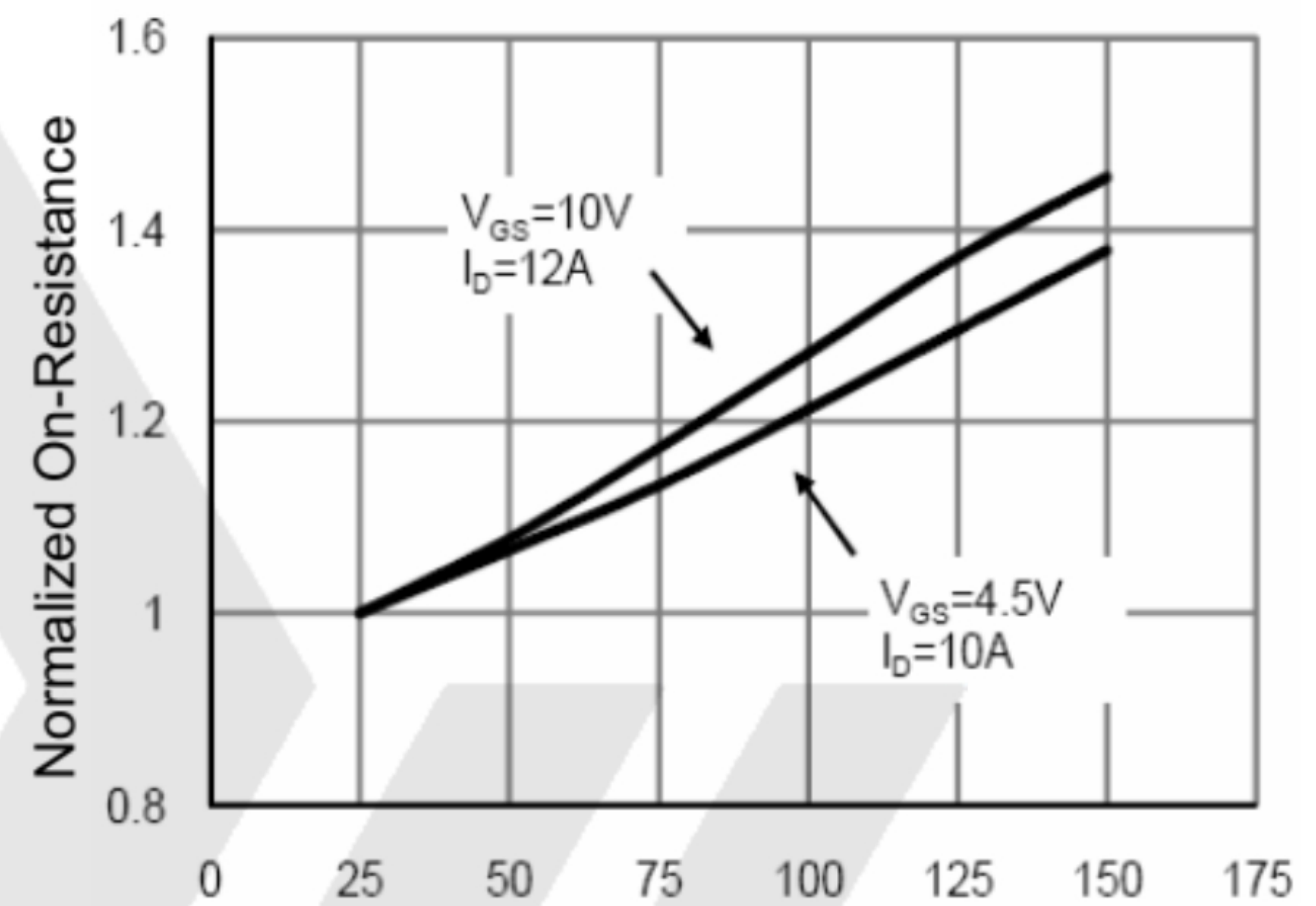
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=15V, V<sub>G</sub>=10V, L=0.5mH, R<sub>g</sub>=25Ω



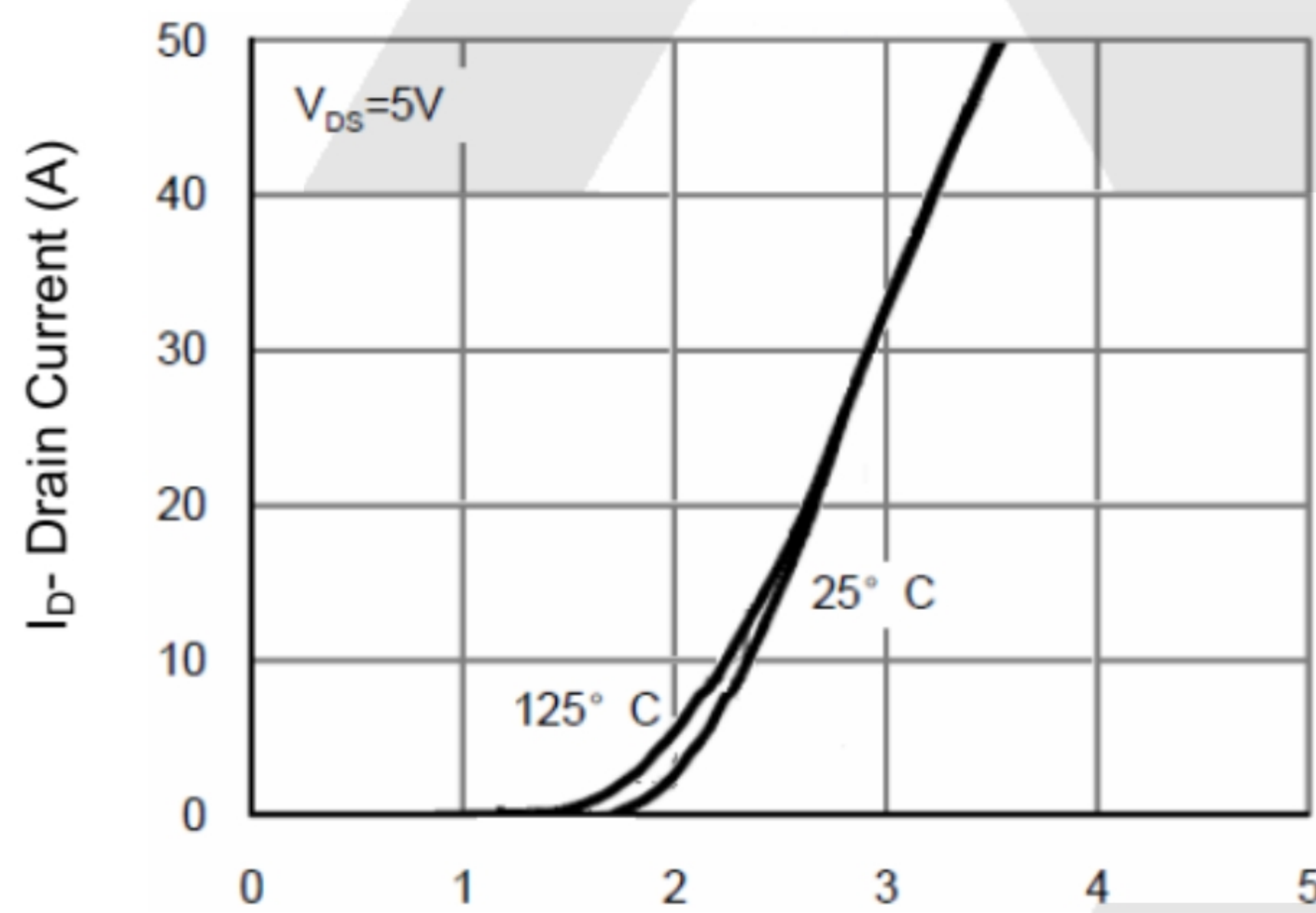
## Typical Electrical and Thermal Characteristics (Curves)



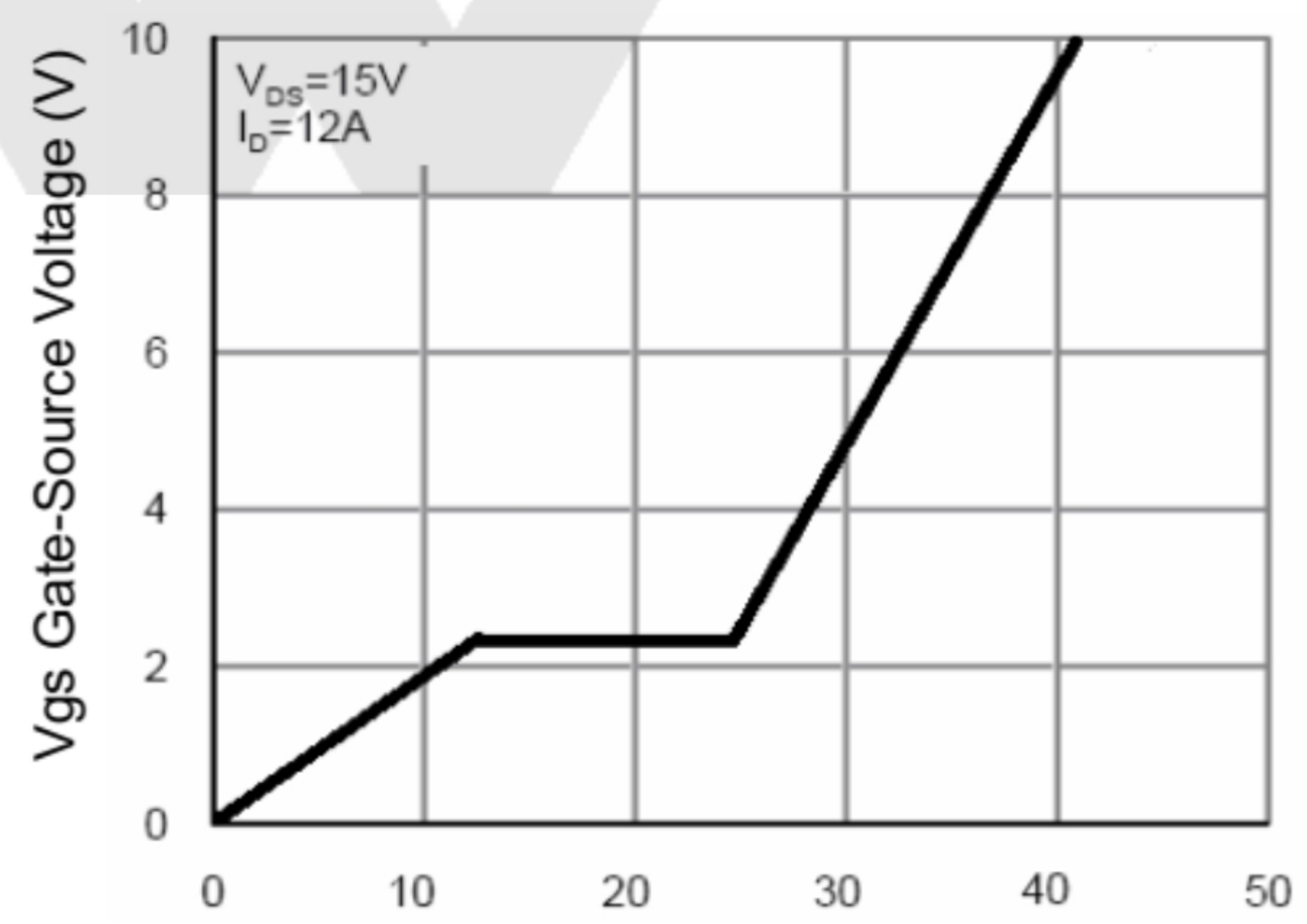
**Output Characteristics**



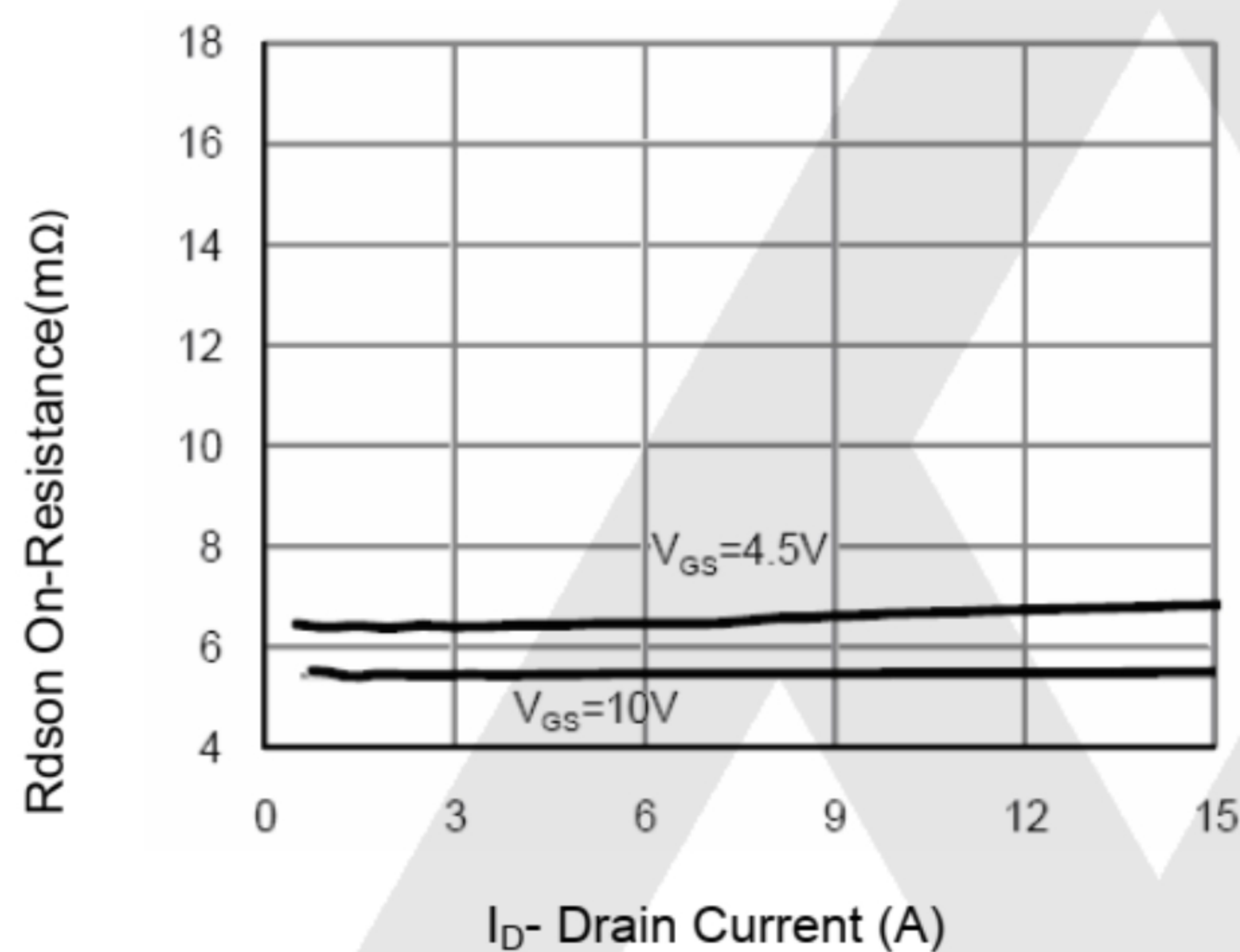
**Rdson-Junction Temperature**



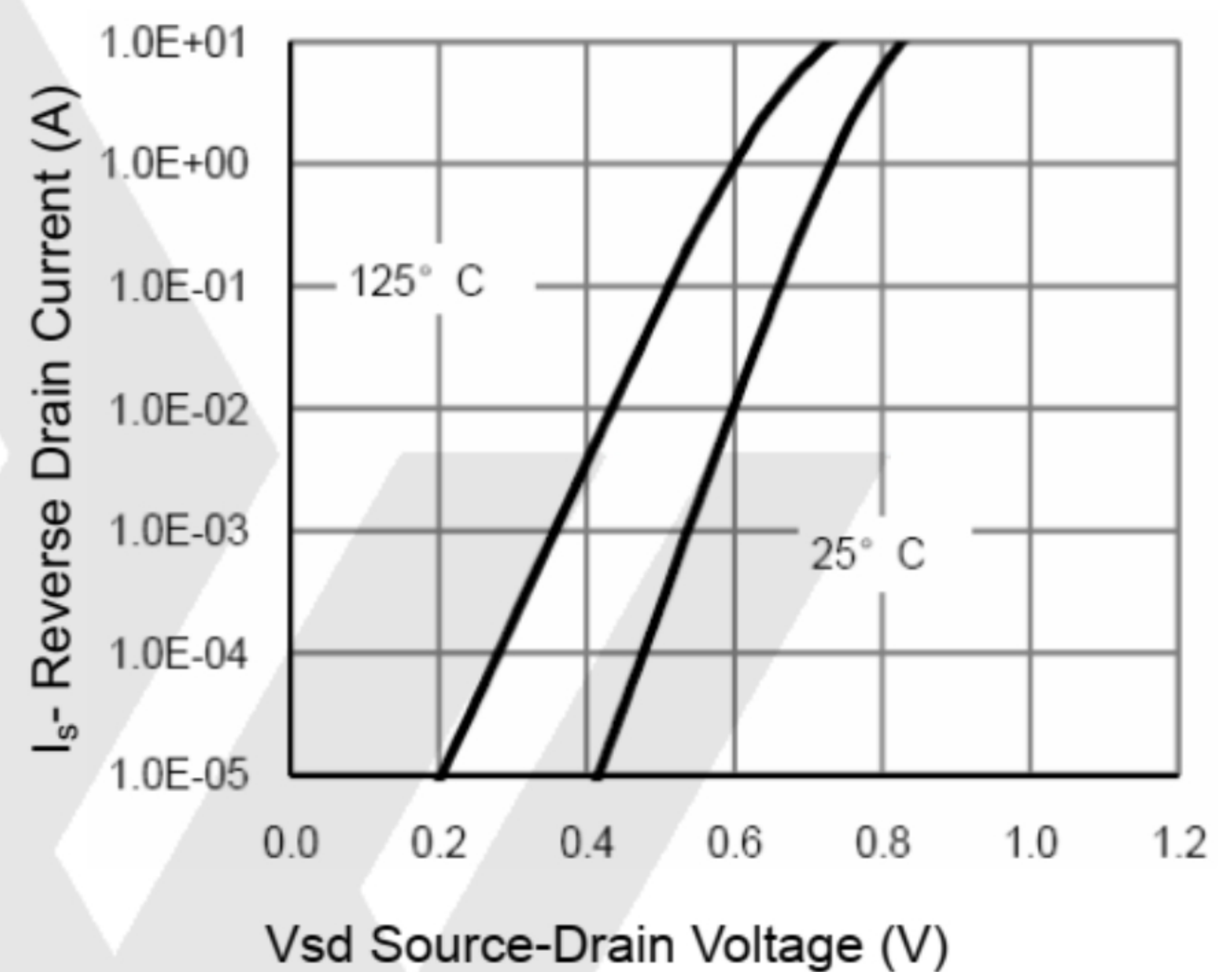
**Transfer Characteristics**



**Gate Charge**

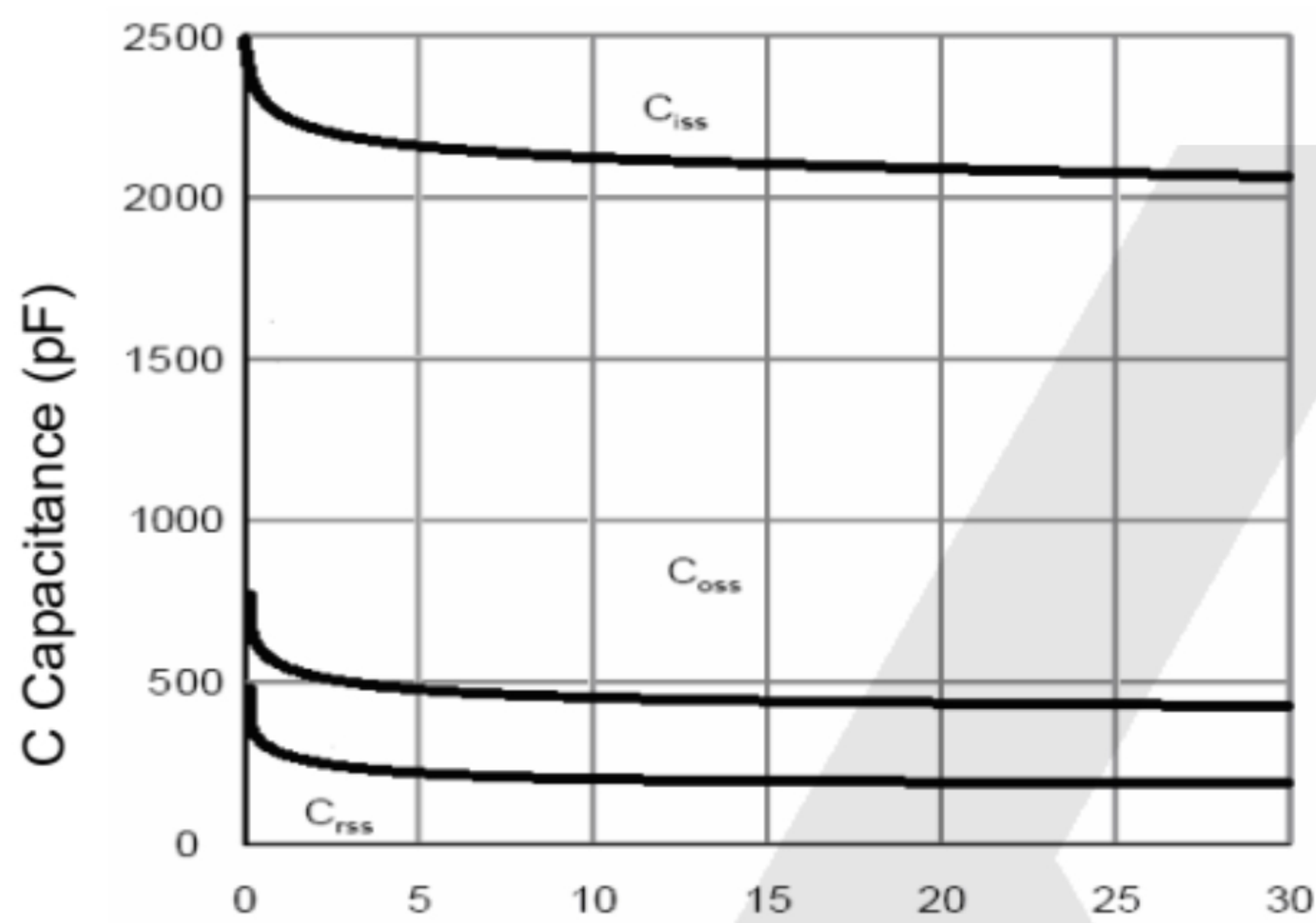


**Rdson- Drain Current**

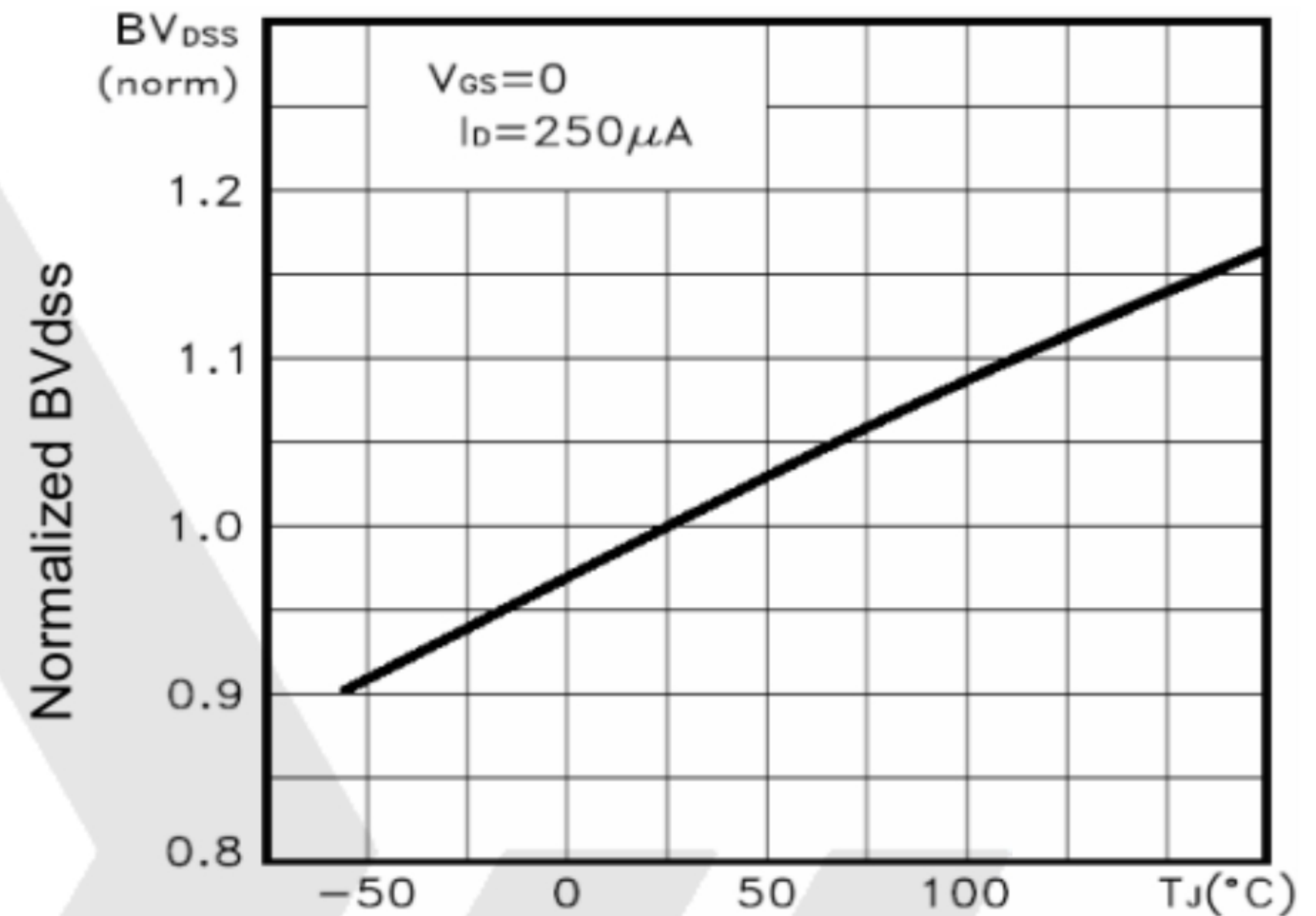


**Source- Drain Diode Forward**

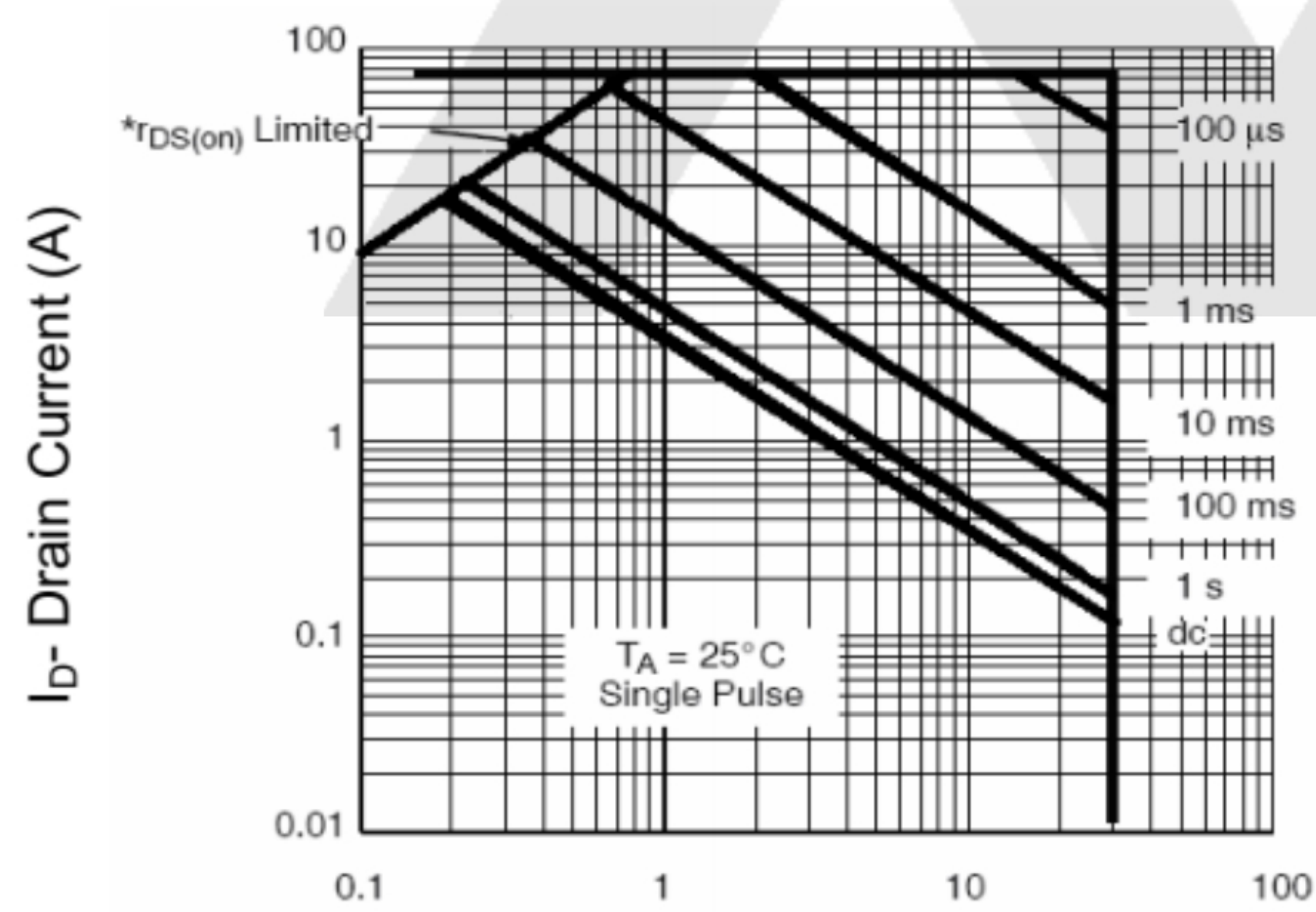




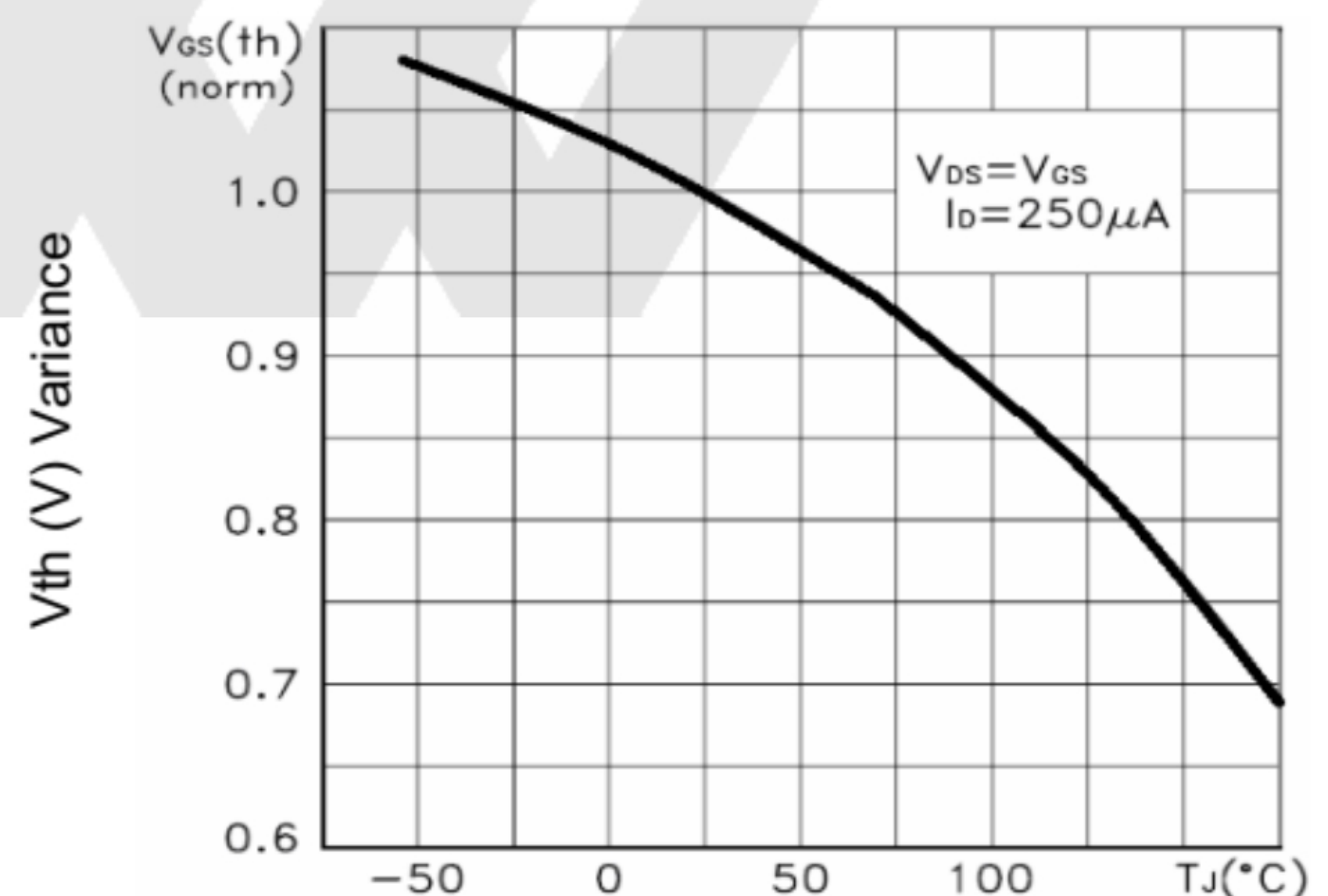
$V_{DS}$  Drain-Source Voltage (V)  
**Capacitance vs  $V_{DS}$**



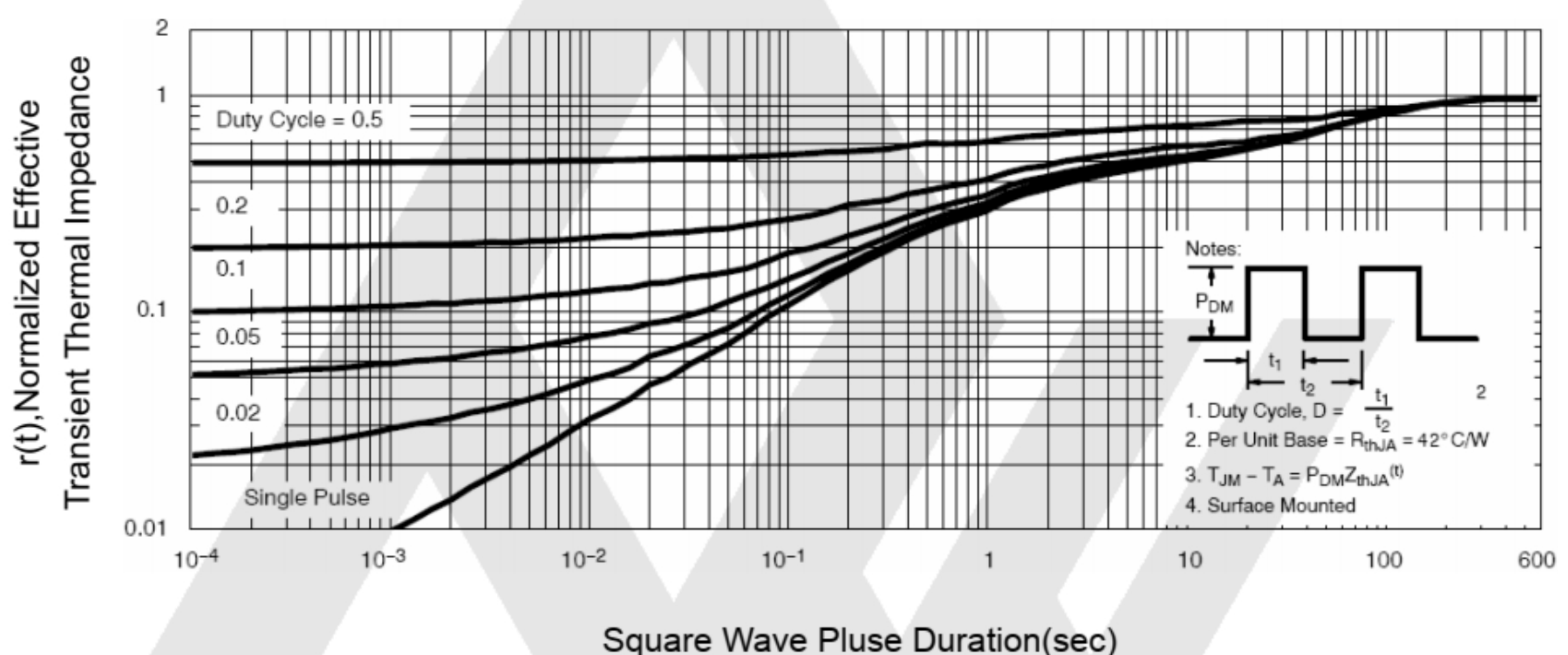
$T_J$ -Junction Temperature(°C)  
 **$BV_{DSS}$  vs Junction Temperature**



$V_{DS}$  Drain-Source Voltage (V)  
**Safe Operation Area**



$T_J$ -Junction Temperature(°C)  
**10  $V_{GS(th)}$  vs Junction Temperature**

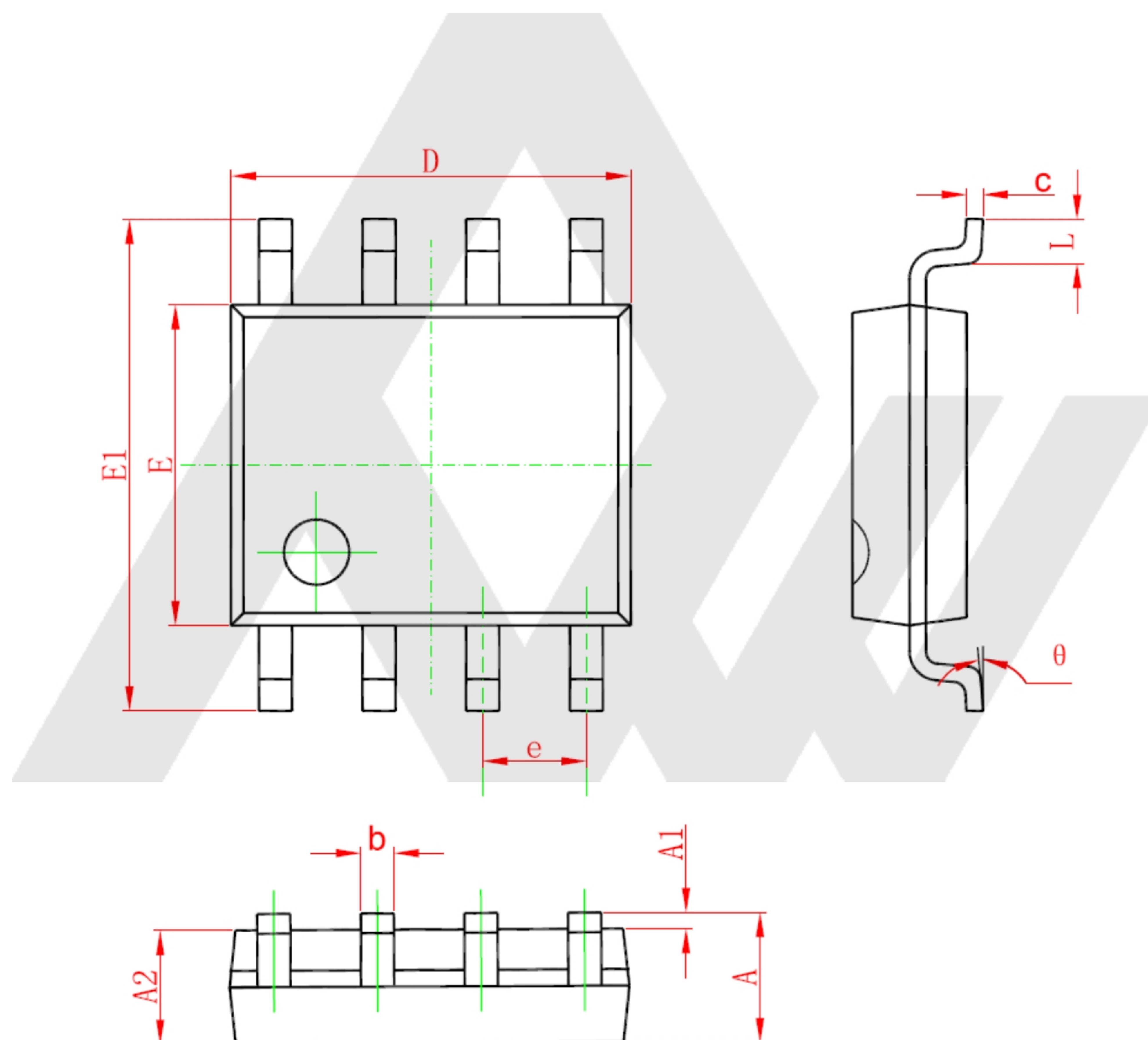


**Normalized Maximum Transient Thermal Impedance**



## PACKAGE DESCRIPTION

### SOP8



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°



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