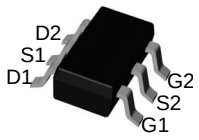
Features

- **N-Channel**
  30V/4.9A,
  $R_{DS(ON)}$=32mΩ(typ.) @ V_{GS}=10V
  $R_{DS(ON)}$=44mΩ(typ.) @ V_{GS}=4.5V
- **P-Channel**
  -30V/-3A,
  $R_{DS(ON)}$=75mΩ(typ.) @ V_{GS}=-10V
  $R_{DS(ON)}$=110mΩ(typ.) @ V_{GS}=-4.5V
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

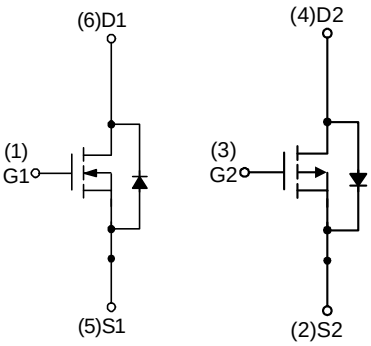
Applications

- Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems.
- Load Switch

Pin Description



Top View of SOT23-6L



N-Channel P-Channel

Absolute Maximum Ratings (T_A = 25°C unless otherwise noted)

Symbol	Parameter		N Channel	P Channel	Unit
Common Ratings					
V_{DSS}	Drain-Source Voltage		30	-30	V
V_{GSS}	Gate-Source Voltage		±20	±20	V
I_D	Continuous Drain Current	T_A=25°C	4.9	-3	A
		T_A=70°C	3.9	-2.4	
I_{DM}	300µs Pulsed Drain Current	V_{GS}=10V	19	-12	
I_S	Diode Continuous Forward Current		1		
T_J	Maximum Junction Temperature		150		°C
T_{STG}	Storage Temperature Range		-55 to 150		
P_D	Maximum Power Dissipation	T_A=25°C	1.4		W
		T_A=70°C	0.9		
$R_{\theta JA}$*	Thermal Resistance-Junction to Ambient	t ≤ 10s	90		°C/W
		Steady State	125		

Note: * Surface Mounted on 1in^2 pad area.

N Channel Electrical Characteristics (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	N Channel			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1.0	1.5	2.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$ [a]	Drain-Source On-State Resistance	V_{GS}=10V, I_{DS}=4.9A	-	32	36	mΩ
		V_{GS}=4.5V, I_{DS}=3A	-	44	53	
Diode Characteristics						
V_{SD} [a]	Diode Forward Voltage	I_{SD}=1A, V_{GS}=0V	-	0.75	1.1	V
t_{rr}	Reverse Recovery Time	I_{SD}=4.9A, dI_{SD}/dt=100A/μs	-	9.2	-	ns
Q_{rr}	Reverse Recovery Charge		-	4.3	-	nC
Dynamic Characteristics [b]						
R_g	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	2.3	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz	-	215	-	pF
C_{oss}	Output Capacitance		-	37	-	
C_{rss}	Reverse Transfer Capacitance		-	28	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V, R_L=15Ω, I_{DS}=1A, V_{GEN}=10V, R_G=6Ω	-	5.3	8	ns
T_r	Turn-on Rise Time		-	11	16	
$t_{d(OFF)}$	Turn-off Delay Time		-	12	17	
T_f	Turn-off Fall Time		-	2.6	4	
Gate Charge Characteristics [b]						
Q_g	Total Gate Charge	V_{DS}=15V, I_{DS}=4.9A, V_{GS}=4.5V	-	3	-	nC
		V_{DS}=15V, I_{DS}=4.9A, V_{GS}=10V	-	5.8	-	
Q_{gs}	Gate-Source Charge	V_{DS}=15V, V_{GS}=10V, I_{DS}=4.9A	-	1.1	-	
Q_{gd}	Gate-Drain Charge		-	1.5	-	
Q_{gth}	Threshold Gate Charge		-	0.5	-	

Note a: Pulse test; pulse width≤300μs, duty cycle≤2%.
Note b: Guaranteed by design, not subject to production testing.

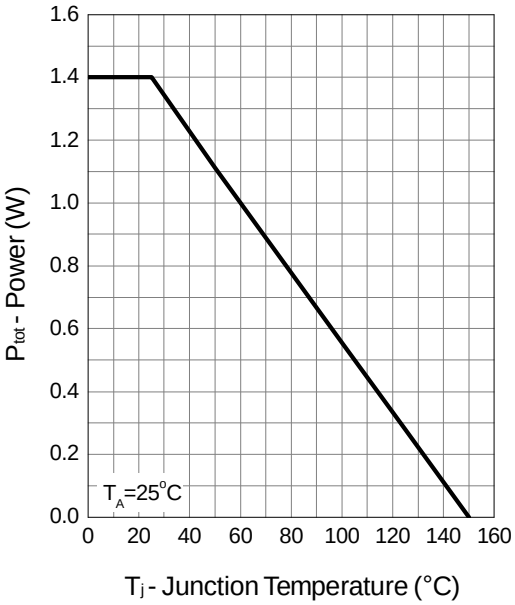
P Channel Electrical Characteristics (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	P Channel			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=-250μA	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-24V, V_{GS}=0V	-	-	-1	μA
		T_J=85°C	-	-	-30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=-250μA	-1.0	-1.5	-2.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$ [a]	Drain-Source On-State Resistance	V_{GS}=-10V, I_{DS}=-3A	-	75	100	mΩ
		V_{GS}=-4.5V, I_{DS}=-1.9A	-	110	170	
Diode Characteristics						
V_{SD} [a]	Diode Forward Voltage	I_{SD}=-1A, V_{GS}=0V	-	-0.75	-1.1	V
t_{rr}	Reverse Recovery Time	I_{SD}=-3A, dI_{SD}/dt=100A/μs	-	19	-	ns
Q_{rr}	Reverse Recovery Charge		-	14	-	nC
Dynamic Characteristics [b]						
R_g	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	7	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-15V, Frequency=1.0MHz	-	229	-	pF
C_{oss}	Output Capacitance		-	42	-	
C_{rss}	Reverse Transfer Capacitance		-	33	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=-15V, R_L=15Ω, I_{DS}=-1A, V_{GEN}=-10V, R_G=6Ω	-	7.2	-	ns
T_r	Turn-on Rise Time		-	9.3	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	15.4	-	
T_f	Turn-off Fall Time		-	3.6	-	
Gate Charge Characteristics [b]						
Q_g	Total Gate Charge	V_{DS}=-15V, I_{DS}=-3A, V_{GS}=-4.5V	-	3.3	-	nC
		V_{DS}=-15V, I_{DS}=-3A, V_{GS}=-10V	-	6.5	-	
Q_{gs}	Gate-Source Charge	V_{DS}=-15V, V_{GS}=-10V, I_{DS}=-3A	-	1.1	-	
Q_{gd}	Gate-Drain Charge		-	1.1	-	
Q_{gth}	Threshold Gate Charge		-	0.6	-	

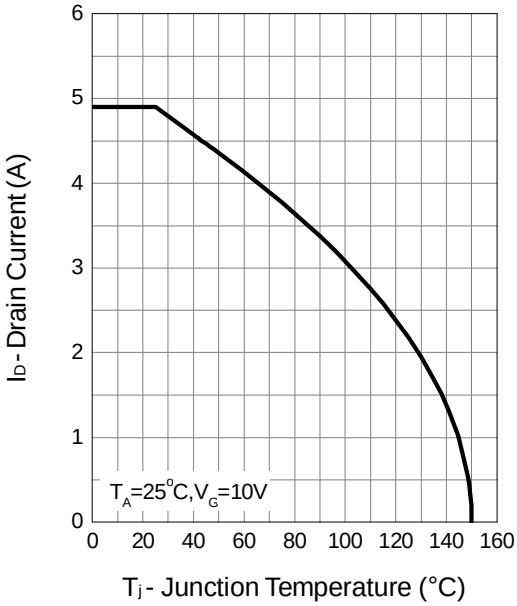
Note a: Pulse test; pulse width≤300μs, duty cycle≤2%.
Note b: Guaranteed by design, not subject to production testing.

N Channel Typical Operating Characteristics

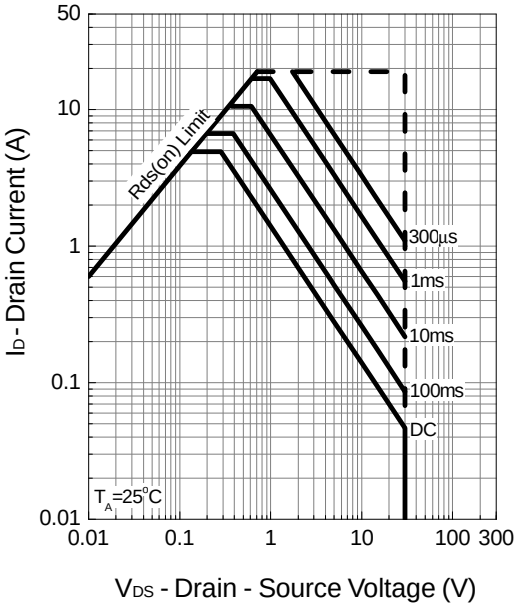
Power Dissipation



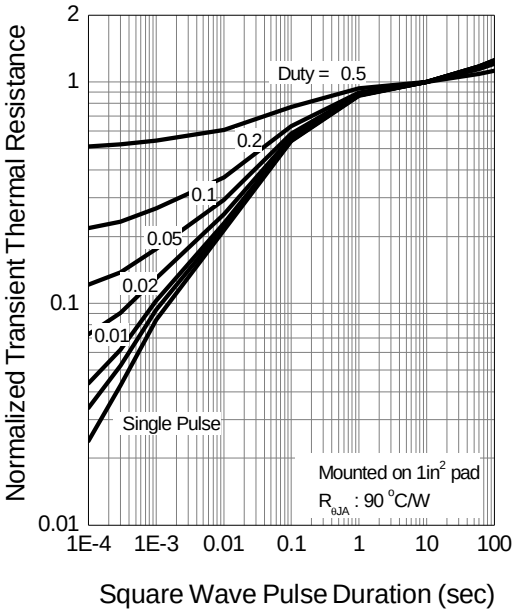
Drain Current



Safe Operation Area

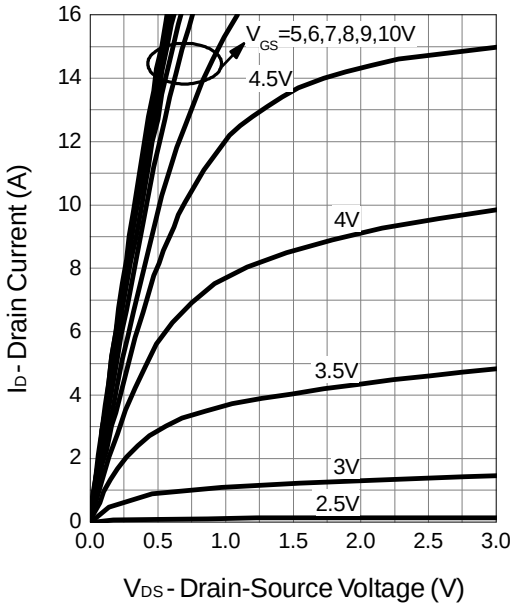


Thermal Transient Impedance

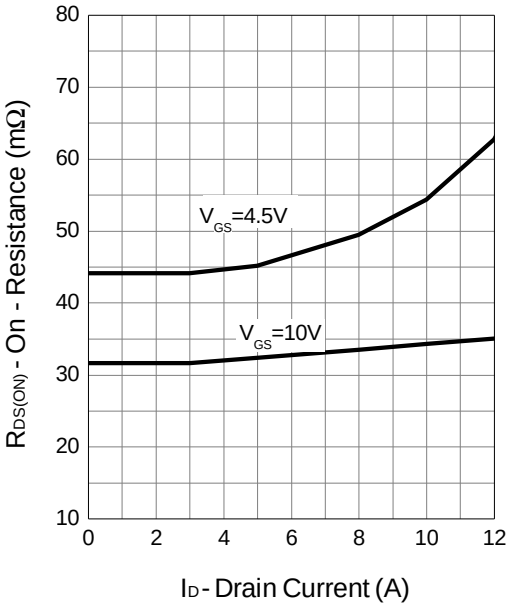


N Channel Typical Operating Characteristics (Cont.)

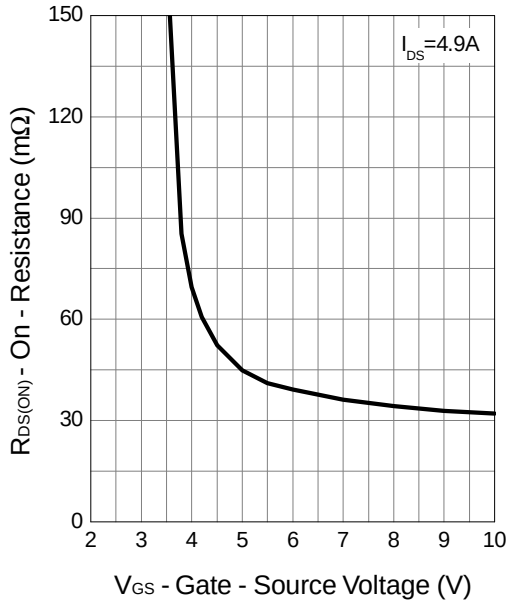
Output Characteristics



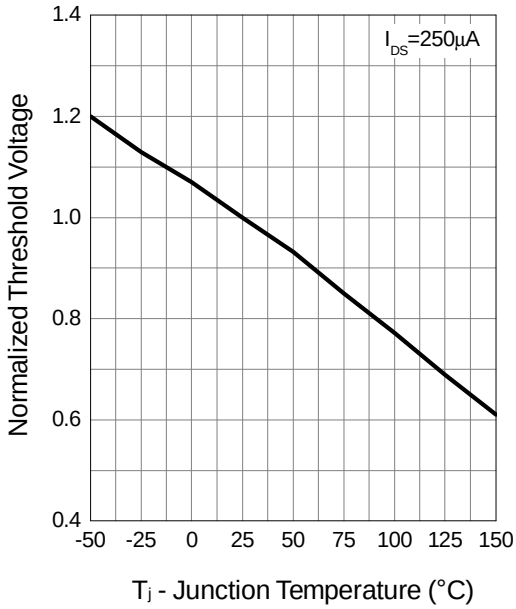
Drain-Source On Resistance



Gate-Source On Resistance

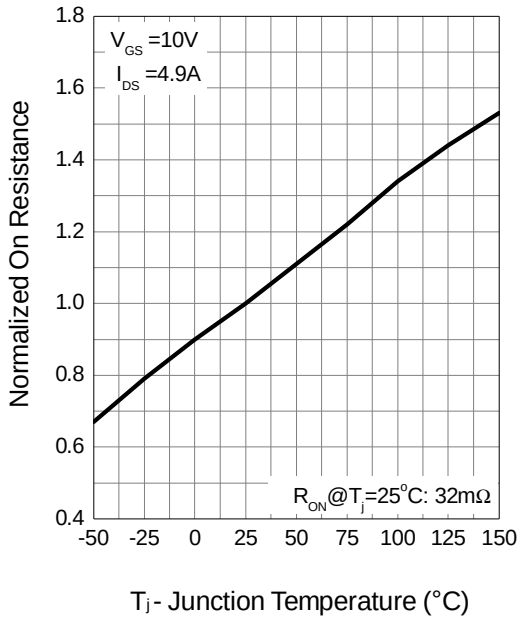


Gate Threshold Voltage



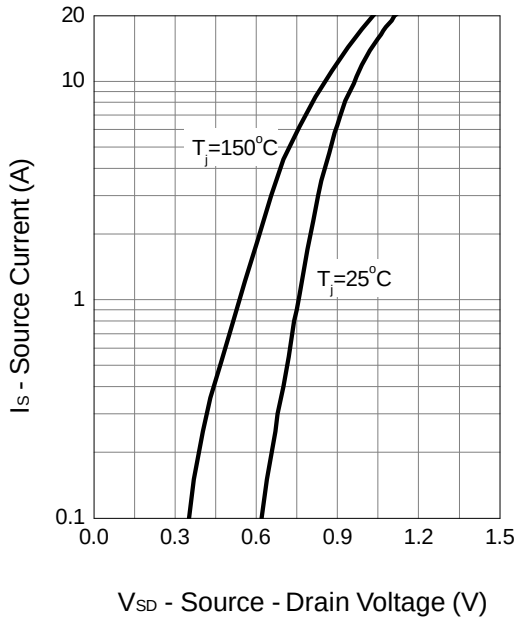
N Channel Typical Operating Characteristics (Cont.)

Drain-Source On Resistance



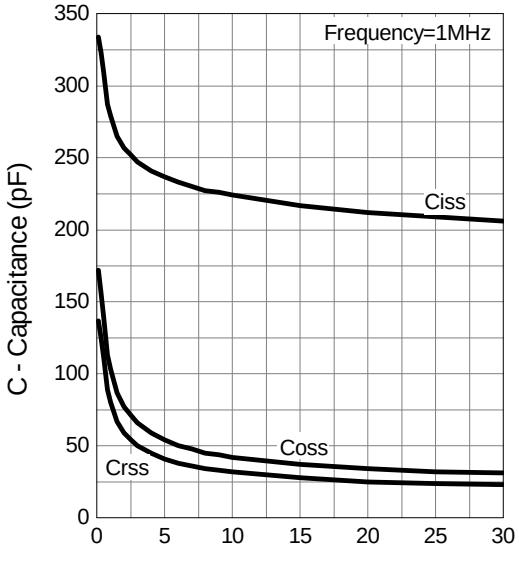
T_j - Junction Temperature (°C)

Source-Drain Diode Forward



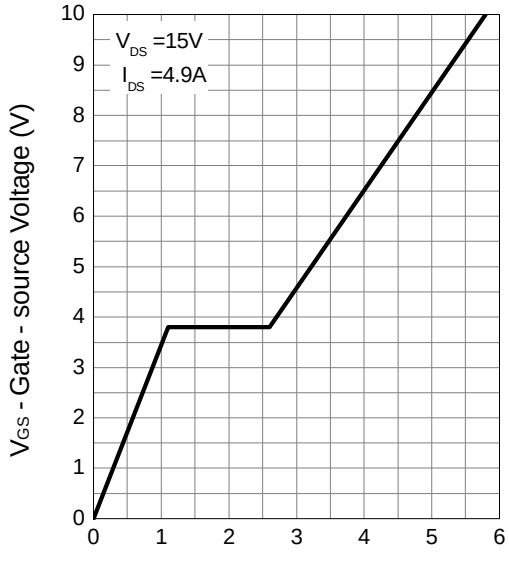
V_{SD} - Source - Drain Voltage (V)

Capacitance



V_{DS} - Drain - Source Voltage (V)

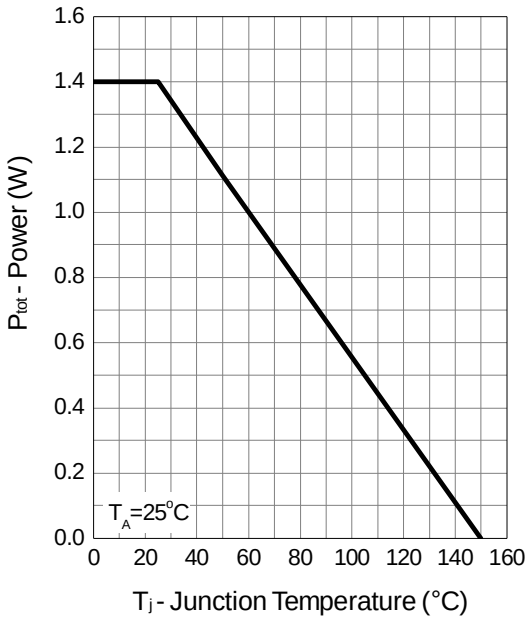
Gate Charge



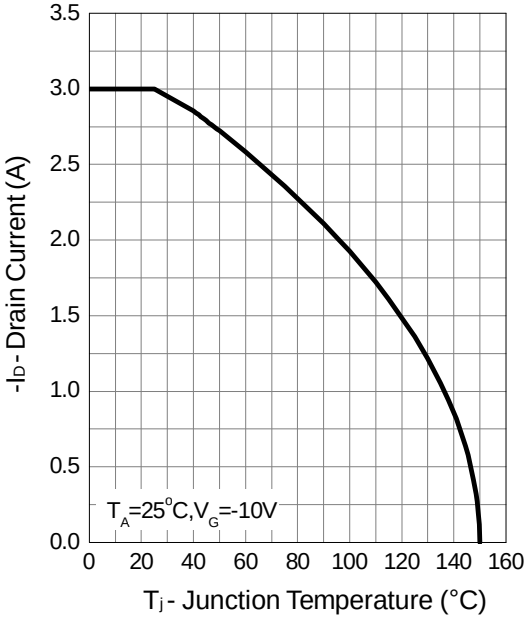
Q_G - Gate Charge (nC)

P Channel Typical Operating Characteristics

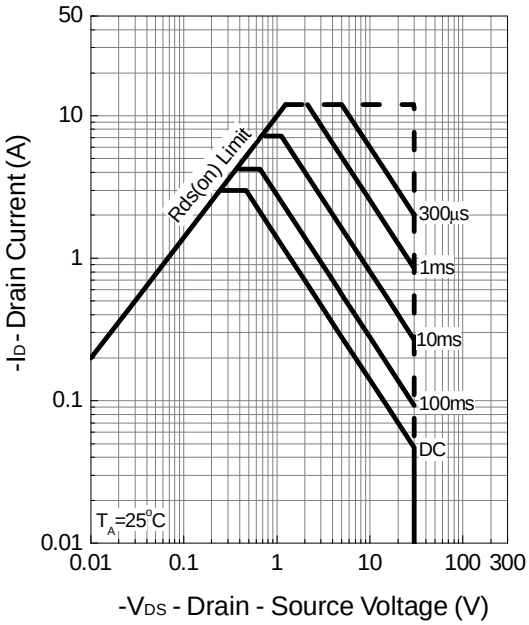
Power Dissipation



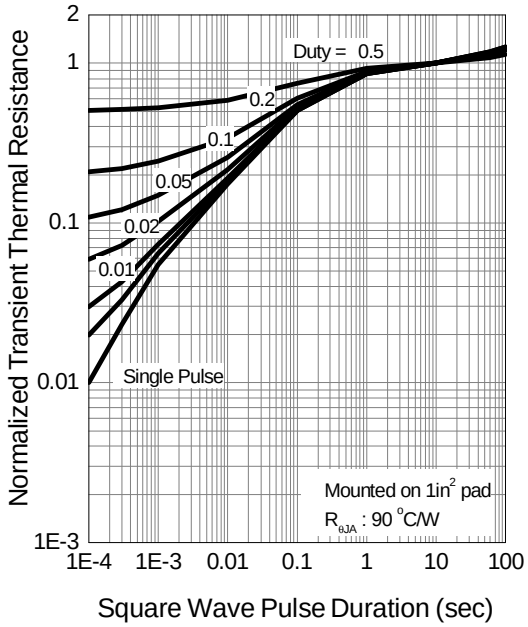
Drain Current



Safe Operation Area

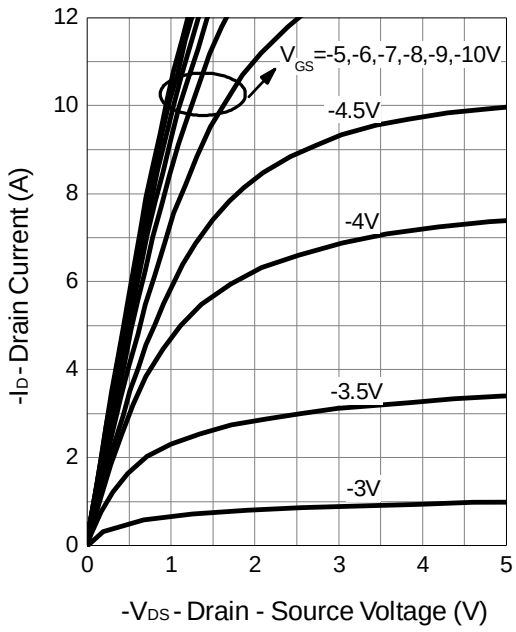


Thermal Transient Impedance

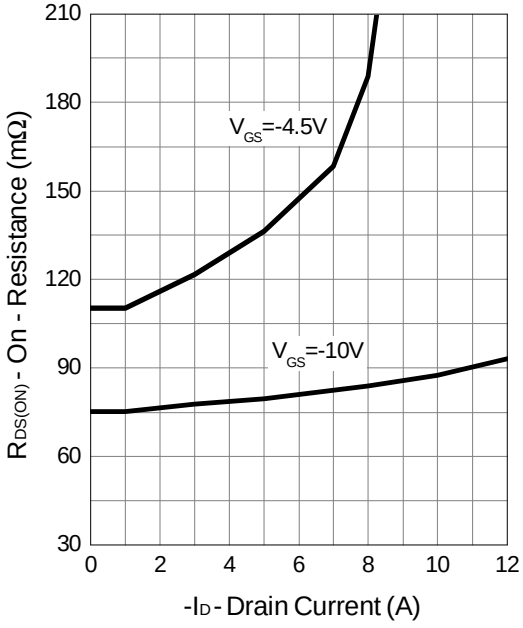


P Channel Typical Operating Characteristics (Cont.)

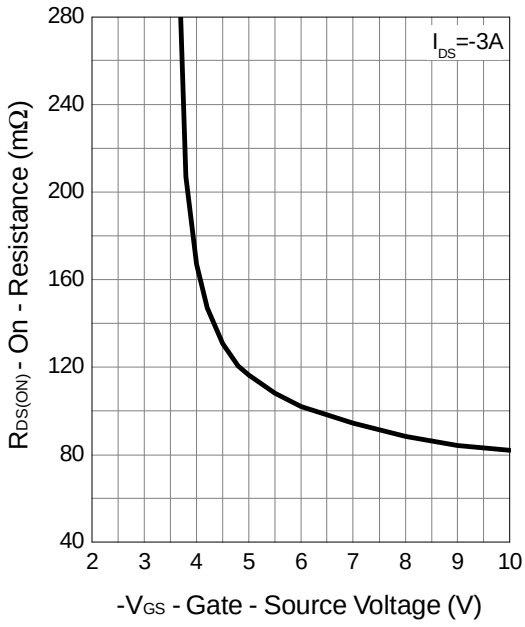
Output Characteristics



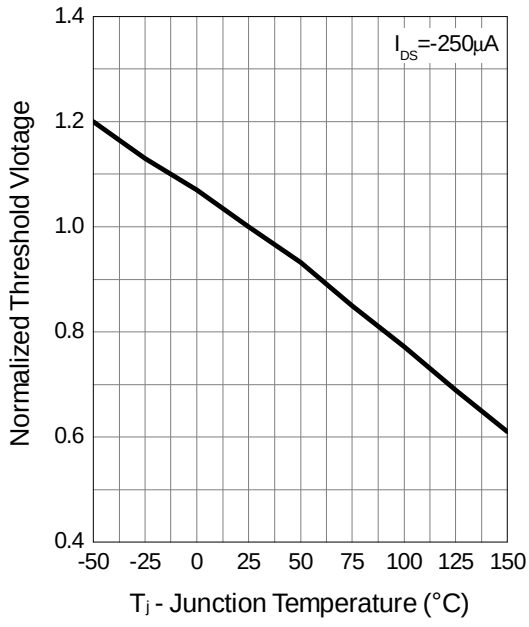
Drain-Source On Resistance



Gate-Source On Resistance

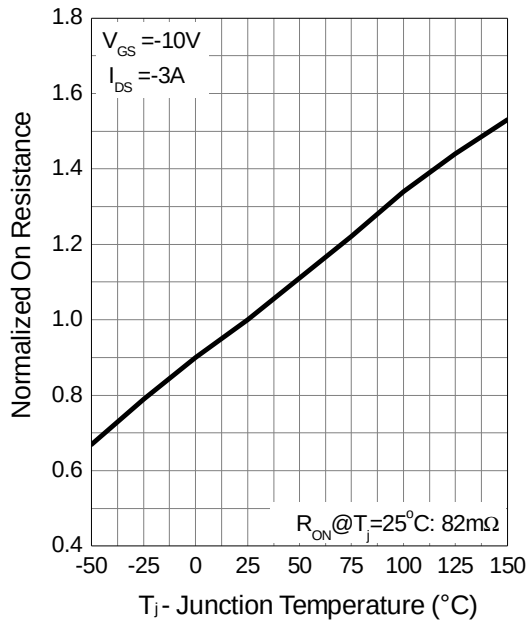


Gate Threshold Voltage

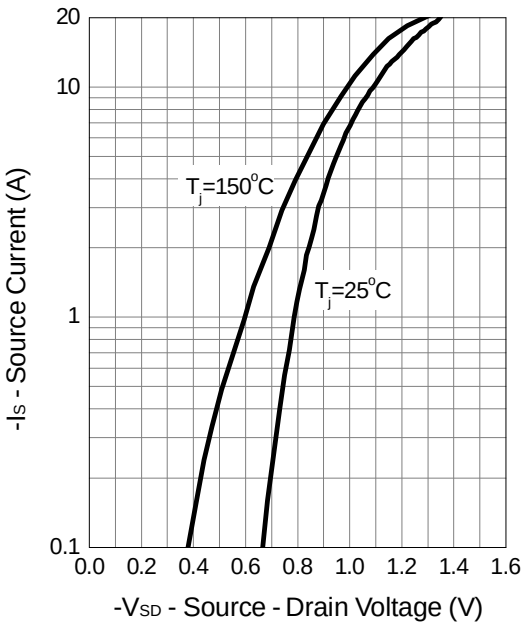


P Channel Typical Operating Characteristics (Cont.)

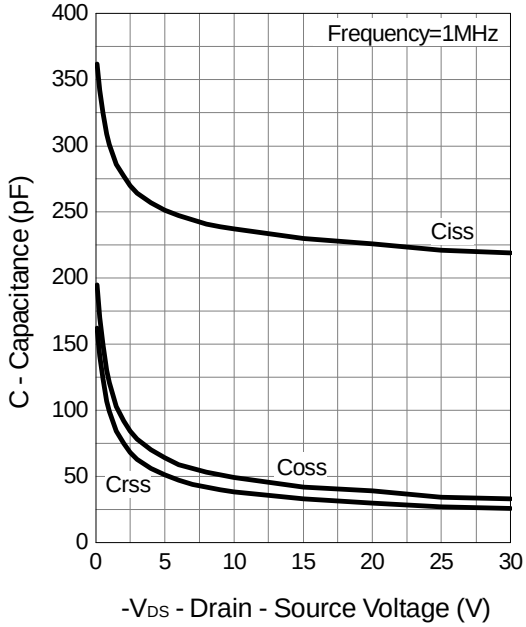
Drain-Source On Resistance



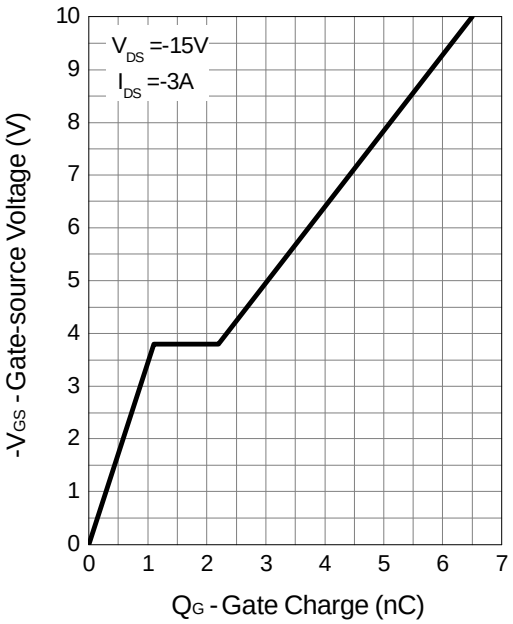
Source-Drain Diode Forward



Capacitance

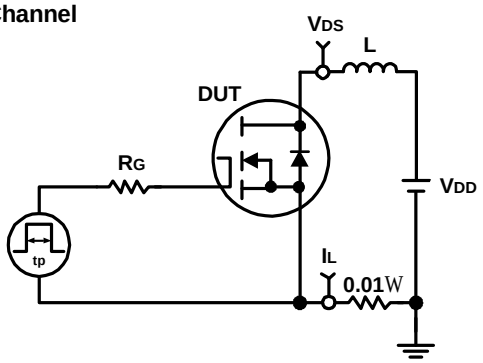


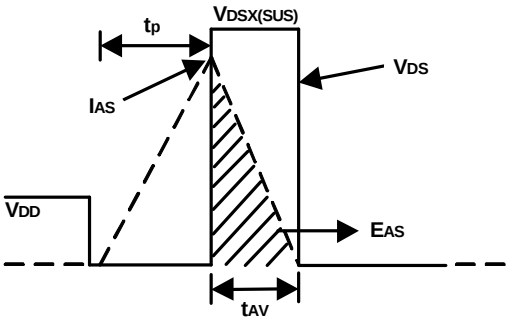
Gate Charge



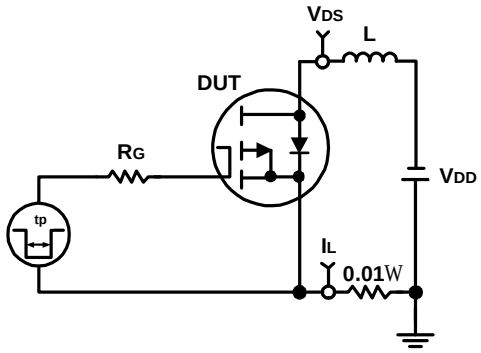
Avalanche Test Circuit and Waveforms

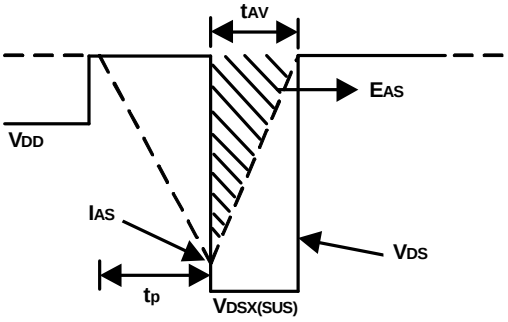
N Channel





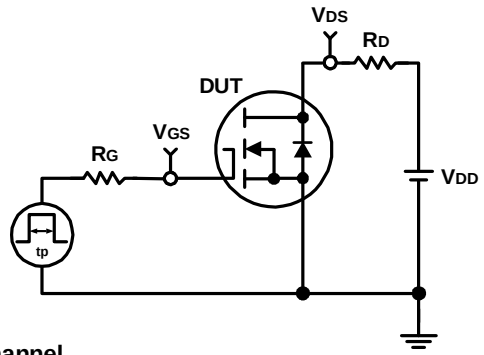
P Channel

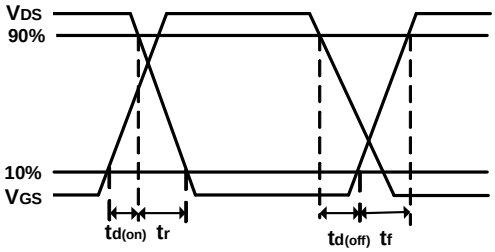




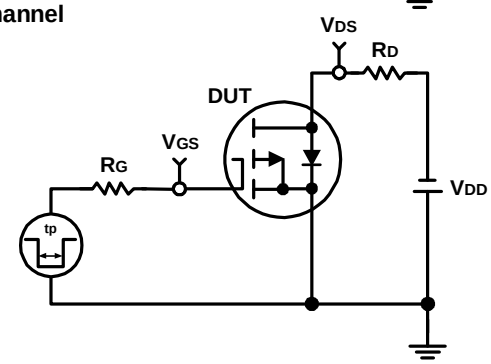
Switching Time Test Circuit and Waveforms

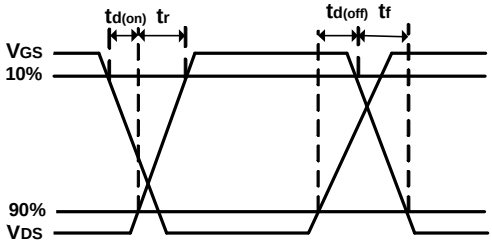
N Channel





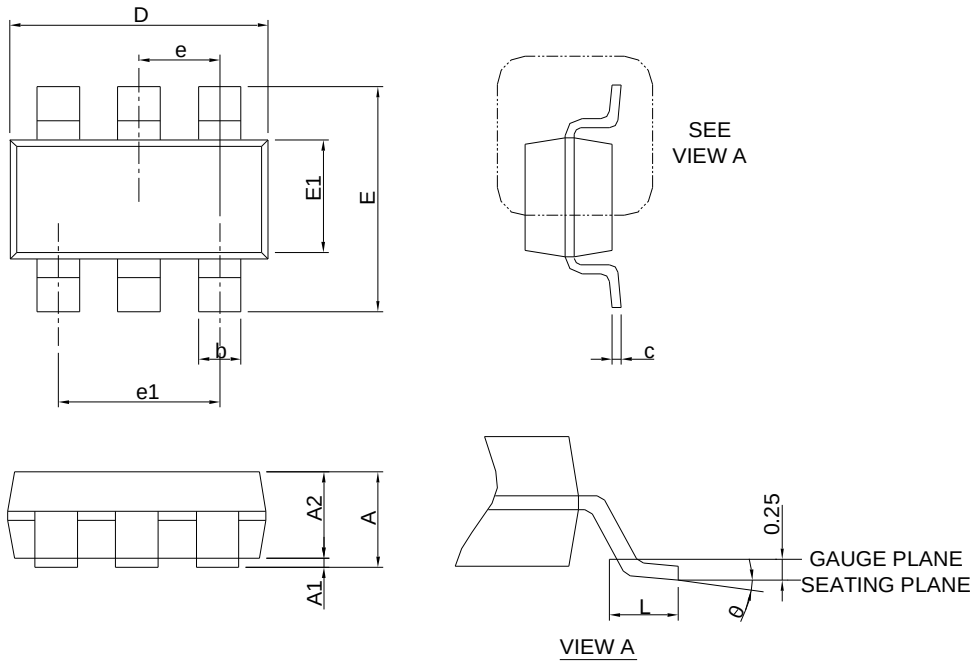
P Channel





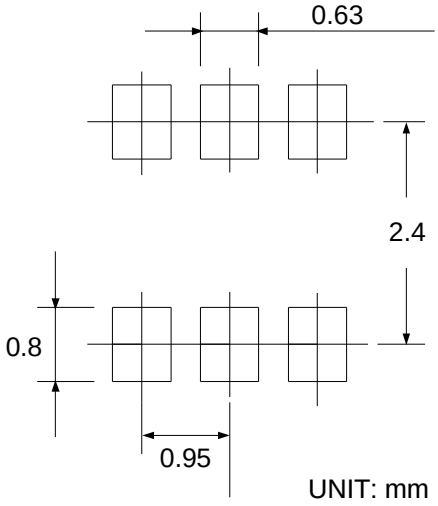
Package Information

SOT23-6L



SYMBOL	SOT23-6L			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	-	1.25	-	0.049
A1	0.00	0.05	0.000	0.002
A2	0.90	1.20	0.035	0.047
b	0.30	0.50	0.012	0.020
c	0.08	0.22	0.003	0.009
D	2.70	3.10	0.106	0.122
E	2.60	3.00	0.102	0.118
E1	1.40	1.80	0.055	0.071
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.30	0.60	0.012	0.024
θ	0°	8°	0°	8°

RECOMMENDED LAND PATTERN



Note : 1. Follow JEDEC TO-178 AB.
2. Dimension D and E1 do not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 10 mil per side.