

Description

The 6703 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

General Features**N-Channel**

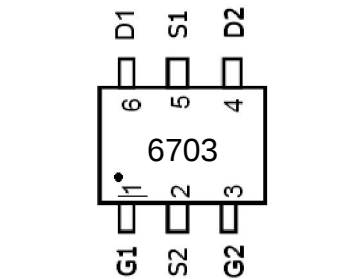
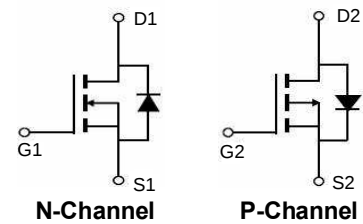
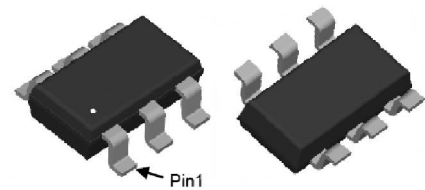
V_{DSS}	$R_{DS(ON)}$ @4.5V (Typ)	$R_{DS(ON)}$ @2.5V (Typ)	I_D
20V	30m Ω	37m Ω	2.9A

P-Channel

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

Application

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

**Marking and pin assignment****SOT-23-6L****Ordering Information**

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

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ 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	$T_A=25^\circ\text{C}$	P_D	1.1	1.1	W
	$T_A=70^\circ\text{C}$		0.7	0.7	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 To 150		$^\circ\text{C}$

Thermal Characteristic

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

N-Channel Electrical Characteristics ($T_A=25^{\circ}\text{C}$ 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 _{iss}	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, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

N-Channel Typical ElectricalL and Thermal Characteristics

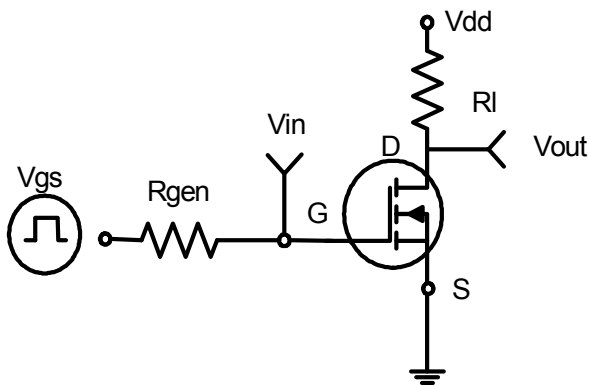


Figure 1:Switching Test Circuit

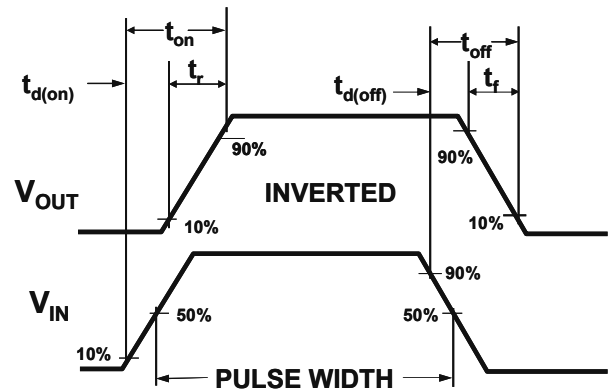


Figure 2:Switching Waveforms

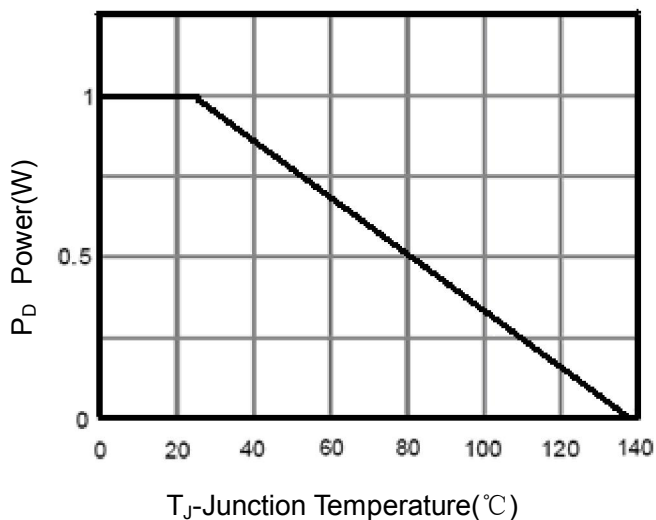


Figure 3 Power Dissipation

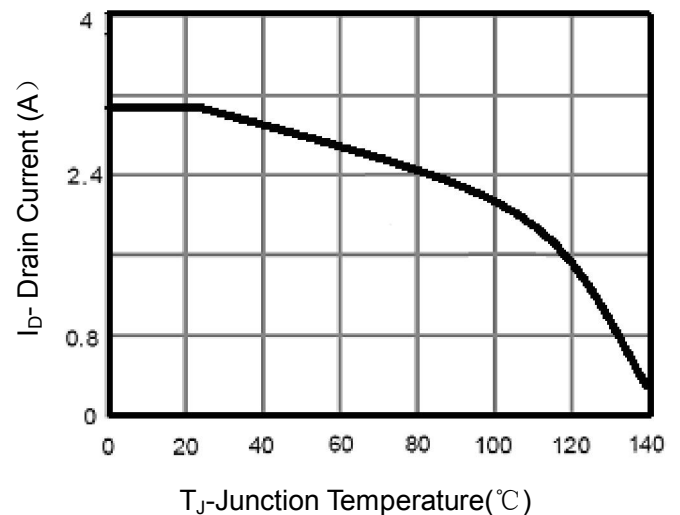


Figure 4 Drain Current

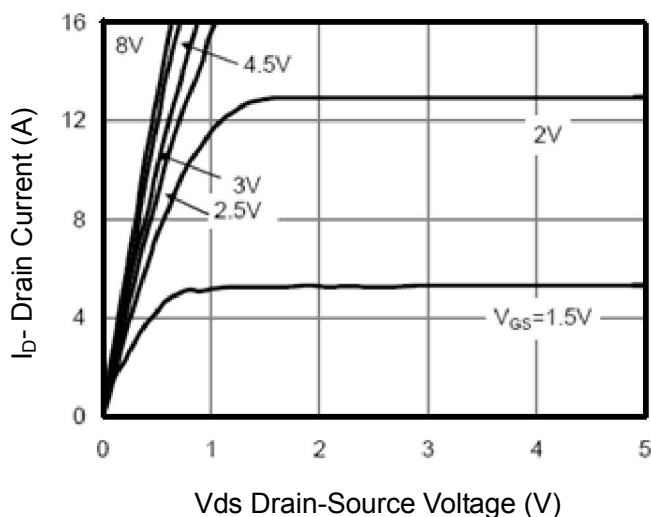


Figure 5 Output Characteristics

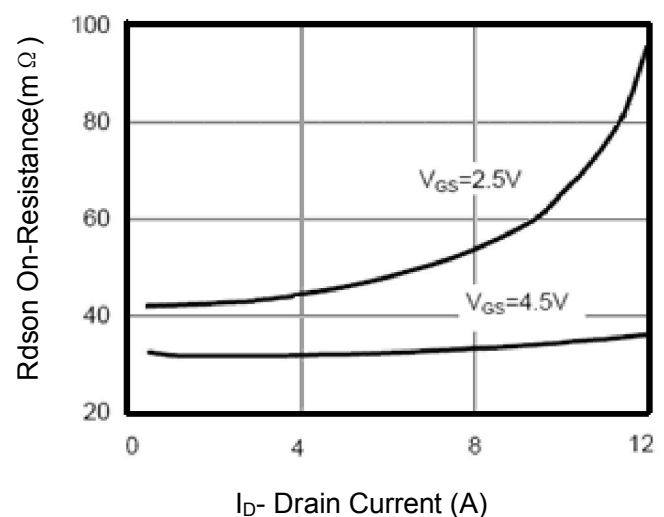


Figure 6 Drain-Source On-Resistance

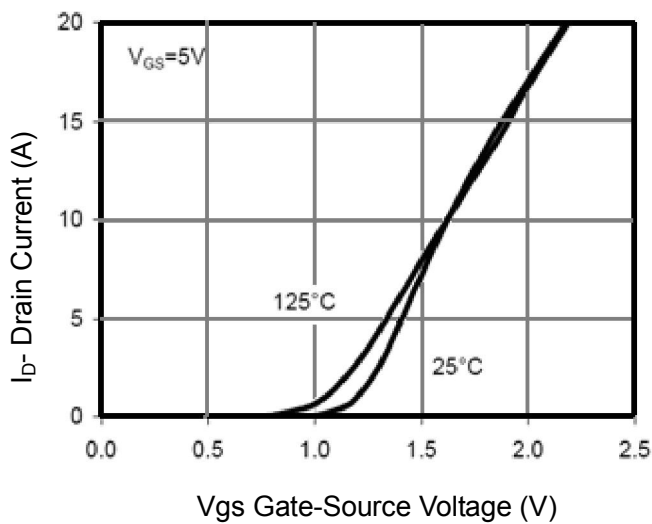


Figure 7 Transfer Characteristics

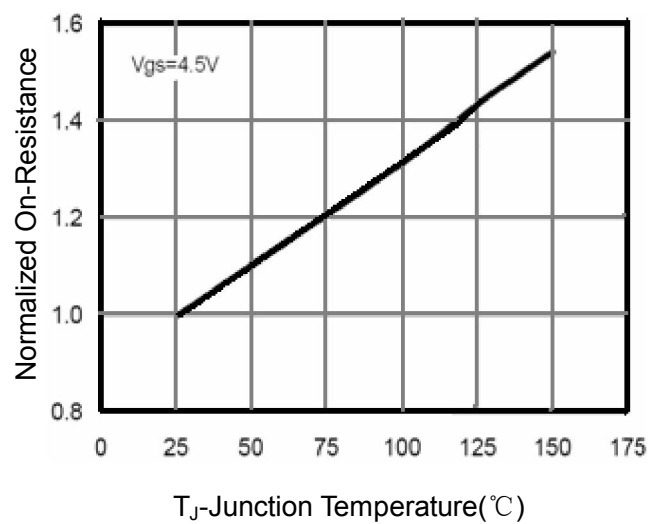


Figure 8 Drain-Source On-Resistance

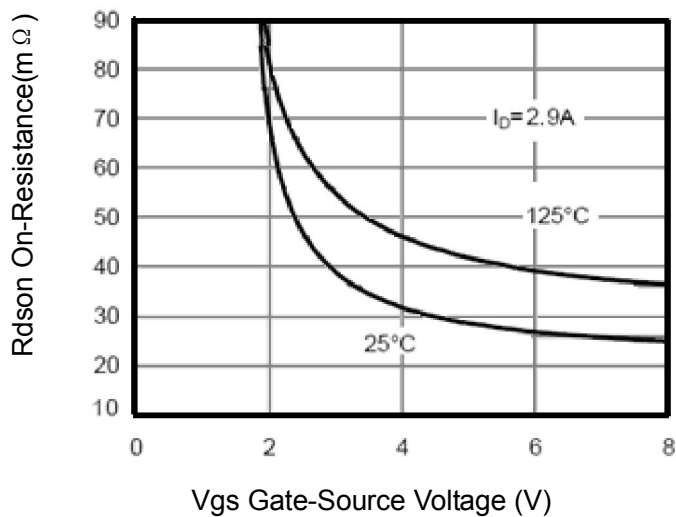


Figure 9 Rdson vs Vgs

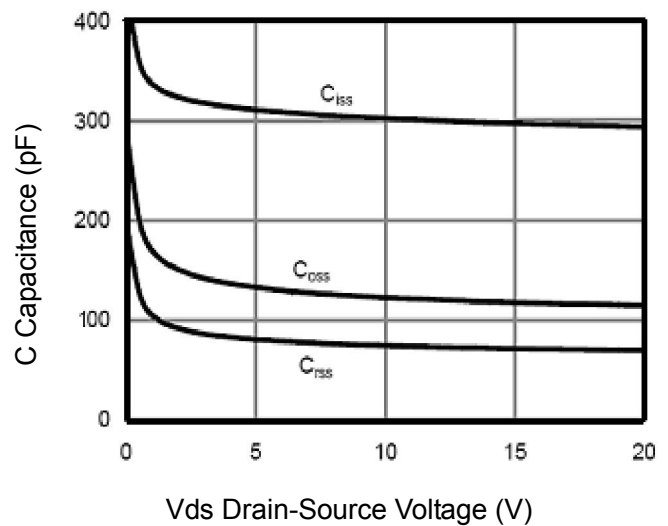


Figure 10 Capacitance vs Vds

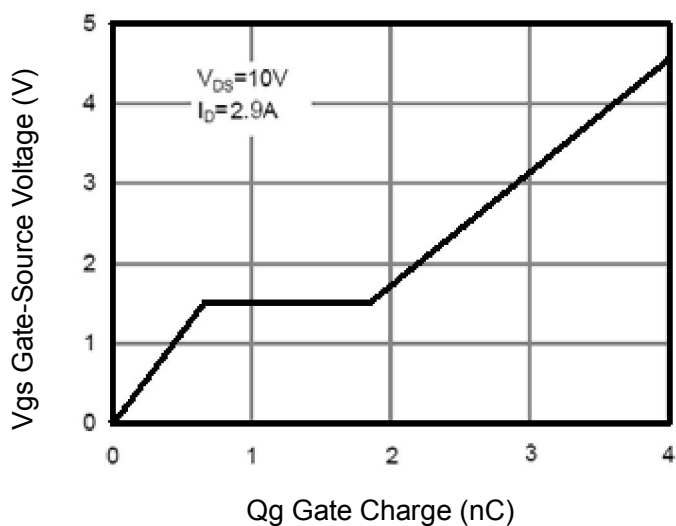


Figure 11 Gate Charge

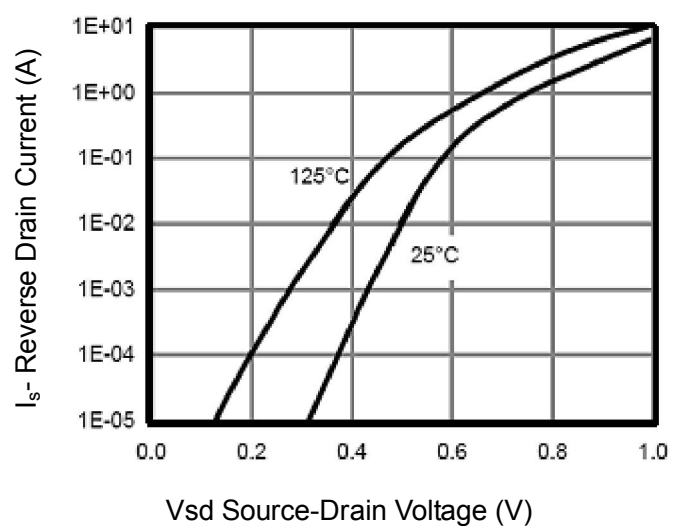


Figure 12 Source- Drain Diode Forward

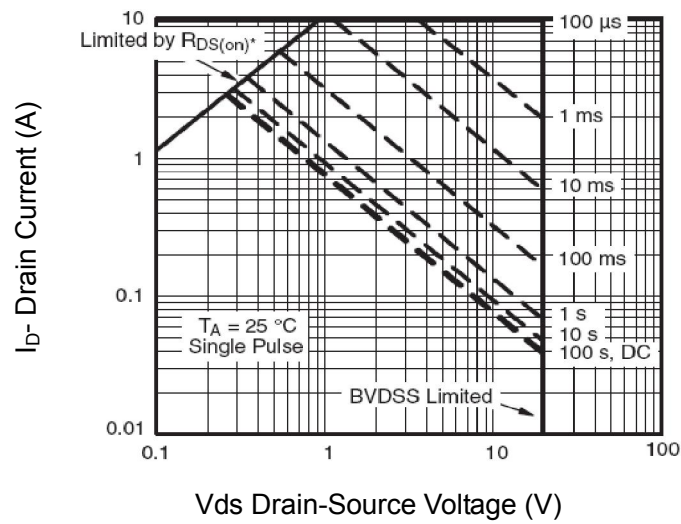


Figure 13 Safe Operation Area

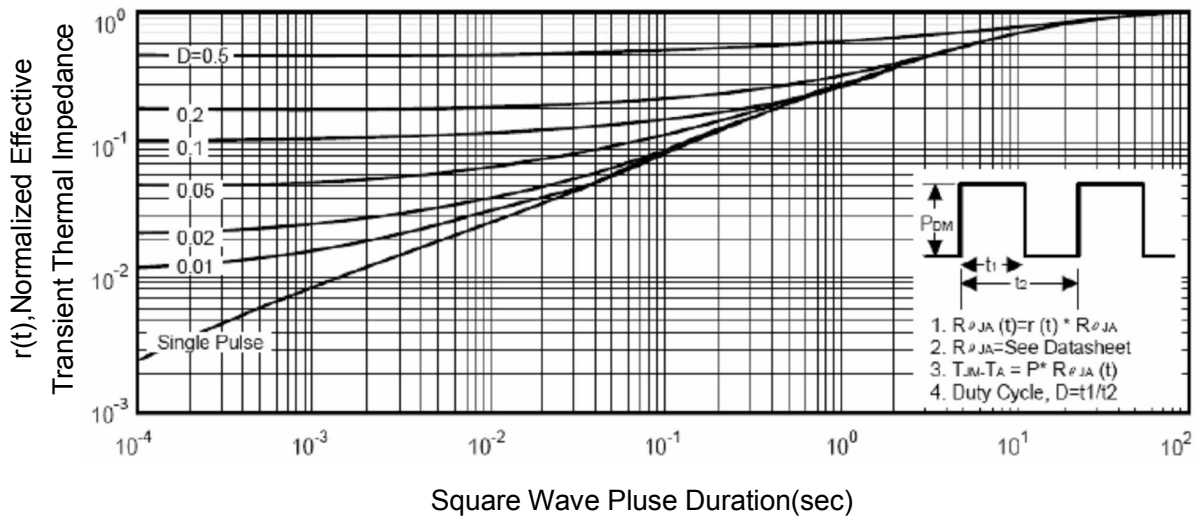


Figure 14 Normalized Maximum Transient Thermal Impedance

P-Channel Electrical Characteristics ($T_A=25^{\circ}\text{C}$ 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 _{iss}	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, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

P-Channel Typical Electrical and Thermal Characteristics

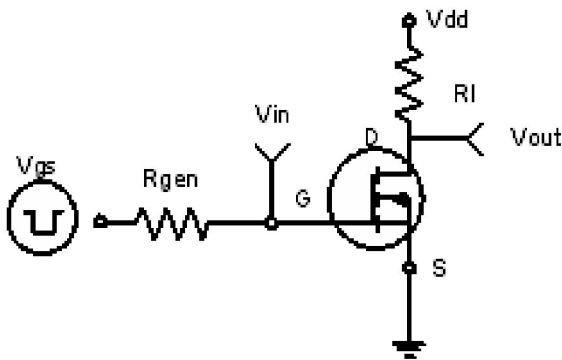


Figure 1: Switching Test Circuit

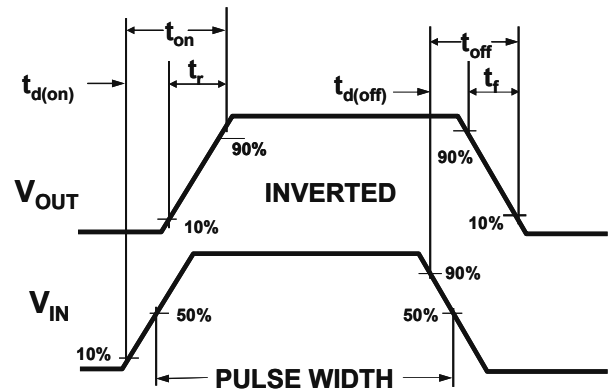


Figure 2: Switching Waveforms

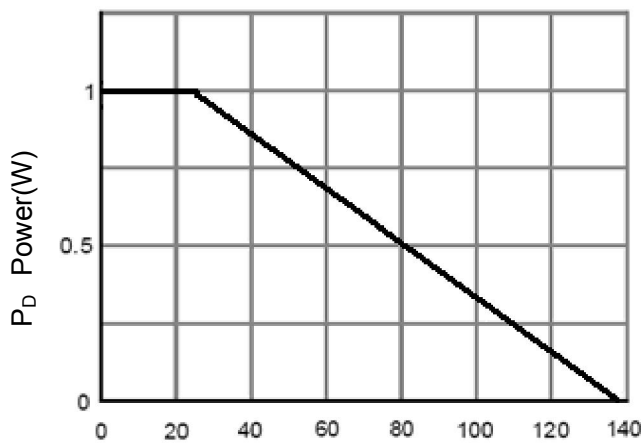


Figure 3 Power Dissipation

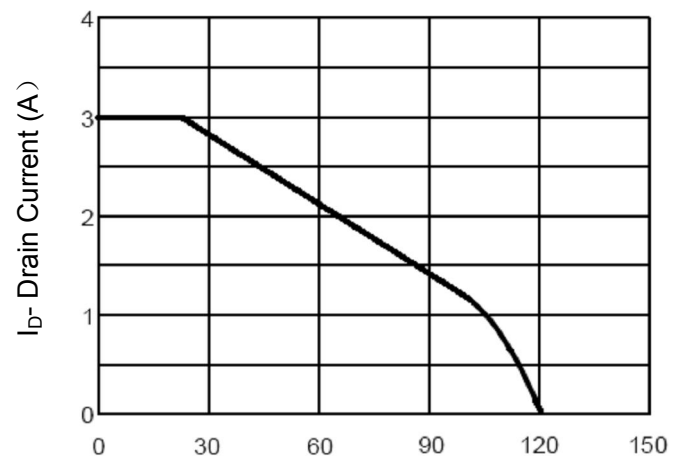


Figure 4 Drain Current

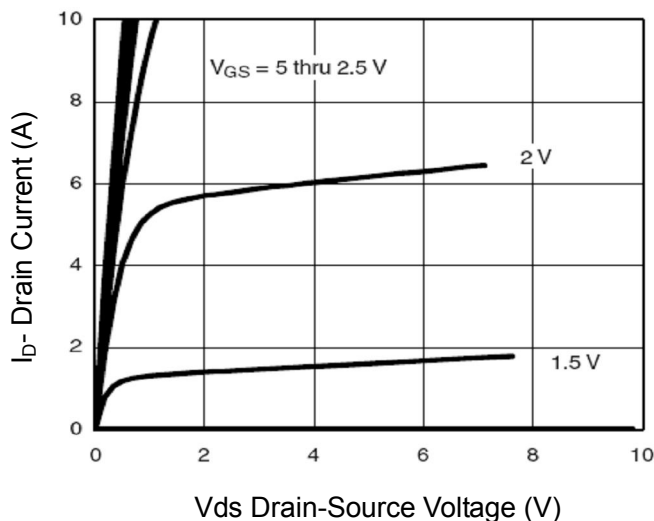


Figure 5 Output Characteristics

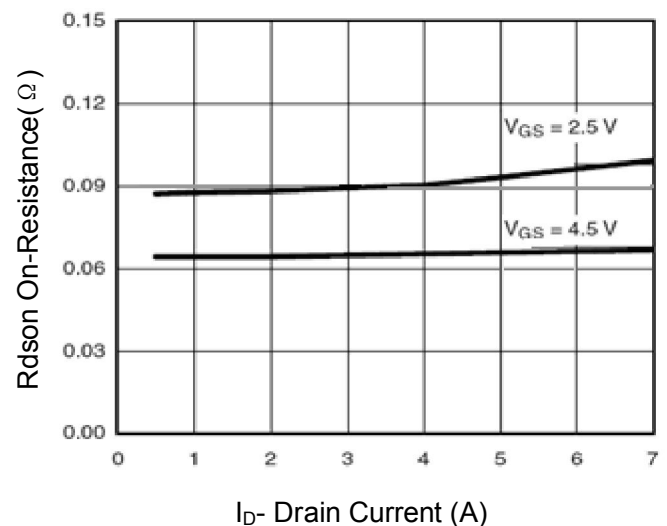


Figure 6 Drain-Source On-Resistance

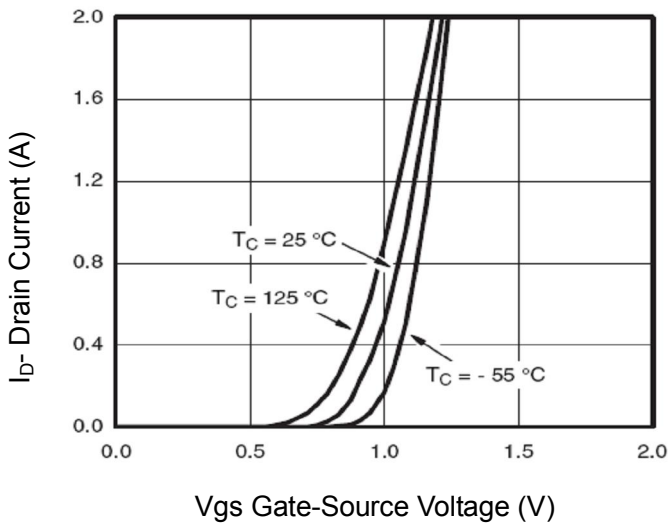


Figure 7 Transfer Characteristics

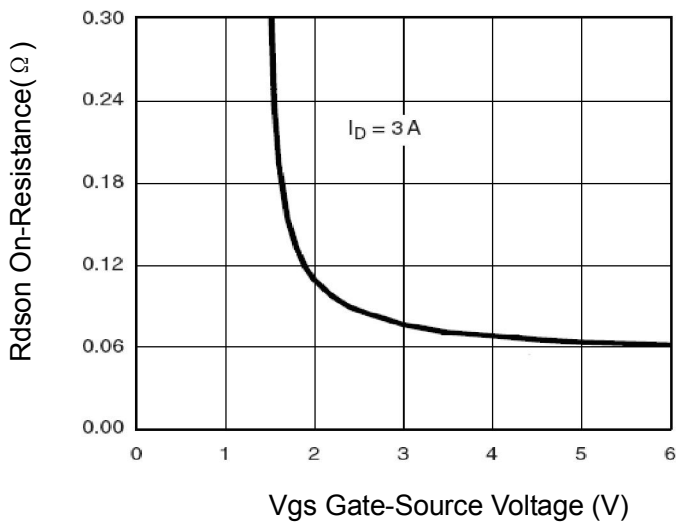


Figure 9 Rdson vs Vgs

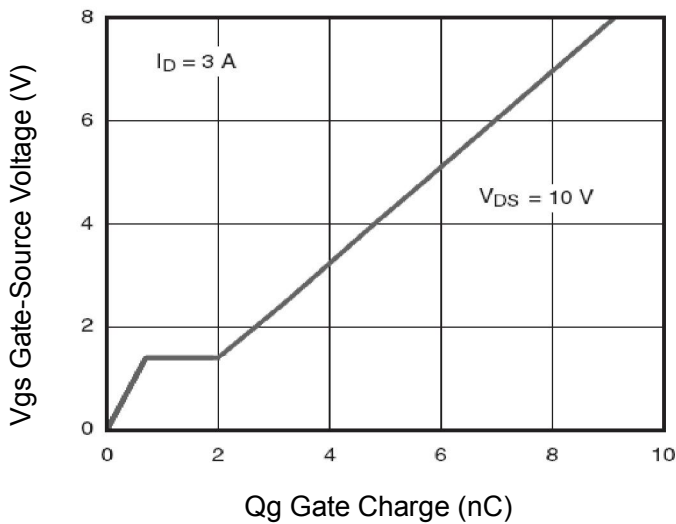


Figure 11 Gate Charge

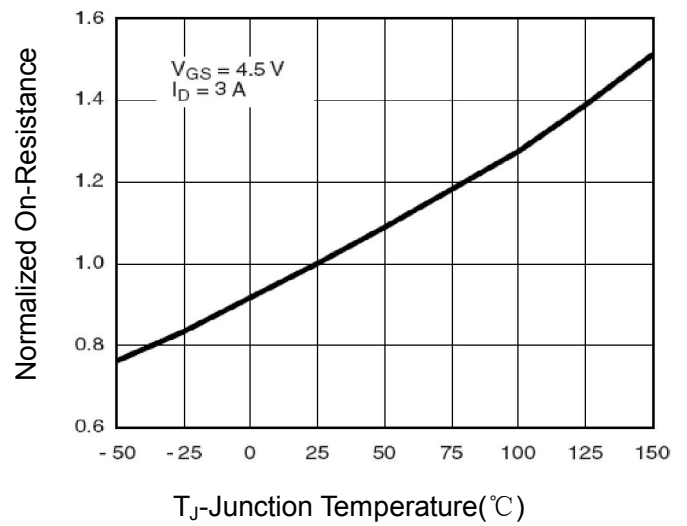


Figure 8 Drain-Source On-Resistance

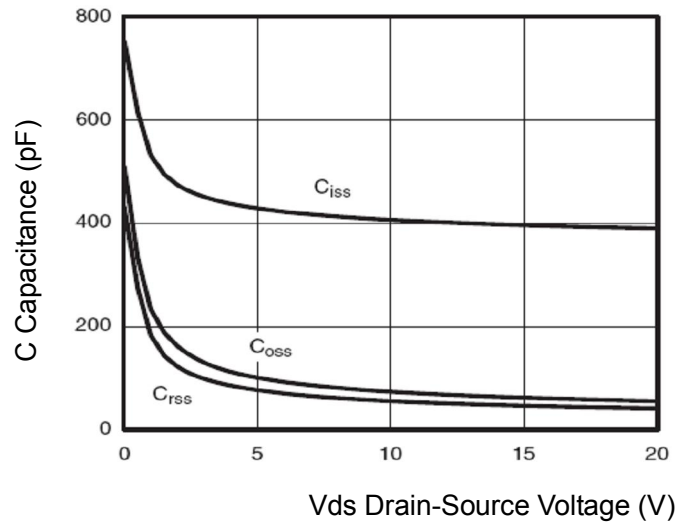


Figure 10 Capacitance vs Vds

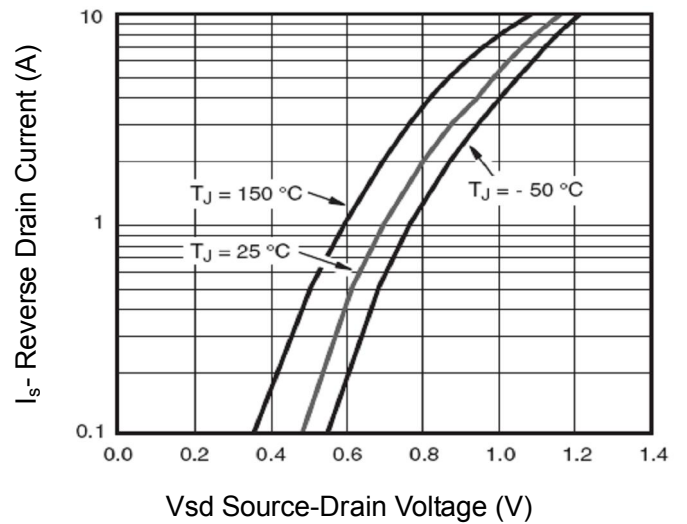


Figure 12 Source- Drain Diode Forward

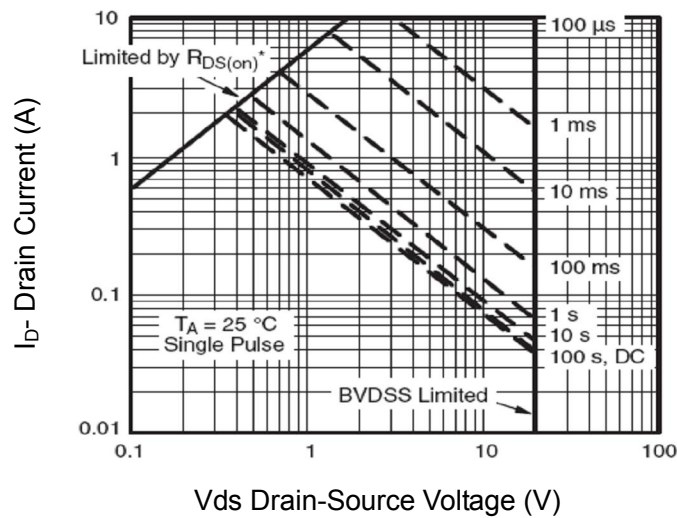


Figure 13 Safe Operation Area

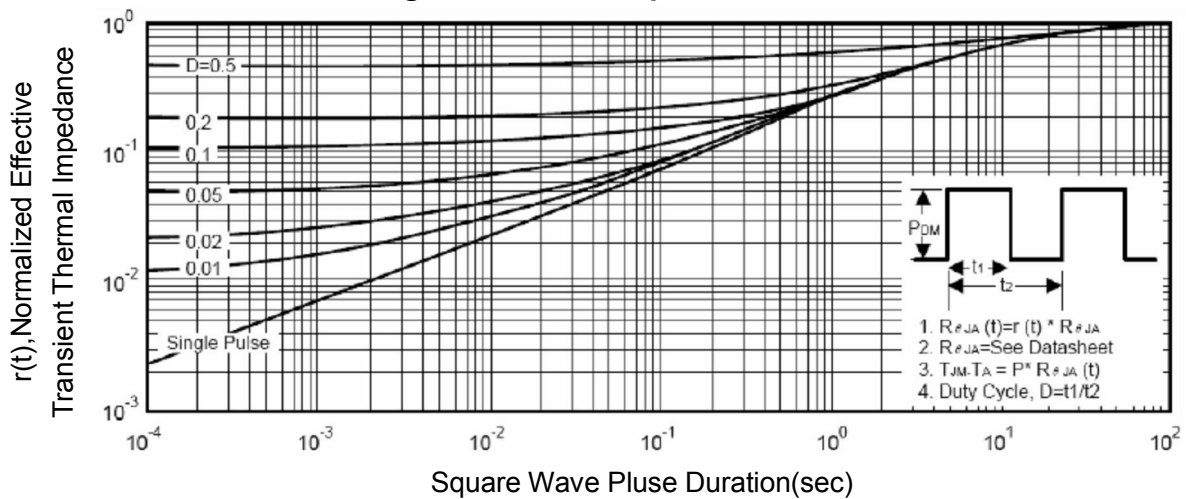
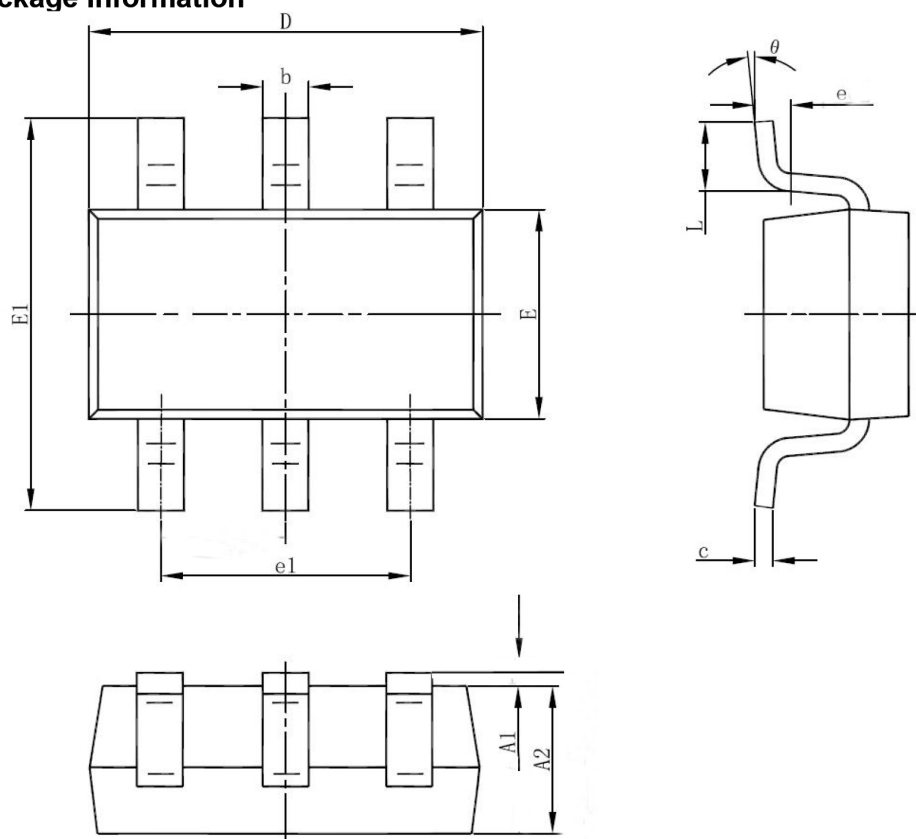


Figure 14 Normalized Maximum Transient Thermal Impedance

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			