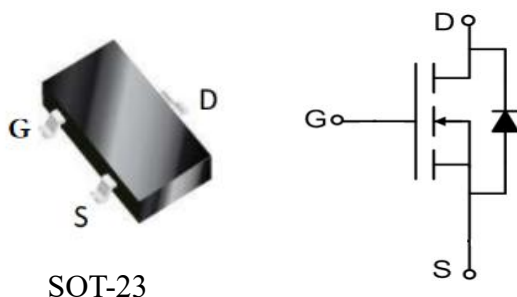


Features

- ◆ 20V, 4.0A
 - $R_{DS(ON)}(Typ.) = 22m\Omega @ V_{GS} = 4.5V.$
 - $R_{DS(ON)}(Typ.) = 26m\Omega @ V_{GS} = 2.5V.$
- ◆ Advanced Trench Technology
- ◆ Excellent $R_{DS(ON)}$ and Low Gate Charge
- ◆ Lead Free.



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Applications

- ◆ Load Switch
- ◆ PWM Application
- ◆ Power Management

Absolute Maximum Ratings $T_c = 25^\circ C$ unless otherwise noted

Symbol	Parameter		Limit	Unit
V_{DS}	Drain-Source Voltage		20	V
V_{GS}	Gate-Source Voltage		± 12	
I_D	Drain Current-Continuous	$T_A = 25^\circ C$	4.0	A
		$T_A = 100^\circ C$	2.5	
I_{DM}	Drain Current-Pulsed ^a		16	
P_D	Maximum Power Dissipation @ $T_A = 25^\circ C$		1.2	W
T_{STG}	Store Temperature Range		-55 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient Max	103	$^\circ C/W$

Electrical Characteristics $T_J = 25^\circ C$ unless otherwise noted

Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 20V, V_{GS} = 0V$	-	-	1.0	μA
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 12V$	-	-	± 100	nA

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.5	0.75	1.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^d	$V_{GS} = 4.5V, I_D = 3A$	-	22	28	mΩ
		$V_{GS} = 2.5V, I_D = 3A$	-	26	35	

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	$V_{DS} = 10V,$ $V_{GS} = 0V,$ $f = 1.0MHz$	-	445	-	pF
C_{oss}	Output Capacitance		-	64	-	
C_{rss}	Reverse Transfer Capacitance		-	55	-	
Q_g	Total Gate Charge	$V_{GS} = 0 \text{ to } 4.5V$ $V_{DS} = 10V, I_D = 2A$	-	6.0	-	nC
Q_{gs}	Gate Source Charge		-	1.0	-	
Q_{gd}	Gate Drain Charge		-	1.5	-	

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 15V, V_{GS} = 4.5V$ $I_D = 3A, R_{GEN} = 3\Omega,$	-	4	-	ns
t_r	Turn-Off Rise Time		-	13	-	
$t_{d(off)}$	Turn-Off Delay Time		-	65	-	
t_f	Turn-Off Fall Time		-	33	-	

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current		-	-	4	A
I_{SM}	Maximum Pulsed Diode Forward Current		-	-	16	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS} = 0V, I_{SD} = 4A$	-	-	1.2	V
T_{rr}	Body Diode Reverse Recovery Time	$di/dt = 60A/\mu s$ $I_F = 2A$	-	6.0	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	0.8	-	nC

Notes:

a: Max. current is limited by junction temperature.

b: Pulse test (pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$).

Typical Characteristics

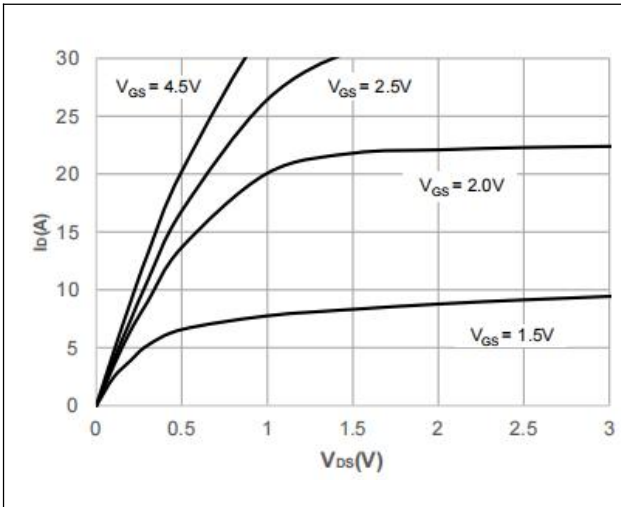


Figure 1. Output Characteristics

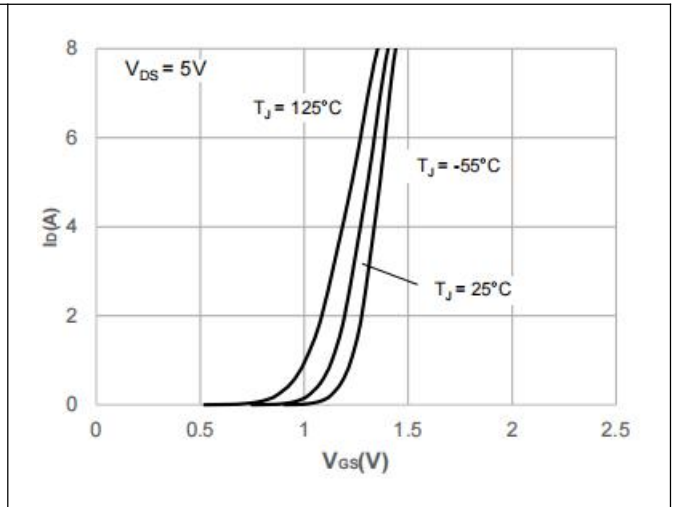


Figure 2. Typical Transfer Characteristics

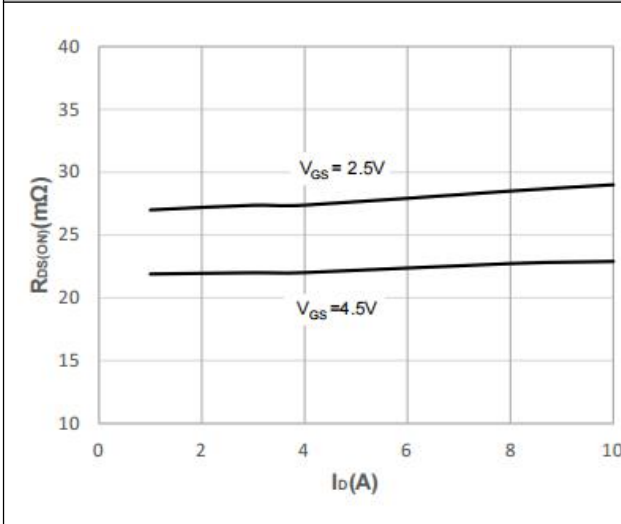


Figure 3. On-Resistance vs. Drain Current

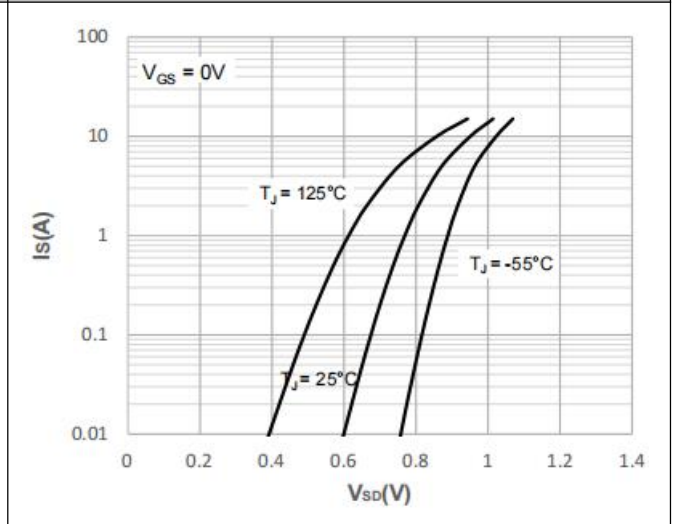


Figure 4. Body Diode Characteristics

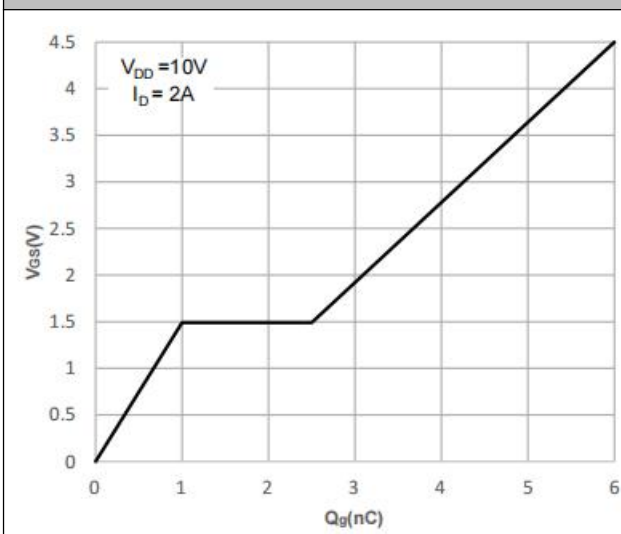


Figure 5. Gate Charge Characteristics

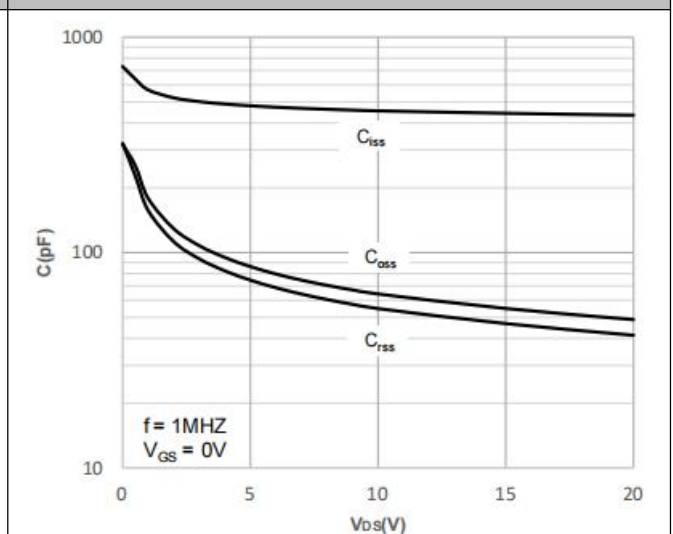


Figure 6. Capacitance Characteristics

Typical Characteristics

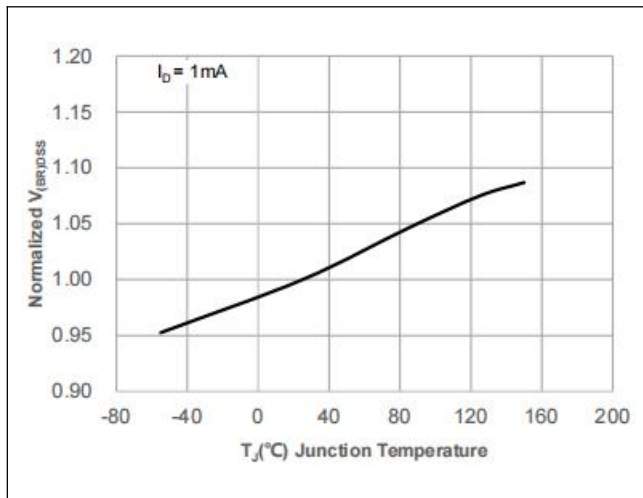


Figure 7. Normalized Breakdown voltage vs. Junction Temperature

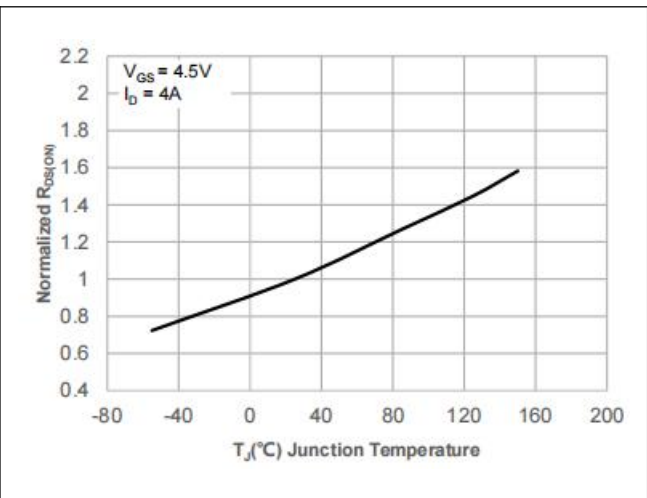


Figure 8. Normalized on Resistance vs. Junction Temperature

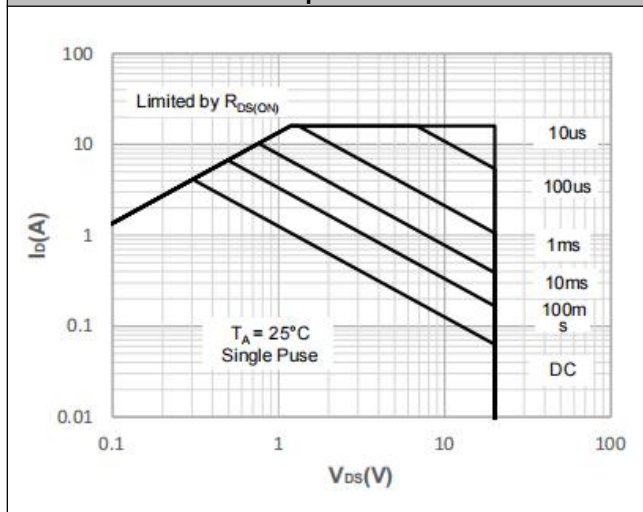


Figure 9. Maximum Safe Operating Area

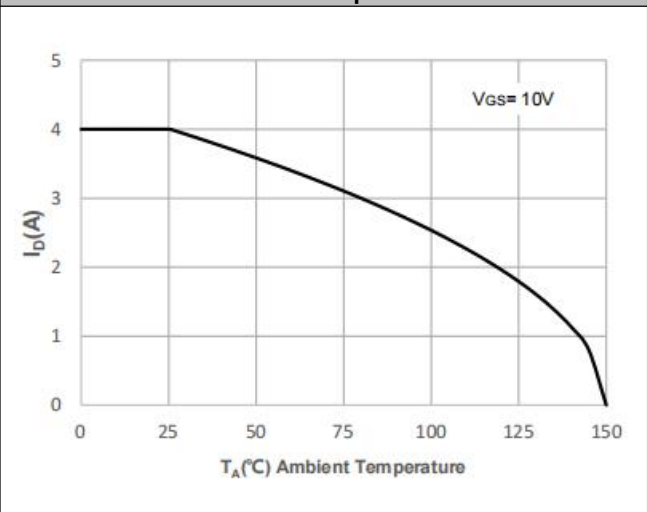


Figure 10. Maximum Continuous Drain Current vs. Ambient Temperature

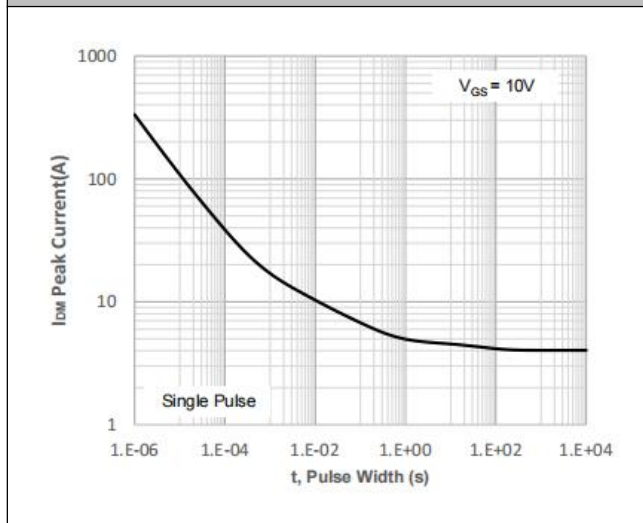


Figure 11. Peak Current Capacity

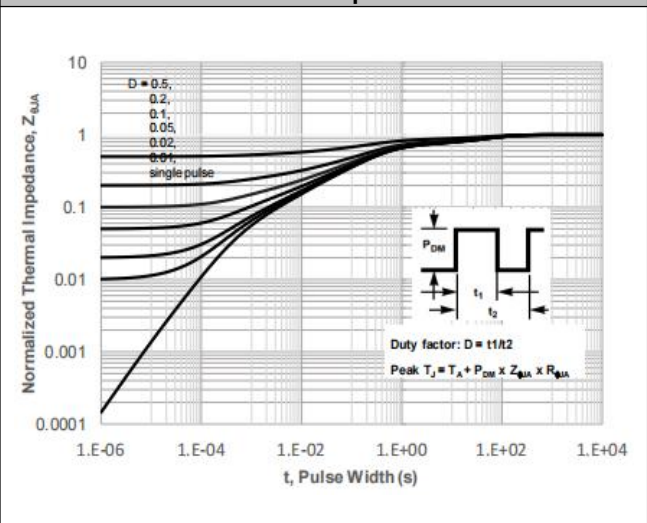
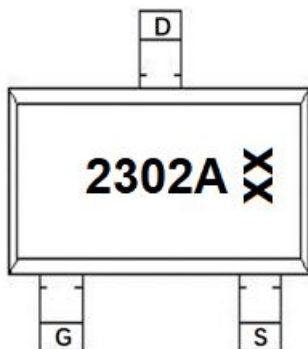


Figure 12: Normalized Maximum Transient Thermal Impedance

■ Marking Information

SOT-23



NOTE:

2302-Part number code

A-Version number code

XX-Week code