N-Channel Power MOSFET
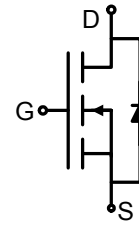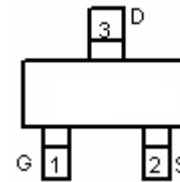
General Features

● V_{DS} = 30V, I_D = 5.8A

$R_{DS(ON)}$ < 59mΩ @ V_{GS}=2.5V

$R_{DS(ON)}$ < 45mΩ @ V_{GS}=4.5V

$R_{DS(ON)}$ < 41mΩ @ V_{GS}=10V

● High power and current handing capability

● Lead free product is acquired

● Surface mount package

● PWM applications

● Load switch

● Power management

Schematic diagram

Marking and pin assignment

SOT-23 top view

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	5.8	A
Drain Current-Pulsed (Note 1)	I_{DM}	30	A
Maximum Power Dissipation	P_D	1.4	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	89	℃/W

Electrical Characteristics (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	30	33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V	-	-	1	μA

Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm12V, V_{DS}=0V$	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.7	0.9	1.4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=2.5V$, $I_D=4A$	-	45	59	mΩ
		$V_{GS}=4.5V$, $I_D=5.8A$	-	31	45	mΩ
		$V_{GS}=10V$, $I_D=5.8A$	-	28	41	mΩ
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=5.8A$	10	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{Iss}	$V_{DS}=15V, V_{GS}=0V$, F=1.0MHz	-	820	-	PF
Output Capacitance	C_{oss}		-	99	-	PF
Reverse Transfer Capacitance	C_{rss}		-	77	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V$, $R_L=2.7Ω$ $V_{GS}=10V, R_{GEN}=3Ω$	-	9.6	-	nS
Turn-on Rise Time	t_r		-	4.8	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	39	-	nS
Turn-Off Fall Time	t_f		-	4	-	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=5.8A$, $V_{GS}=4.5V$	-	9.5	-	nC
Gate-Source Charge	Q_{gs}		-	1.5	-	nC
Gate-Drain Charge	Q_{gd}		-	3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=5.8A$	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	5.8	A

Notes:

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

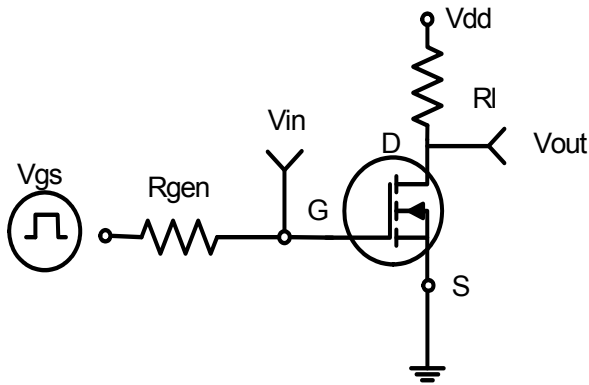## Typical Electrical and Thermal Characteristics
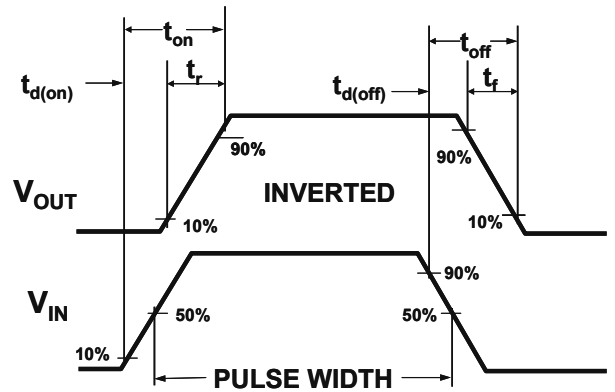
Figure 1:Switching Test Circuit
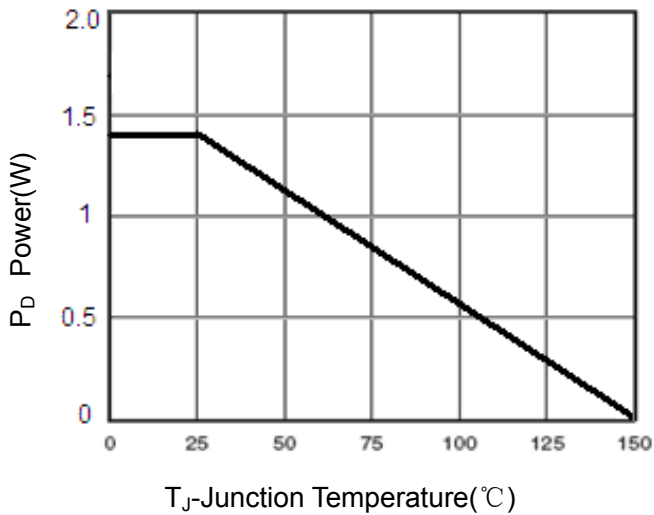
Figure 2:Switching Waveforms
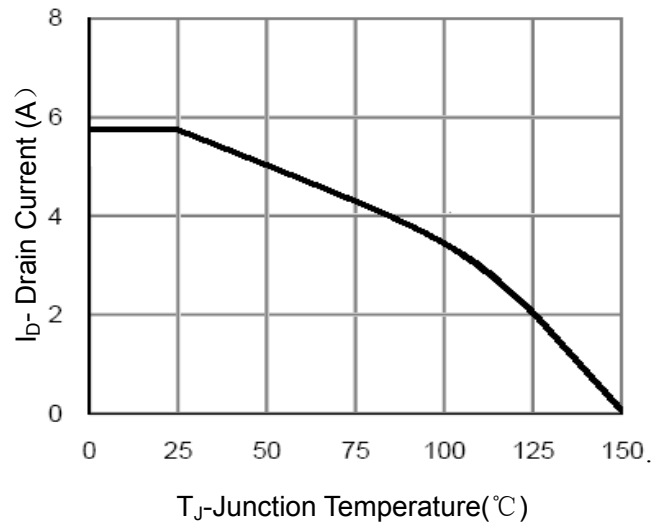
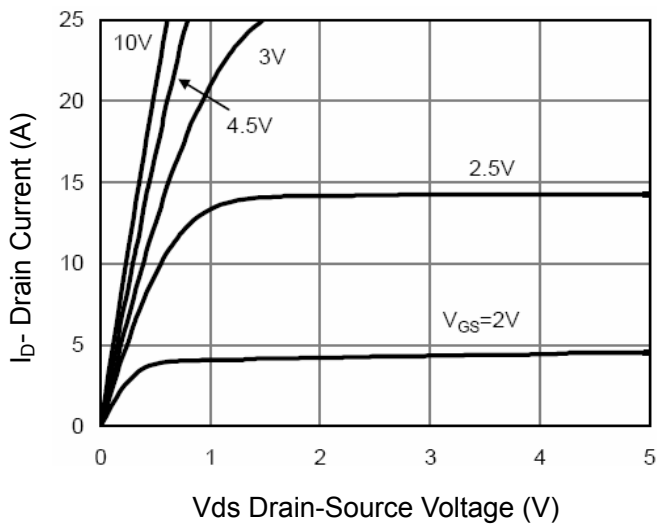**Figure 3 Power Dissipation**

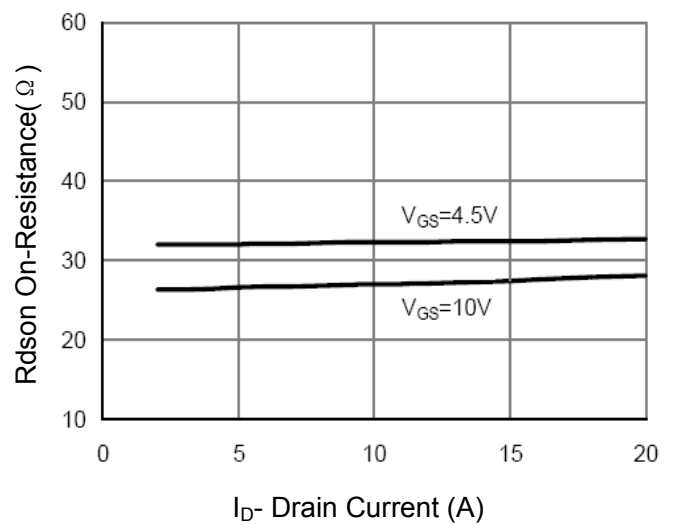**Figure 4 Drain Current**

Figure 5 Output Characteristics

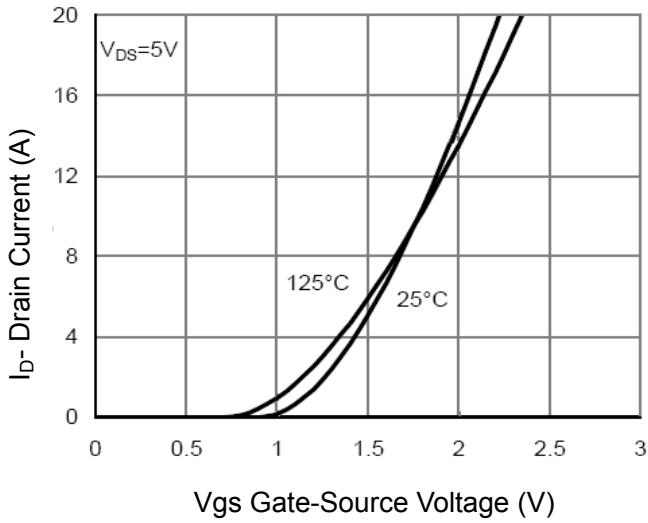**Figure 6 Drain-Source On-Resistance**
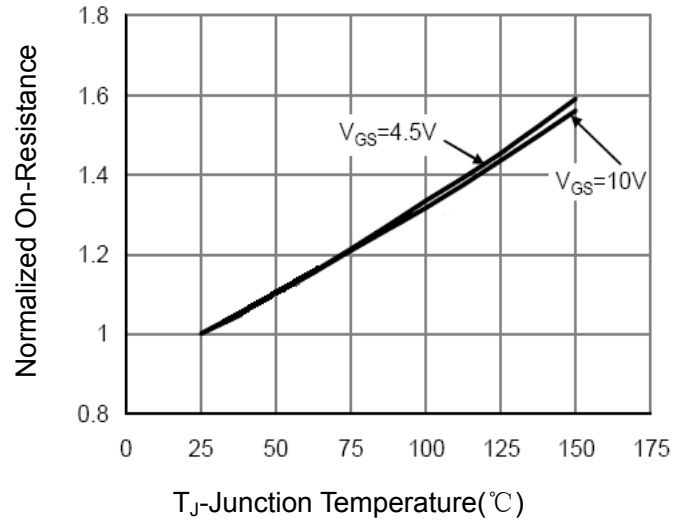
Figure 7 Transfer Characteristics
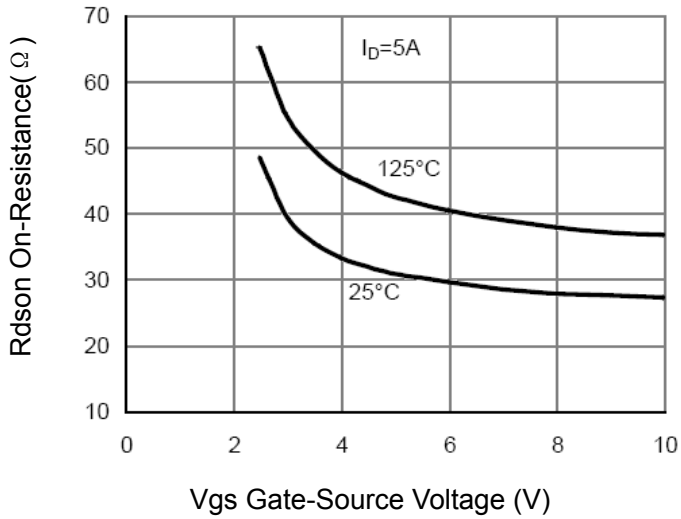
Figure 8 Drain-Source On-Resistance
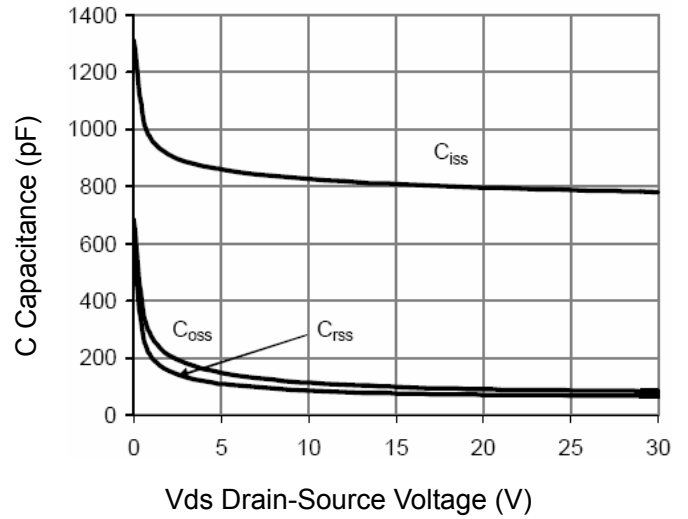
Figure 9 Rdson vs Vgs

Figure 10 Capacitance vs Vds

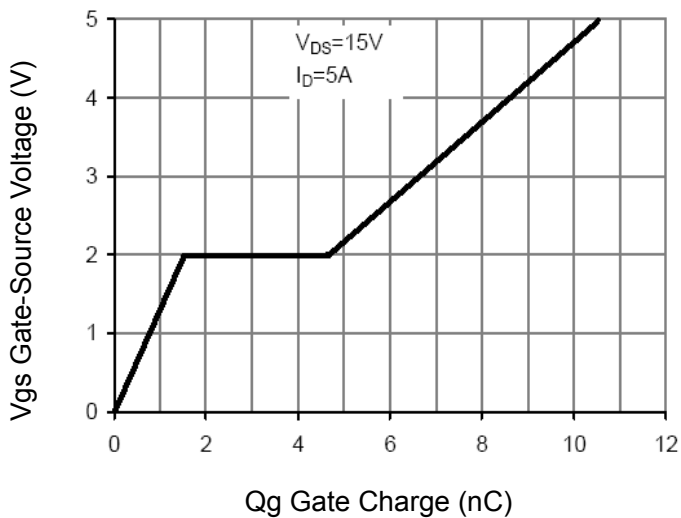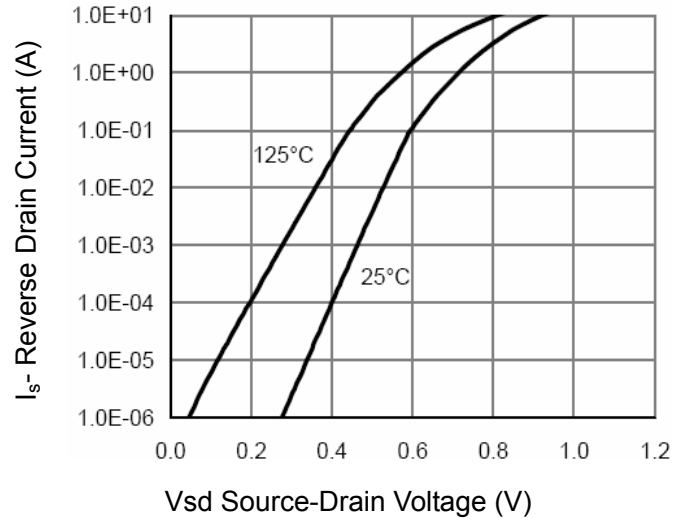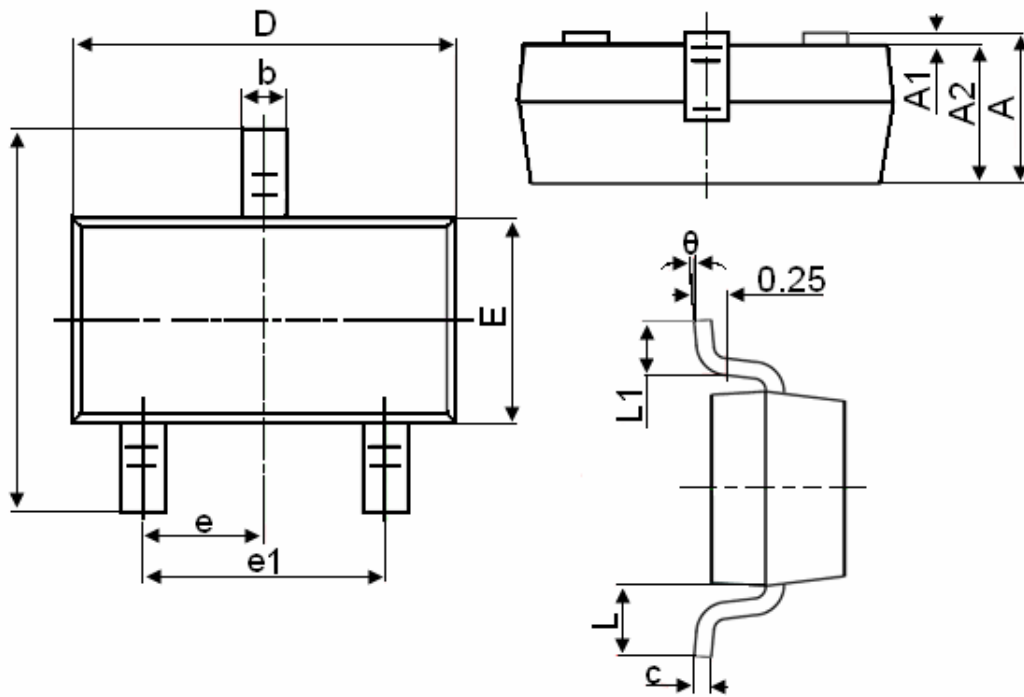**Figure 11 Gate Charge**

Figure 12 Source- Drain Diode Forward

SOT-23 Package Information

Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

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