

P-Channel Enhancement Mode MOSFET

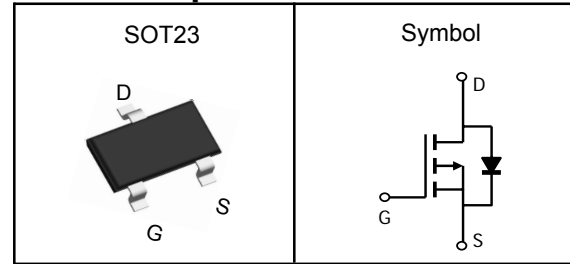
Features

- Low $R_{ds(on)}$ for low conduction loss
- Reliable and Rugged
- ROHS Compliant & Halogen-Free

Applications

- Power Management in Desktop Computer
- DC/DC Converters

Pin Description



V_{DSS}	-60	V
$R_{DS(ON)-Typ}$	3.3	Ω
I_D	-0.17	A

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$, Unless Otherwise Noted)

Symbol	Parameter	Rating	Unit
V_{DSS}	Drain-Source Voltage	-60	V
V_{GSS}	Gate-Source Voltage	± 20	V
T_J	Maximum Junction Temperature	-55 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$I_{DM}^{①}$	Pulse Drain Current Tested	-1.2	A
I_D	Continuous Drain Current	-0.17	A
P_D	Maximum Power Dissipation	0.35	W

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient(Max)	357	$^\circ\text{C/W}$

Note ① : Max. current is limited by bonding wire.

Note ② : UIS tested and pulse width are limited by maximum junction temperature 150°C .

Note ③ : Surface Mounted on 1in^2 FR-4 board with 1oz.



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Electrical Characteristics ($T_J=25^{\circ}\text{C}$, Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-60V, V_{GS}=0V$	---	---	-1	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	---	-2.0	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS}=-10V, I_D=-0.15A$	---	3.3	8.0	Ω
		$V_{GS}=-4.5V, I_D=-0.15A$	---	3.5	9.9	Ω
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	---	---	---	Ω
Dynamic Characteristics ^⑤						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=-30V, \text{Freq.}=1MHz$	---	43	---	pF
C_{oss}	Output Capacitance		---	2.9	---	
C_{riss}	Reverse Transfer Capacitance		---	1.8	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=-30V, V_{GS}=-4.5V, R_G=2.5\Omega, I_D=-0.15A$	---	8.6	---	nS
T_r	Turn-on Rise Time		---	20	---	
$T_{d(off)}$	Turn-off Delay Time		---	15	---	
T_f	Turn-off Fall Time		---	77	---	
Q_g	Total Gate Charge	$V_{DS}=-30V, V_{GS}=-10V, I_D=-0.15A$	---	1.77	---	nC
Q_{gs}	Gate-Source Charge		---	0.57	---	
Q_{gd}	Gate-Drain Charge		---	0.18	---	
Source-Drain Characteristics						
V_{SD} ^④	Diode Forward Voltage	$V_{GS}=0V, I_S=-0.17A, T_J=25^{\circ}\text{C}$	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-0.15A, di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	23	---	nS
Q_{rr}	Reverse Recovery Charge		---	13	---	nC

Note ④: Pulse test (pulse width 300us, duty cycle 2%).

Note ⑤: Guaranteed by design, not subject to production testing.

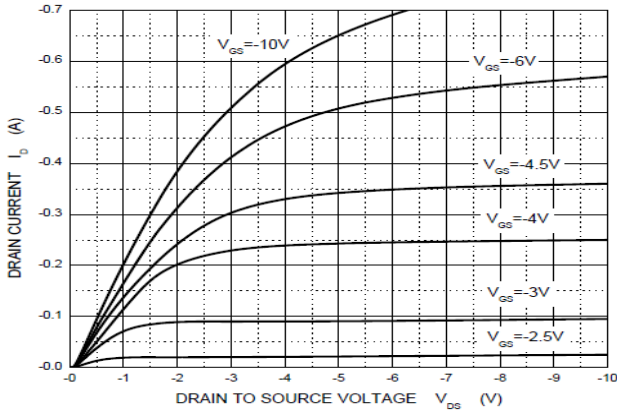
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Typical Characteristics


Figure1. Output Characteristics

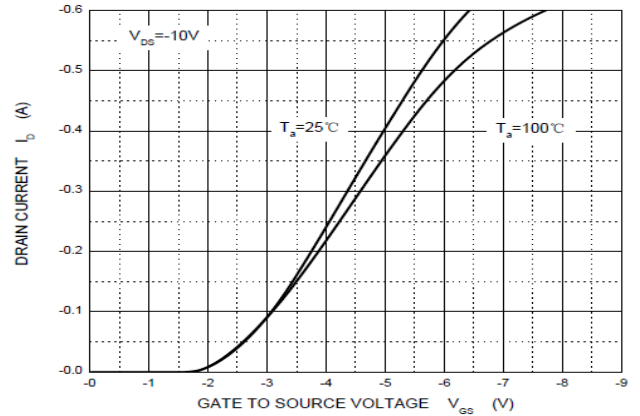


Figure2. Transfer Characteristics

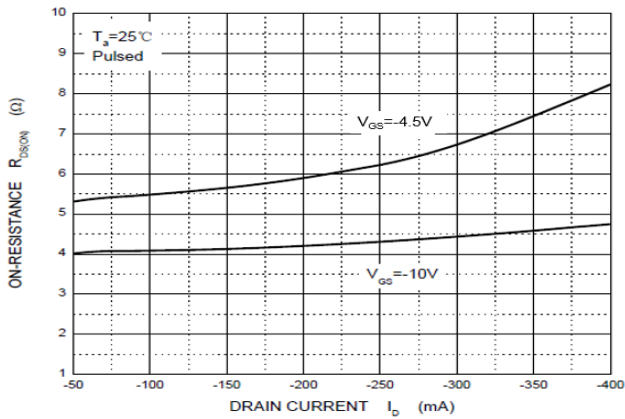


Figure3. Drain-Source on Resistance

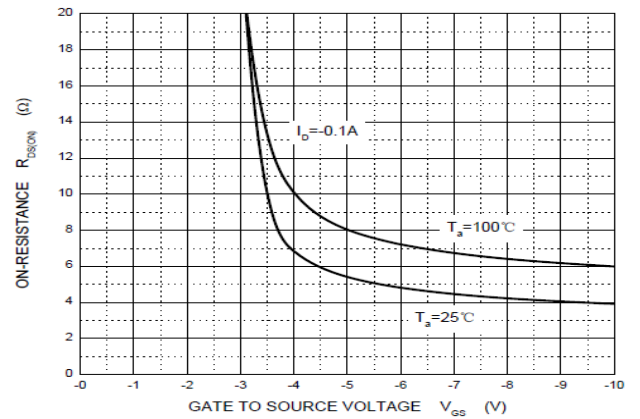


Figure4. Drain-Source on Resistance

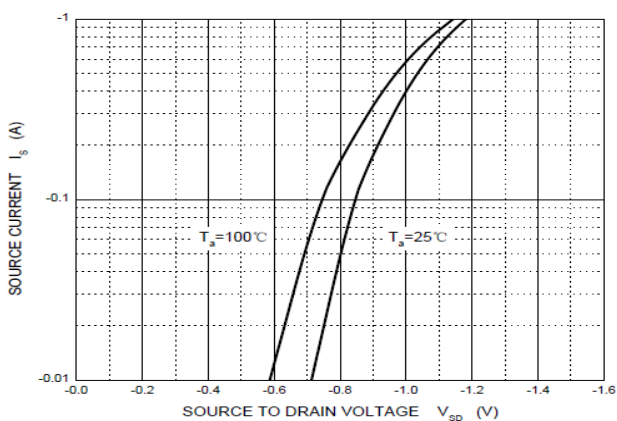


Figure5. Diode Forward Voltage vs. current

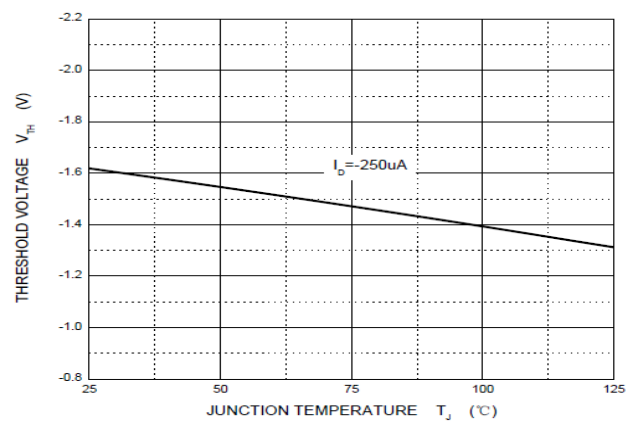


Figure6. Gate Threshold vs. Junction Temperature

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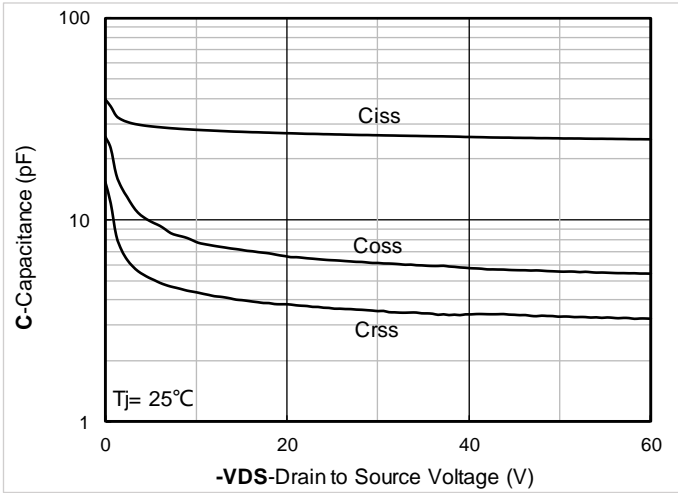


Figure7. Capacitance Characteristics

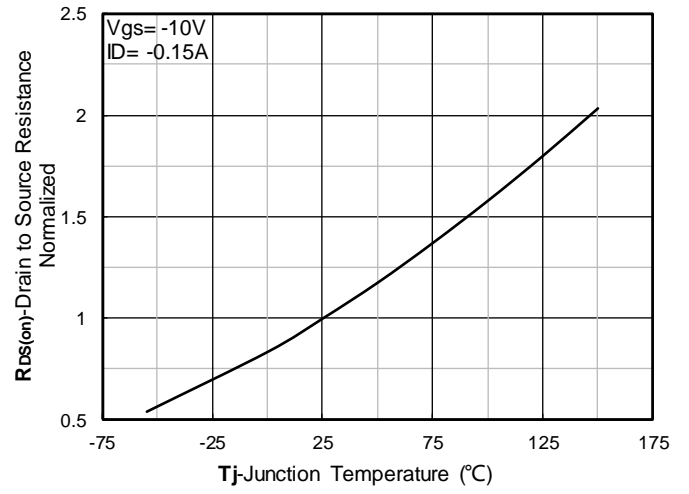
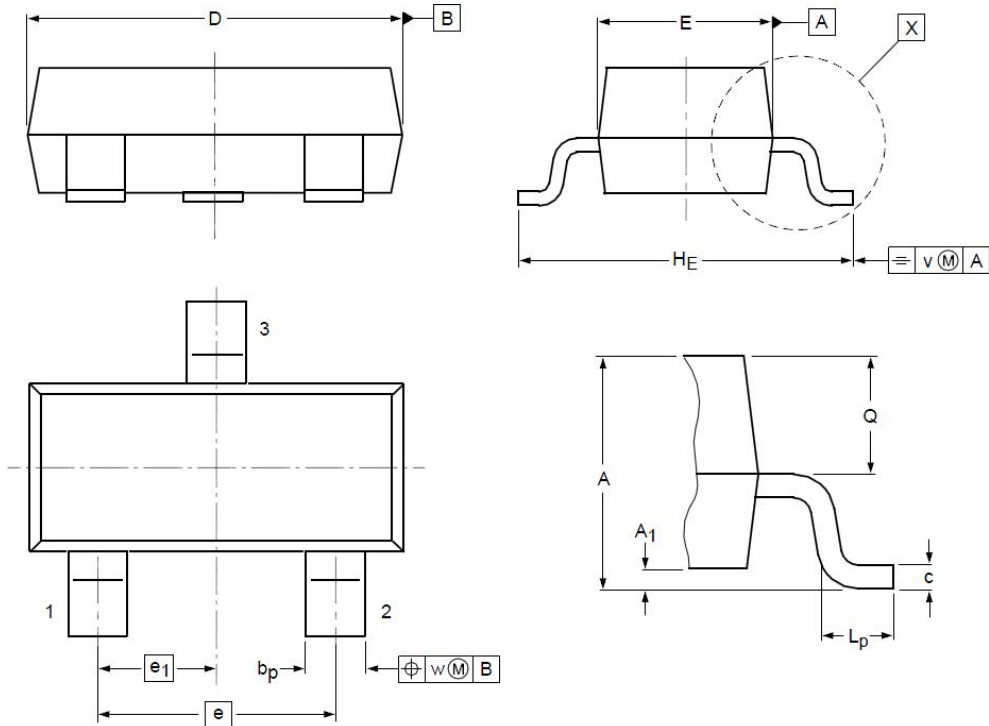


Figure8. Normalized On-Resistance

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SOT23 Package Outline Dimensions


Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	0.90	1.05	1.20	e₁	--	0.95	--
A₁	0.01	0.05	0.10	H_E	2.10	2.40	2.50
b_p	0.38	0.42	0.48	L_p	0.40	0.50	0.60
c	0.09	0.13	0.15	Q	0.45	0.49	0.55
D	2.80	2.92	3.00	V	--	0.20	--
E	1.20	1.33	1.40	W	--	0.10	--
e	--	1.90	--				