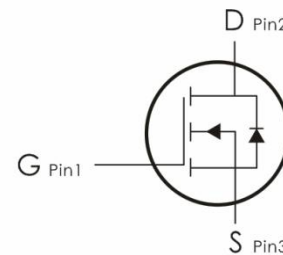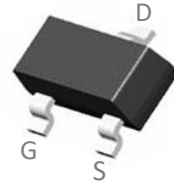## Description：

This N-Channel MOSFET 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：

1) V_{DS}=20V,I_D=3.0A,$R_{DS(ON)}$<42mΩ @V_{GS}=4.5V

2) Low gate charge.

3) Green device available.

4) Advanced high cell denity trench technology for ultra $R_{DS(ON)}$.

5) Excellent package for good heat dissipation.

Absolute Maximum Ratings： (T_A=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±10	V
I_D	Continuous Drain Current-T_A=25℃	3.0	A
I_{DM}	Pulse Drain Current Tested	14	A
P_D	Power Dissipation-T_A=25℃	0.7	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	℃

Thermal Characteristics：

Symbol	Parameter	Max	Units
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	178	℃/W

Package Marking and Ordering Information：

Part NO.	Marking	Package
DO2302D-Q	2302D	SOT-23

Electrical Characteristics： (T$_A$=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV$_{DSS}$	Drain-Sourtce Breakdown Voltage	V$_{GS}$=0V,I$_D$=250μA	20	---	---	V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{GS}$=0V, V$_{DS}$=20V	---	---	1	μA
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±10V, V$_{DS}$=0A	---	---	±100	nA
On Characteristics						
V$_{GS(th)}$	GATE-Source Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$=250μA	0.55	0.78	1.1	V
R$_{DS(ON)}$	Drain-Source On-Resistance	V$_{GS}$=4.5V,I$_D$=3A	---	32	42	mΩ
		V$_{GS}$=2.5V,I$_D$=2A	---	42	60	
Dynamic Characteristics						
C$_{iss}$	Input Capacitance	V$_{DS}$=10V, V$_{GS}$=0V, f=1MHz	---	220	---	pF
C$_{oss}$	Output Capacitance		---	34	---	
C$_{rss}$	Reverse Transfer Capacitance		---	26	---	
Switching Characteristics						
t$_{d(on)}$	Turn-On Delay Time	V$_{DD}$=10V, R$_L$=1.5Ω ,R$_G$=3Ω	---	6.8	---	ns
t$_r$	Rise Time		---	57	---	ns
t$_{d(off)}$	Turn-Off Delay Time		---	14	---	ns
t$_f$	Fall Time		---	53	---	ns
Q$_g$	Total Gate Charge	V$_{GS}$=4.5V, V$_{DS}$=10V, I$_D$=3A	---	3.61	---	nC
Q$_{gs}$	Gate-Source Charge		---	0.88	---	nC
Q$_{gd}$	Gate-Drain "Miller" Charge		---	0.77	---	nC
Drain-Source Diode Characteristics						
V$_{SD}$	Forward Voltage	V$_{GS}$=0V , I$_S$=3A	---	---	1.2	V

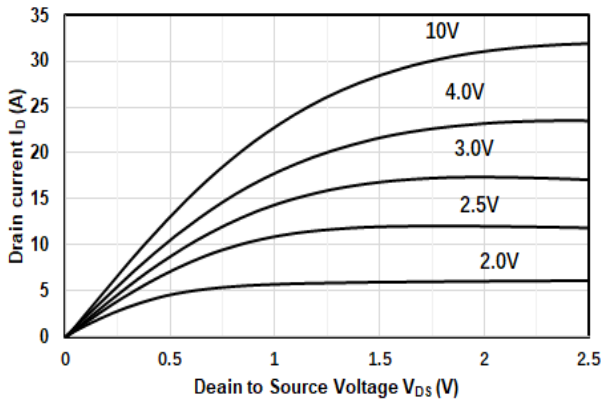## Typical Characteristics： (T$_A$=25℃ unless otherwise noted)

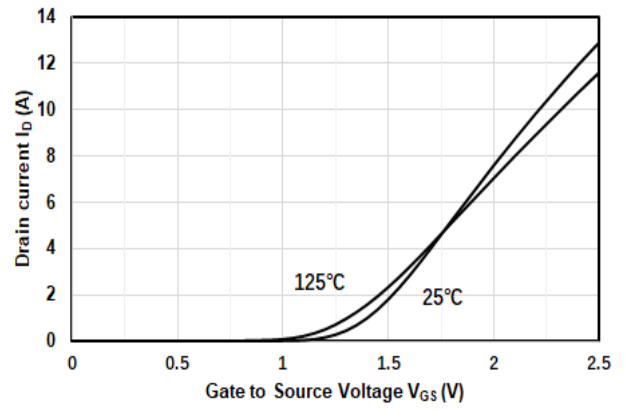Figure1. Output Characteristics

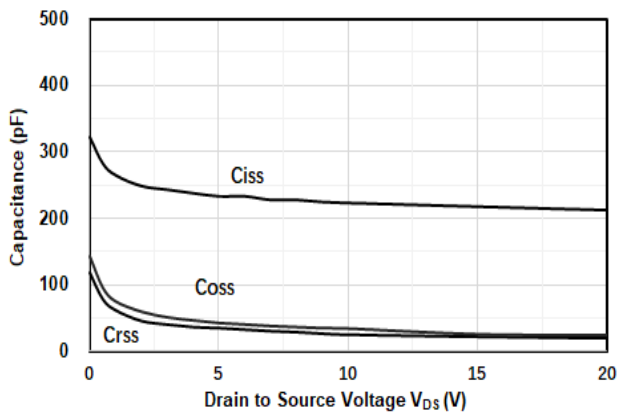Figure2. Transfer Characteristics
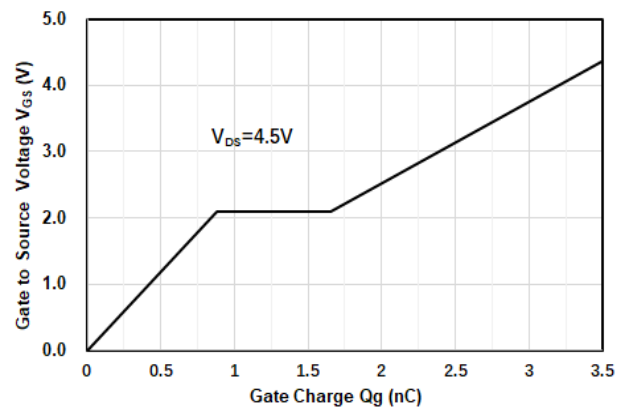
Figure3. Capacitance Characteristics
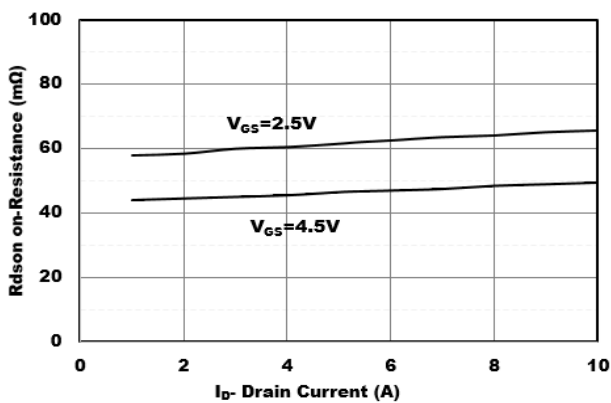
Figure4. Gate Charge
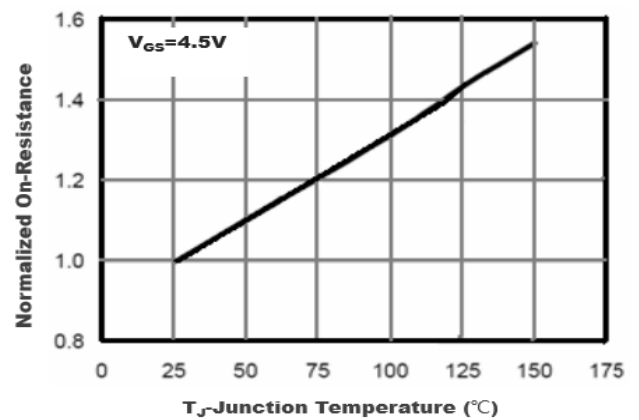
Figure5. Drain-Source on Resistance
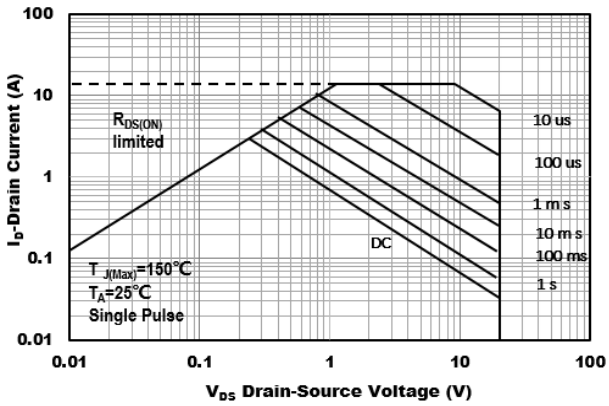
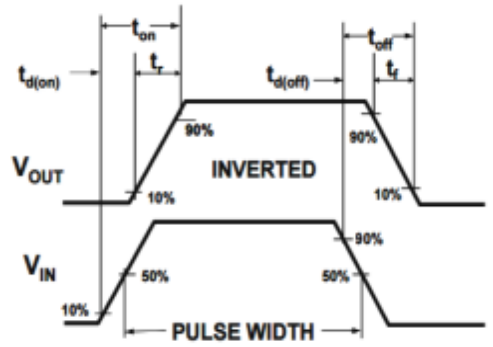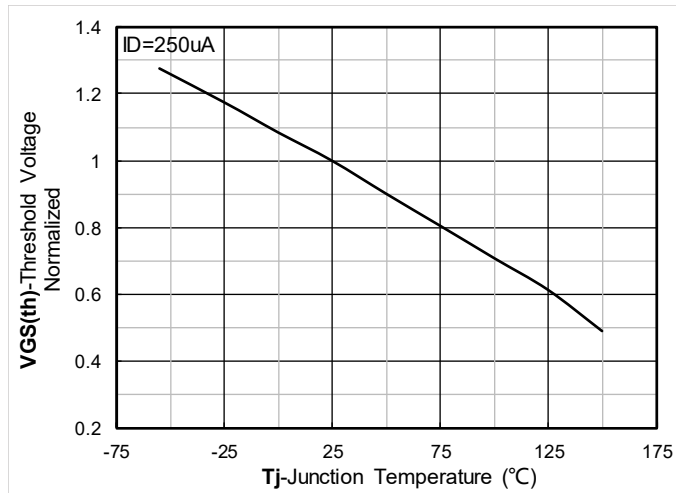Figure6. Drain-Source on Resistance

Figure7. Safe Operation Area

Figure8. Switching wave

Figure 9. Normalized Threshold voltage