Description

The 6703 combines advanced trench MOSFET technology with a low resistance package to provide extremely low RDS(ON).

General Features

N-Channel

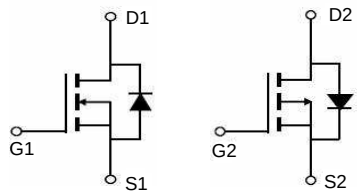
V_{DSS}	$R_{DS(ON)}$ @4.5V (Typ)	$R_{DS(ON)}$ @2.5V (Typ)	I_D
20V	30mΩ	37 mΩ	2.9A

P-Channel

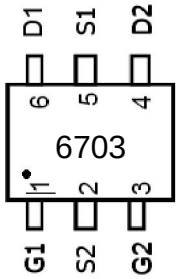
V_{DSS}	$R_{DS(ON)}$ @-4.5V(Typ)	$R_{DS(ON)}$ @-2.5V(Typ)	I_D
-20V	80mΩ	110mΩ	-3A

Application

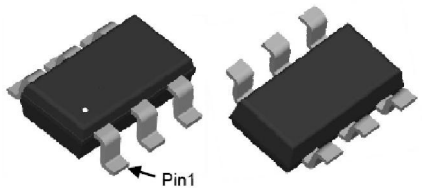
- Battery protection
- Load switch
- Power management
- RoHS Compliant



N-Channel P-Channel



Marking and pin assignment



SOT-23-6L

Ordering Information

Part Number	Marking	Case	Packaging
6703	6703	SOT-23-6L	3000pcs/Reel

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

Parameter		Symbol	Max n-channel	Max p-channel	Unit
Drain-Source Voltage		V_{DS}	20	-20	V
Gate-Source Voltage		V_{GS}	±12	±12	V
Drain Current-Continuous		I_D	2.9	-3	A
Drain Current-Pulsed (Note 1)		I_{DM}	10	-10	A
Maximum Power Dissipation	T_A=25℃	P_D	1.1	1.1	W
	T_A=70℃		0.7	0.7	
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150		℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	108	℃/W
Thermal Resistance,Junction-to-Lead	$R_{\theta JL}$	78	℃/W

N-Channel 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	20	22	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V	-	-	1	μA
Parameter	**Symbol**	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.5	0.85	1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=2.5V, I_D=2.5A	-	37	59	mΩ
		V_{GS}=4.5V, I_D=2.9A	-	30	45	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=2.9A	-	8	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=10V,V_{GS}=0V, F=1.0MHz	-	300	-	PF
Output Capacitance	C_{oss}		-	120	-	PF
Reverse Transfer Capacitance	C_{rss}		-	80	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V,I_D=2.9A V_{GS}=4.5V,R_{GEN}=6Ω	-	10	15	nS
Turn-on Rise Time	t_r		-	50	85	nS
Turn-Off Delay Time	$t_{d(off)}$		-	17	45	nS
Turn-Off Fall Time	t_f		-	10	20	nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=2.9A, V_{GS}=4.5V	-	4.0	10	nC
Gate-Source Charge	Q_{gs}		-	0.65	-	nC
Gate-Drain Charge	Q_{gd}		-	1.2	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=2.9A	-	0.75	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	2.9	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

N-Channel Typical ElectricalL and Thermal Characteristics

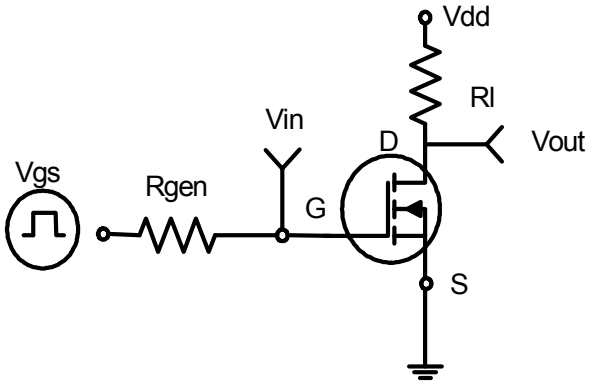


Figure 1:Switching Test Circuit

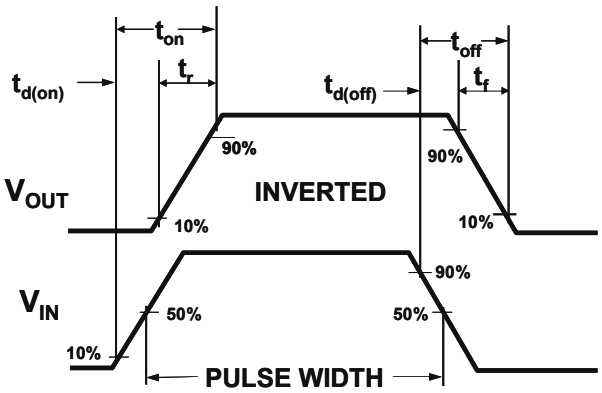


Figure 2:Switching Waveforms

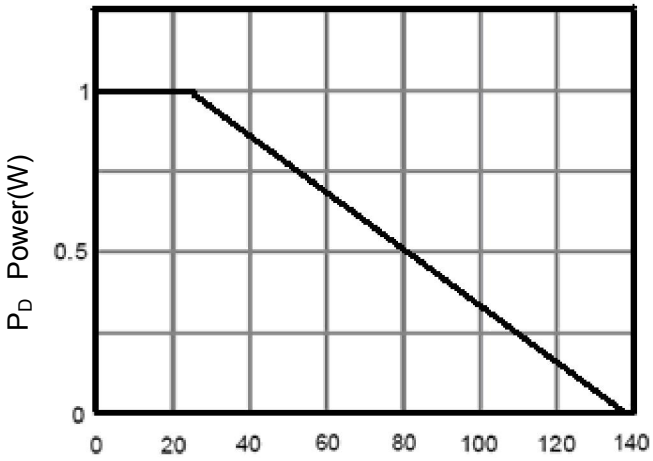


Figure 3 Power Dissipation

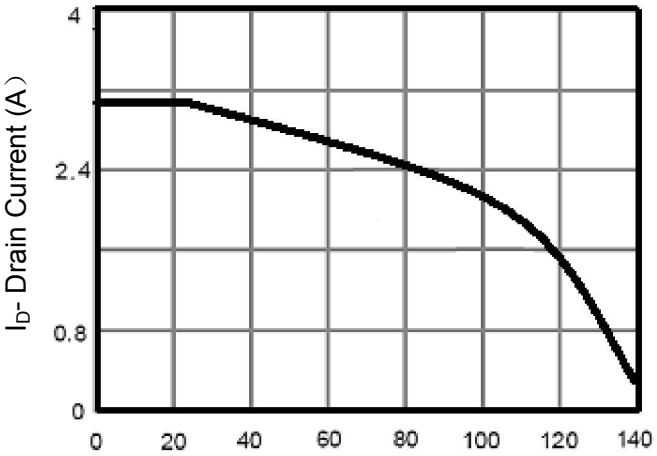


Figure 4 Drain Current

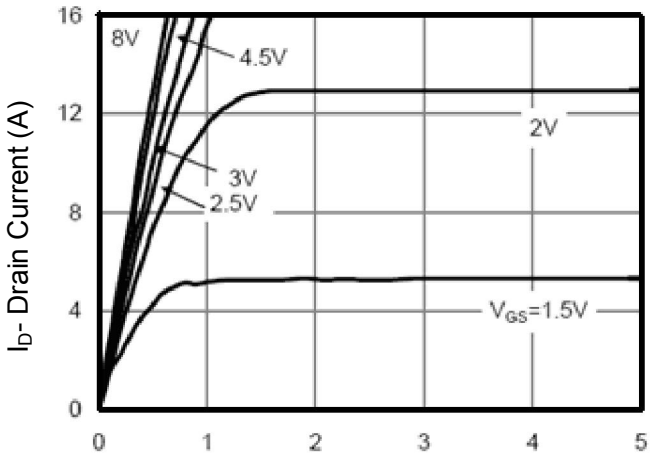


Figure 5 Output Characteristics

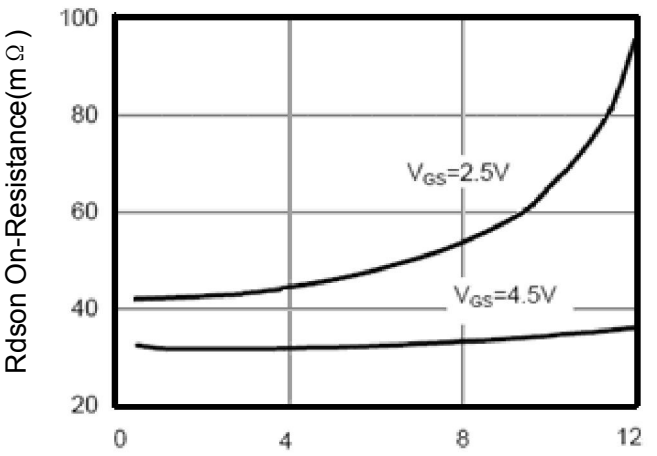


Figure 6 Drain-Source On-Resistance

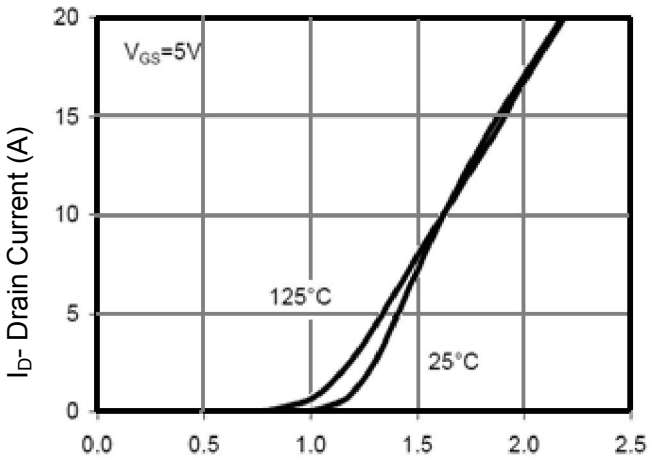


Figure 7 Transfer Characteristics

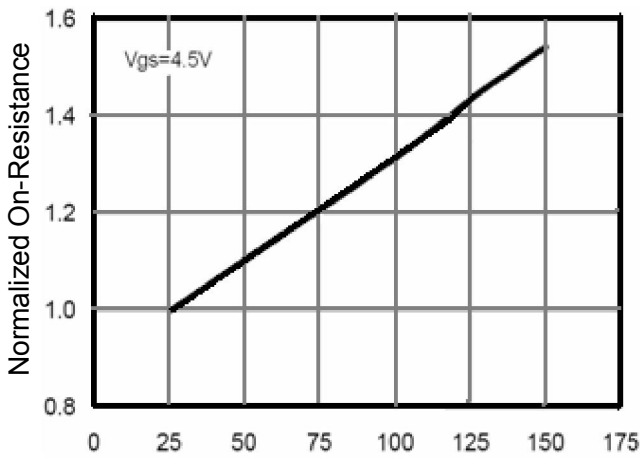


Figure 8 Drain-Source On-Resistance

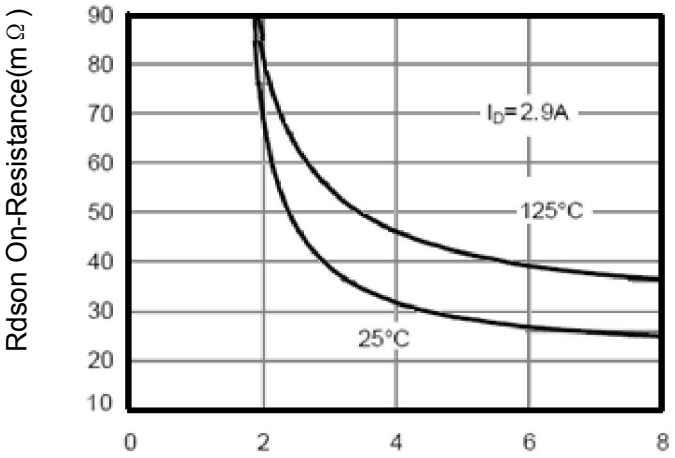


Figure 9 Rdson vs Vgs

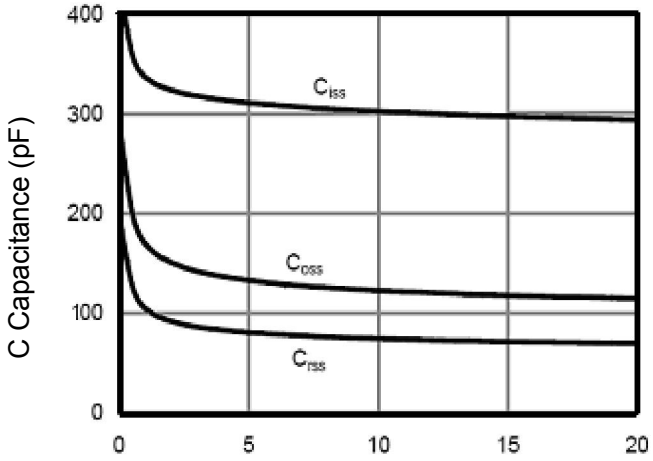


Figure 10 Capacitance vs Vds

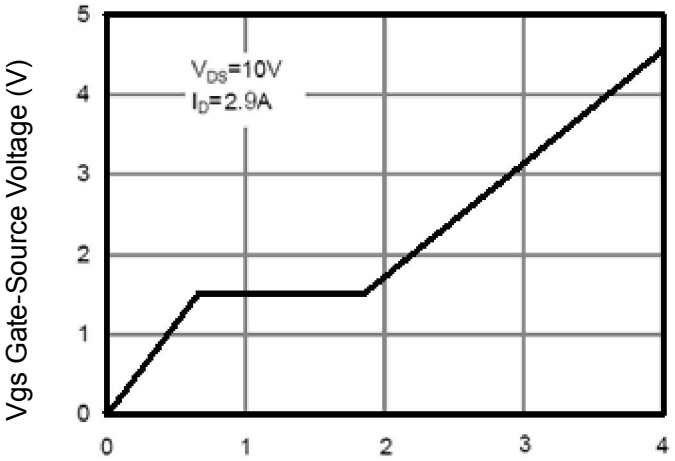


Figure 11 Gate Charge

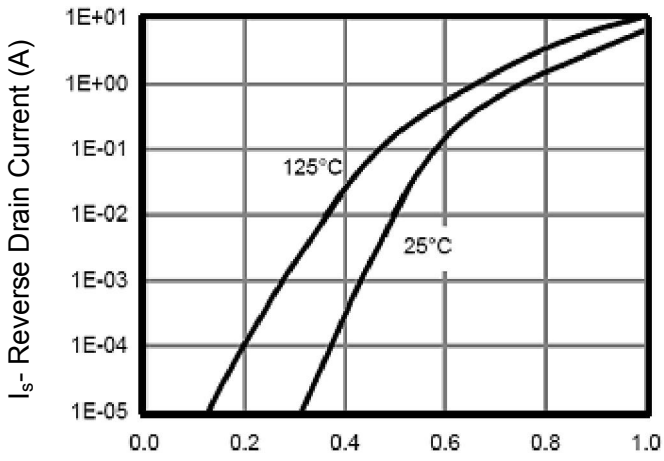


Figure 12 Source- Drain Diode Forward

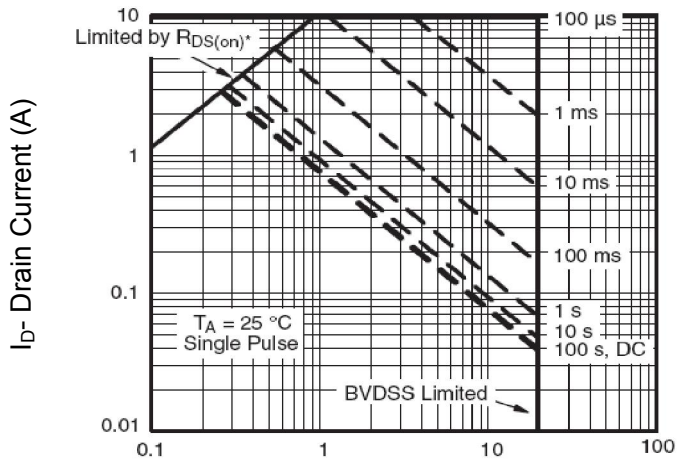


Figure 13 Safe Operation Area

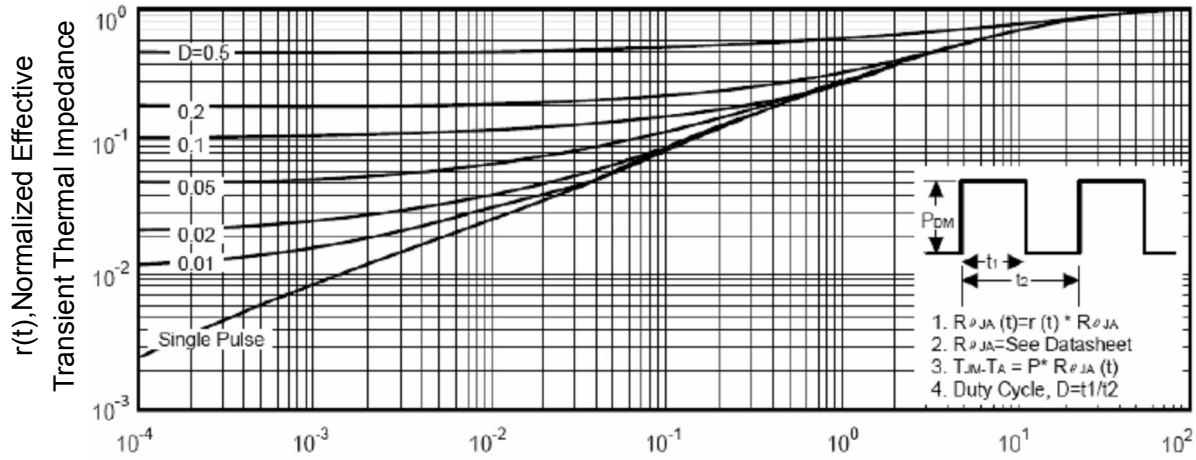


Figure 14 Normalized Maximum Transient Thermal Impedance

P-Channel 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	-20	-24	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V,V_{GS}=0V	-	-	-1	μA
Parameter	**Symbol**	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-0.4	-0.7	-1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-3A	-	80	110	mΩ
		V_{GS}=-2.5V, I_D=-2A	-	110	140	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-2.8A	-	9.5	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-10V,V_{GS}=0V, F=1.0MHz	-	405	-	PF
Output Capacitance	C_{oss}		-	75	-	PF
Reverse Transfer Capacitance	C_{rss}		-	55	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-10V,I_D=-1A V_{GS}=-4.5V,R_{GEN}=10Ω	-	11	-	nS
Turn-on Rise Time	t_r		-	35	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	nS
Turn-Off Fall Time	t_f		-	10	-	nS
Total Gate Charge	Q_g	V_{DS}=-10V,I_D=-3A, V_{GS}=-2.5V	-	3.3	12	nC
Gate-Source Charge	Q_{gs}		-	0.7	-	nC
Gate-Drain Charge	Q_{gd}		-	1.3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=1.3A	-	-	-1.2	V
Diode Forward Current (Note 2)	I_S		-	-	-1.3	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

P-Channel Typical Electrical and Thermal Characteristics

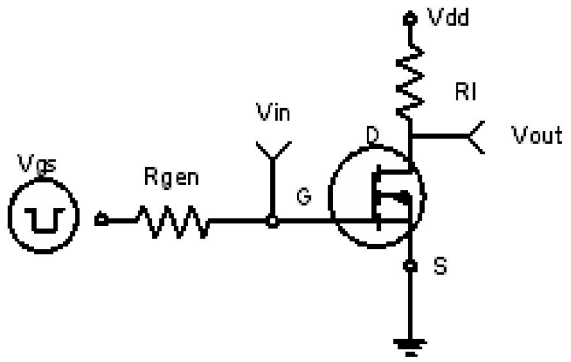


Figure 1:Switching Test Circuit

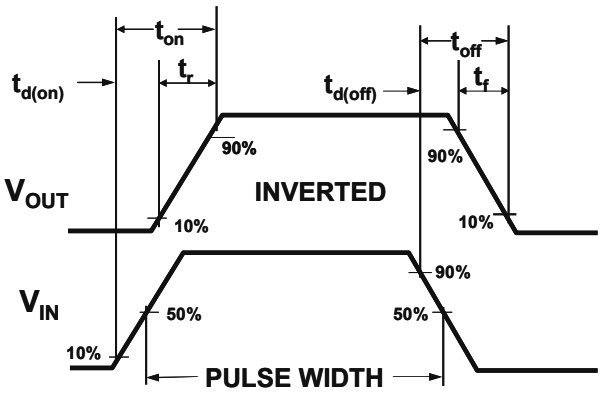
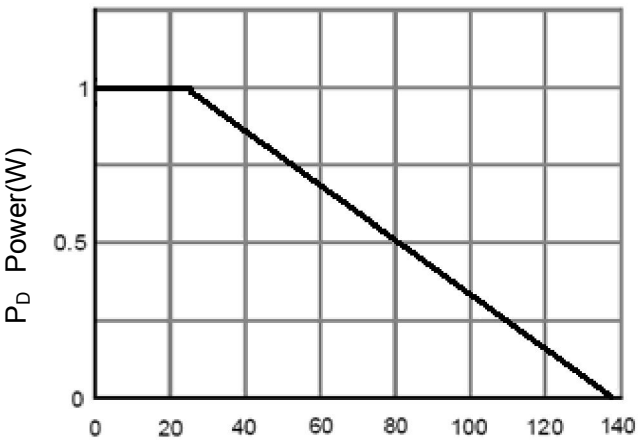
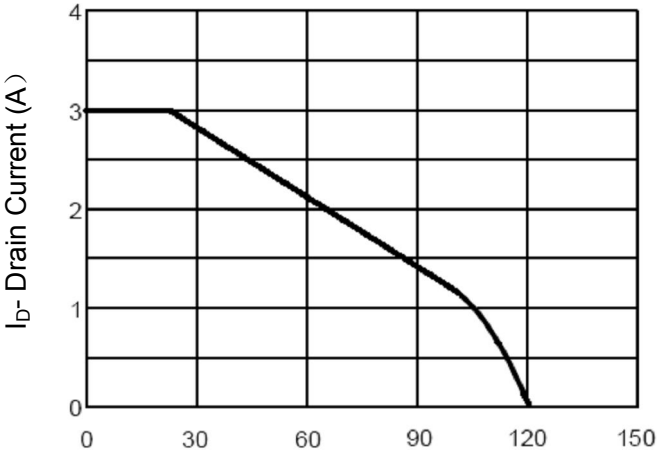


Figure 2:Switching Waveforms



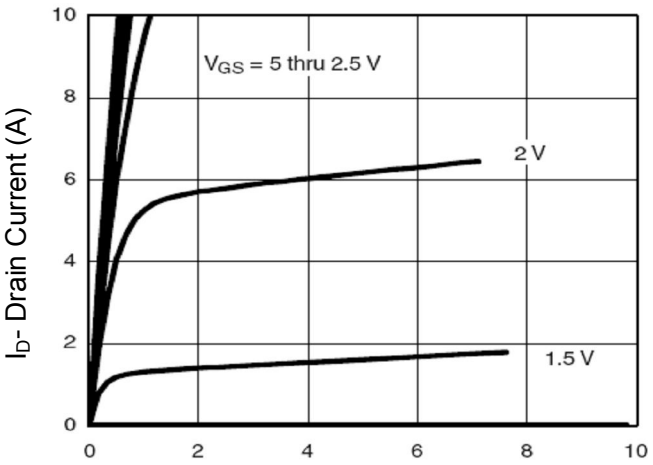
TJ-Junction Temperature(℃)

Figure 3 Power Dissipation



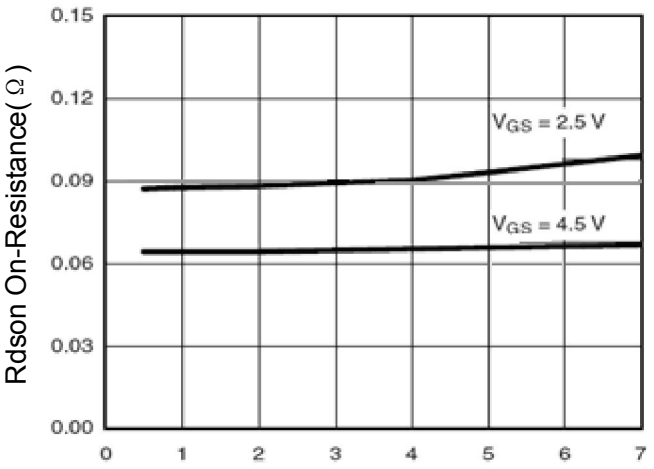
TJ-Junction Temperature(℃)

Figure 4 Drain Current



Vds Drain-Source Voltage (V)

Figure 5 Output Characteristics



ID- Drain Current (A)

Figure 6 Drain-Source On-Resistance

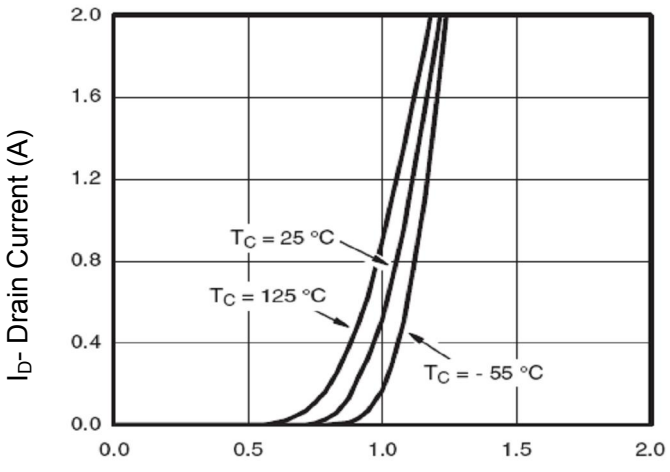


Figure 7 Transfer Characteristics

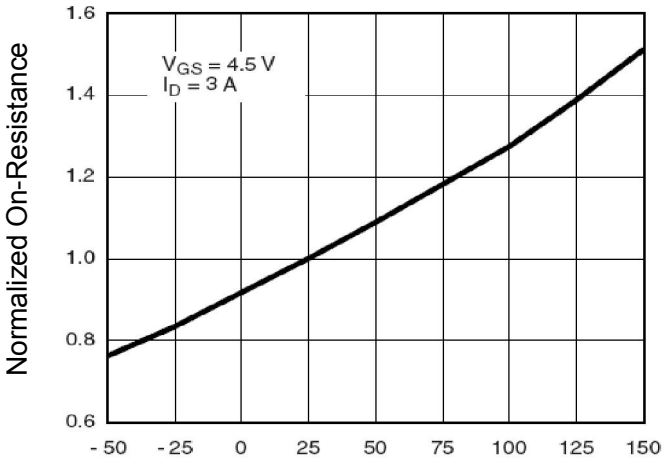


Figure 8 Drain-Source On-Resistance

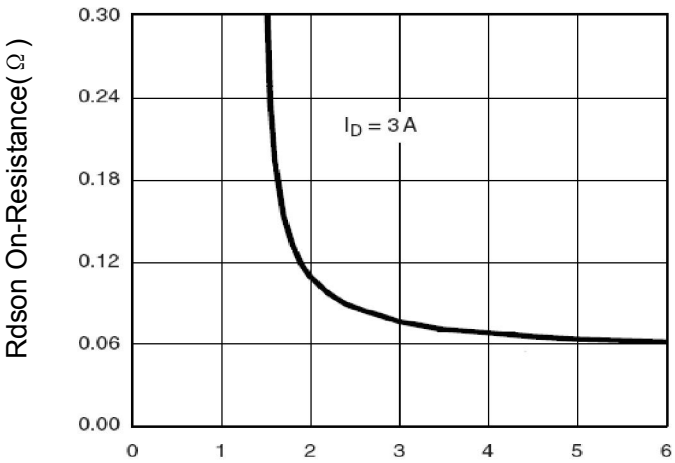


Figure 9 Rdson vs Vgs

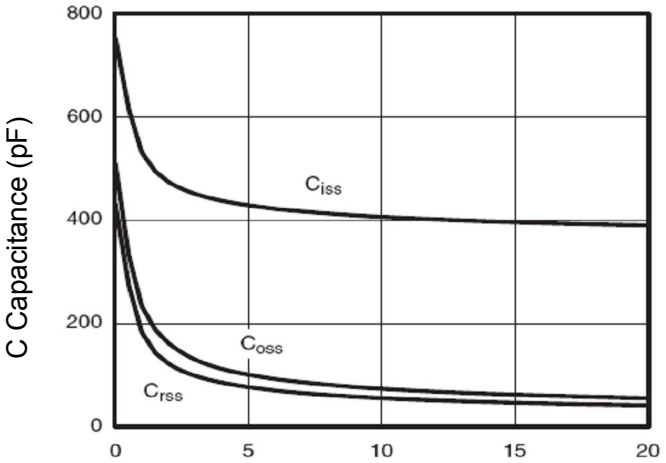


Figure 10 Capacitance vs Vds

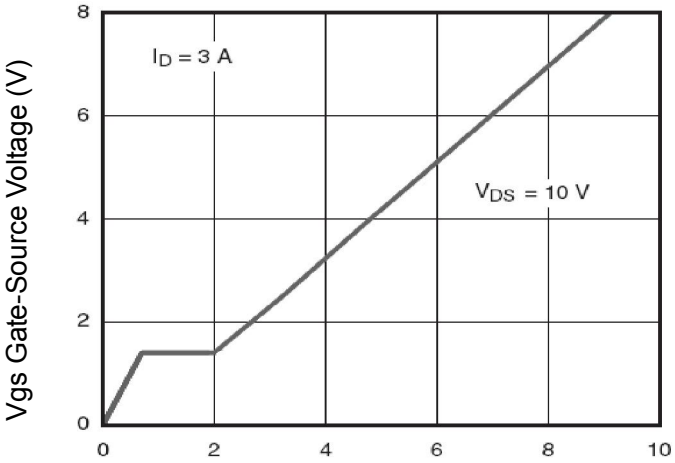


Figure 11 Gate Charge

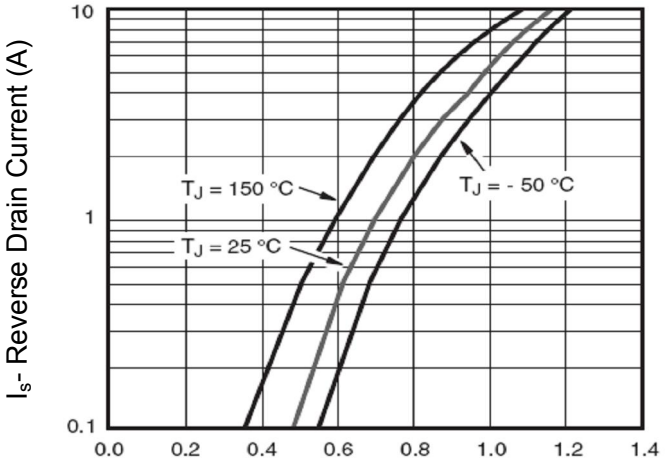


Figure 12 Source- Drain Diode Forward

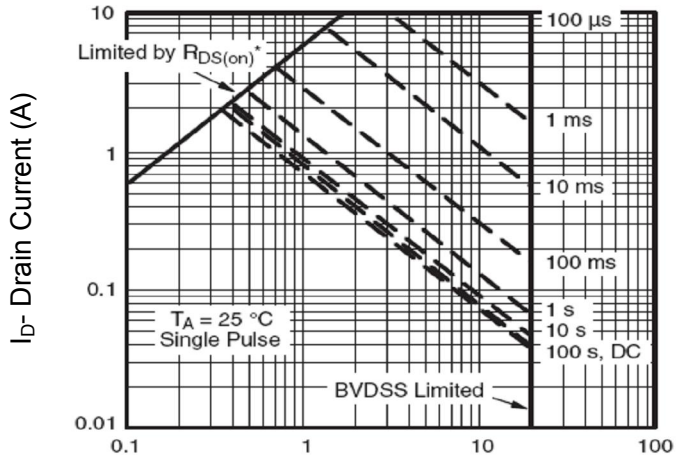


Figure 13 Safe Operation Area

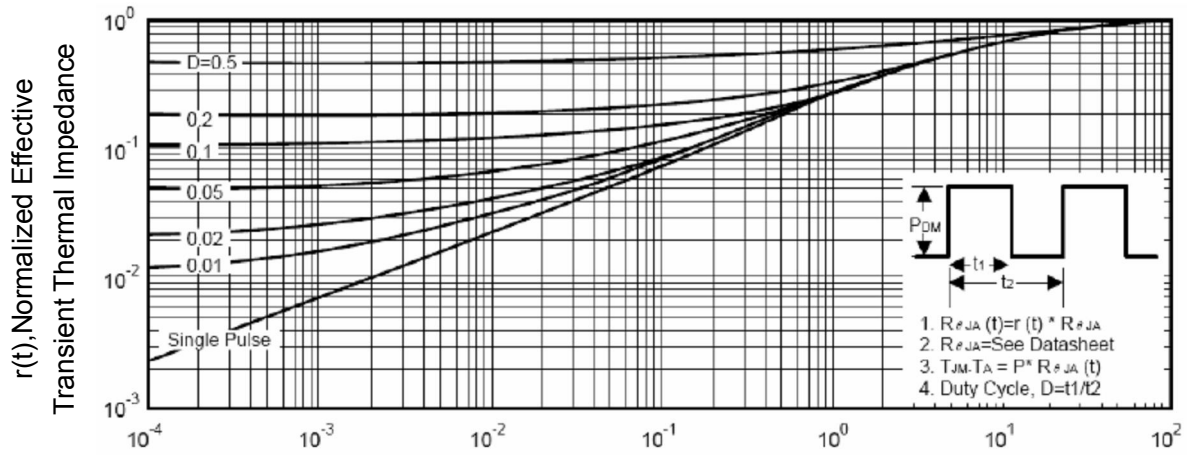
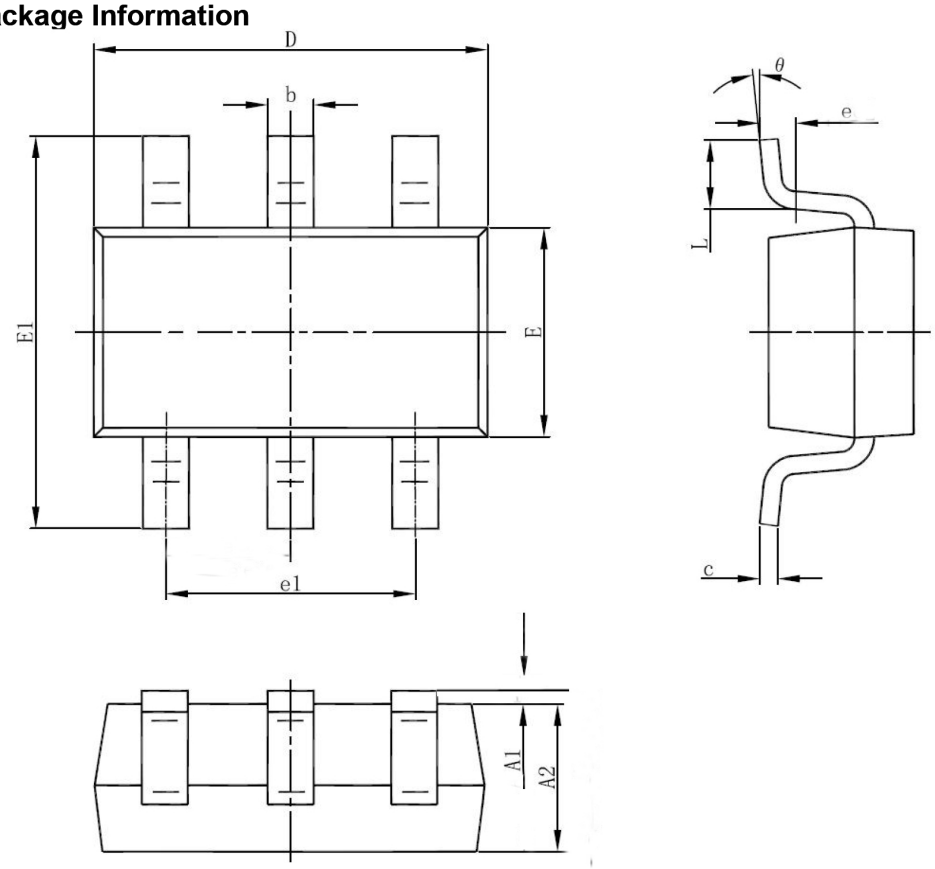


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT23-6L Package Information



DIM	MIN	NOM	MAX
A1	0.00	-	0.10
A2	1.00	1.10	1.20
b	0.30	0.40	0.50
c	0.10	0.15	0.20
D	2.80	2.90	3.00
E	1.50	1.60	1.70
E1	2.60	2.80	3.00
e	0.2GAUGE PLANE		
e1	-	1.90	-
L	0.30	0.45	0.60
θ	0°	-	8°
All Dimensions in mm			