Dual N-Channel Enhancement Mode MOSFET

Features

- **N-Channel**

  20V / 0.91A

  $R_{DS(ON)}$= 240mΩ(max.) @ V_{GS}=4.5V

  $R_{DS(ON)}$= 320mΩ(max.) @ V_{GS}=2.5V

- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)
- ESD Protection

Applications

- DC-DC Conversion.
- Load Switching.
- Portable Devices.

Marking

Marking	OX****

Pin Description
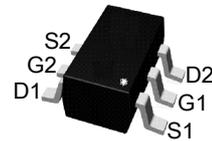
Top View of SC70-6L
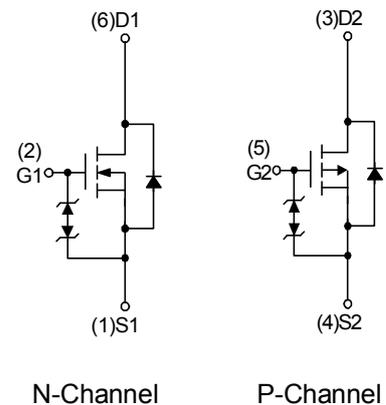
N-Channel   P-Channel

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

Symbol	Parameter		N Channel	Unit
Common Ratings				
V_{DSS}	Drain-Source Voltage		20	V
V_{GSS}	Gate-Source Voltage		±12	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	
I_S	Diode Continuous Forward Current	T_A=25°C	0.25	A
I_D	Continuous Drain Current	T_A=25°C	0.91	
I_{DM}	Pulsed Drain Current	T_A=25°C	1.2	
P_D	Power Dissipation	T_A=25°C	0.3	W
		T_A=70°C	0.2	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	t ≤ 10s	390	°C/W
		Steady State	440	

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	20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=16V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-		30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	0.5	0.9	1.3	V
I_{GSS}	Gate Leakage Current	V_{GS}=±12V, V_{DS}=0V	-	-	±10	μA
$R_{DS(ON)}$ [a]	Drain-Source On-state Resistance	V_{GS}=4.5V, I_{DS}=0.6A	-	180	240	mΩ
		V_{GS}=2.5V, I_{DS}=0.4A	-	230	320	
Gfs	Forward Transconductance	V_{DS}=2V, I_D=1.2A	-	2.3	-	S
Diode Characteristics						
V_{SD} [a]	Diode Forward Voltage	I_{SD}=0.23A, V_{GS}=0V	-	0.75	1.1	V
Dynamic Characteristics [b]						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=10V, Frequency=1.0MHz	-	45	-	pF
C_{oss}	Output Capacitance		-	18	-	
C_{rss}	Reverse Transfer Capacitance		-	7	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=10V, R_L=15Ω, I_{DS}=1A, V_{GEN}=4.5V, R_G=1Ω	-	9.4	-	ns
t_r	Turn-on Rise Time		-	14.2	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	57.2	-	
t_f	Turn-off Fall Time		-	34	-	
Gate Charge Characteristics [b]						
Q_g	Total Gate Charge	V_{DS}=10V, V_{GS}=4.5V, I_{DS}=1A	-	1	-	nC
Q_{gs}	Gate-Source Charge		-	0.39	-	
Q_{gd}	Gate-Drain Charge		-	0.2	-	
Q_{gth}	Threshold Gate Charge		-	0.15	-	

N Channel Typical Operating Characteristics

Power Dissipation

P_{tot} - Power (W) vs T_j - Junction Temperature (°C)

$T_A=25^oC$

Drain Current

I_D - Drain Current (A) vs T_j - Junction Temperature (°C)

$T_A=25^oC, V_G=4.5V$

Safe Operation Area

I_D - Drain Current (A) vs V_{DS} - Drain - Source Voltage (V)

Rds(on) Limit

300μs
1ms
10ms
100ms
1s
DC

$T_A=25^oC$
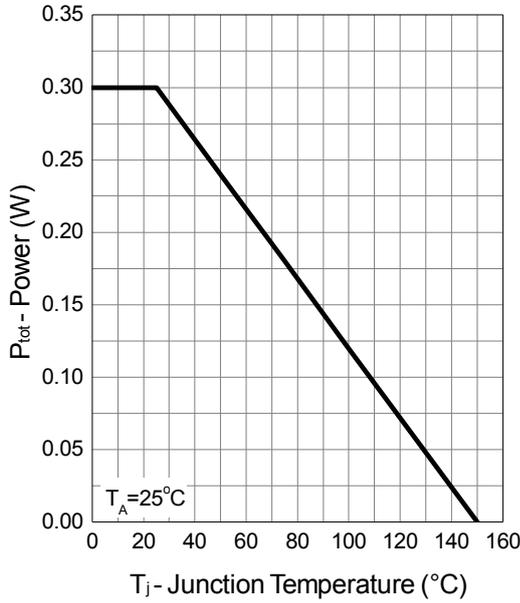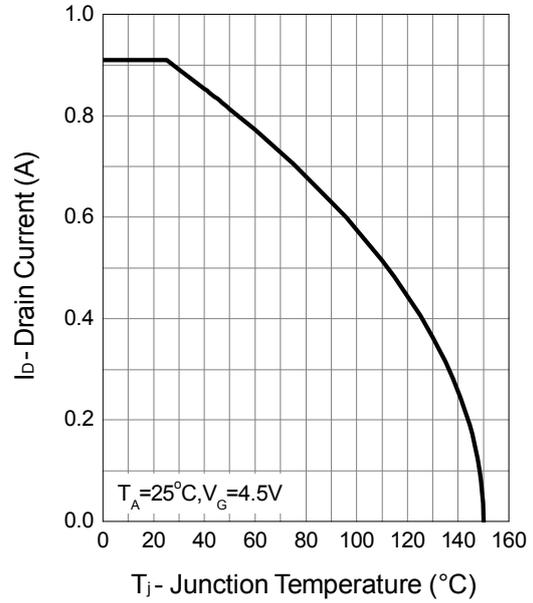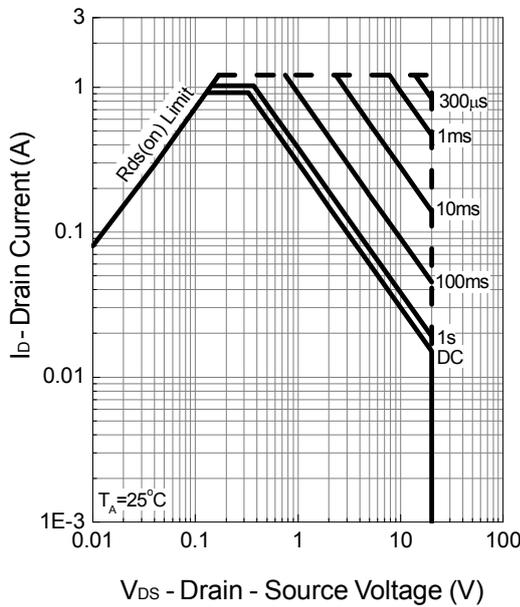
Thermal Transient Impedance

Normalized Transient Thermal Resistance vs Square Wave Pulse Duration (sec)

Duty = 0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse

Mounted on 1in^2 pad
$R_{\theta JA}$: 390 °C/W
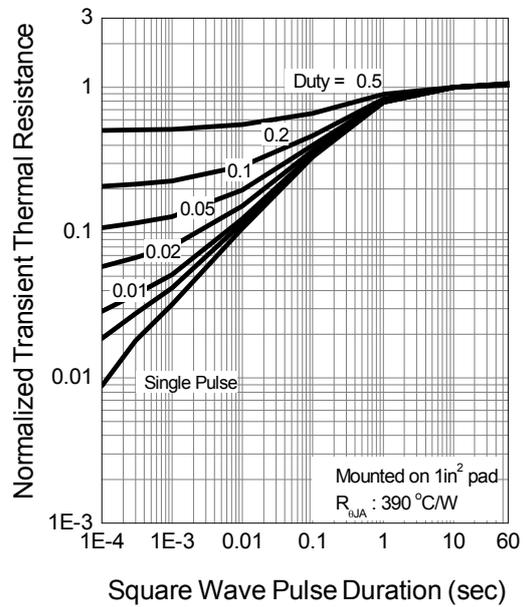
N Channel Typical Operating Characteristics (Cont.)

Output Characteristics
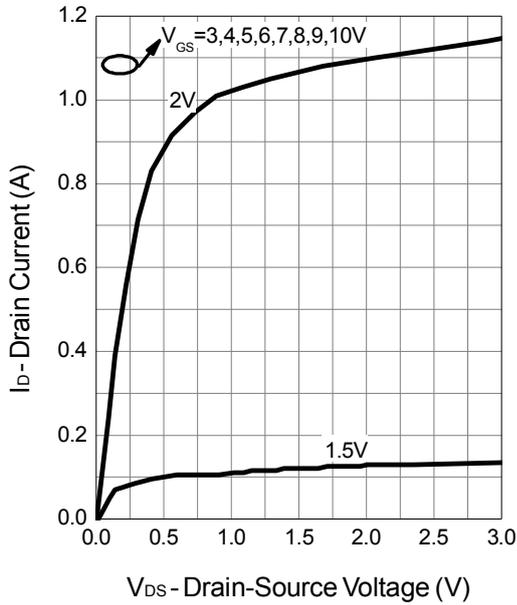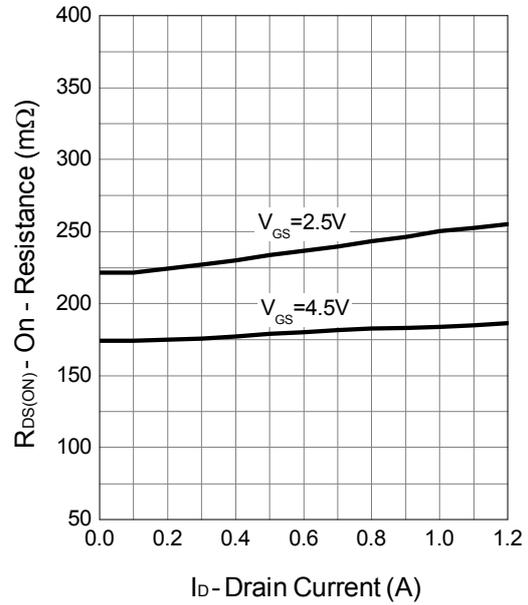
V_{GS}=3,4,5,6,7,8,9,10V

2V

1.5V

I_D - Drain Current (A)

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

Drain-Source On Resistance

V_{GS}=2.5V

V_{GS}=4.5V

$R_{DS(ON)}$ - On - Resistance (mΩ)

I_D - Drain Current (A)

Gate-Source On Resistance

I_{DS}=0.6A

$R_{DS(ON)}$ - On - Resistance (mΩ)

V_{GS} - Gate - Source Voltage (V)

Gate Threshold Voltage

I_{DS}=250μA

Normalized Threshold Voltage

T_j - Junction Temperature (°C)
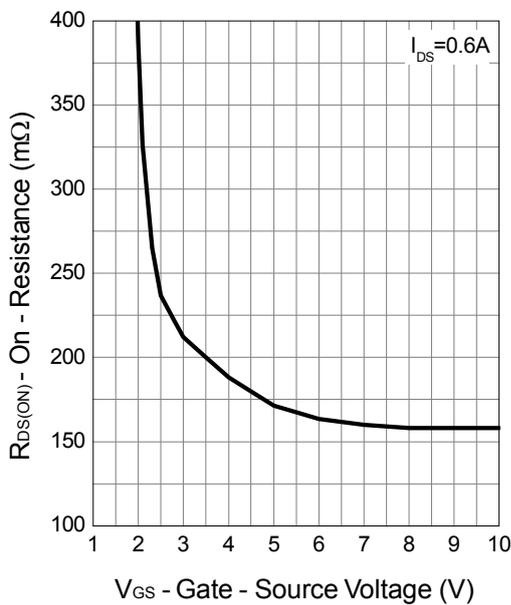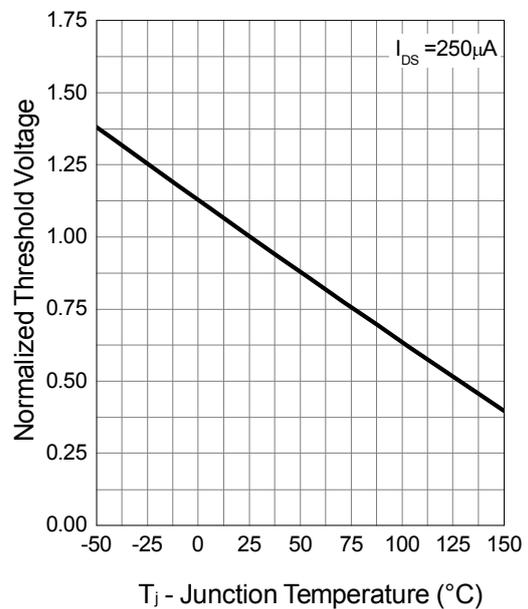
N Channel Typical Operating Characteristics (Cont.)

Drain-Source On Resistance

V_{GS} = 4.5V
I_{DS} = 0.6A

R_{ON}@T_j=25°C: 180mΩ

Normalized On Resistance

T_j- Junction Temperature (°C)
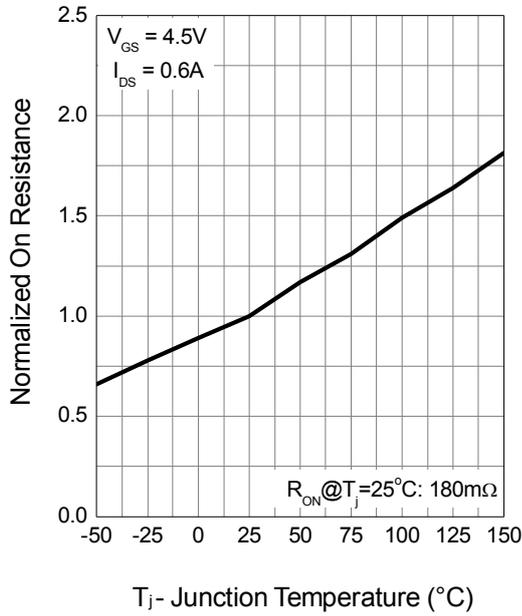
Source-Drain Diode Forward

T_j=150°C

T_j=25°C

I_S - Source Current (A)

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

Capacitance

Frequency=1MHz

Ciss

Coss

Crss

C - Capacitance (pF)

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

Gate Charge

V_{DS}=10V
I_{DS}=1A

V_{GS} - Gate - source Voltage (V)
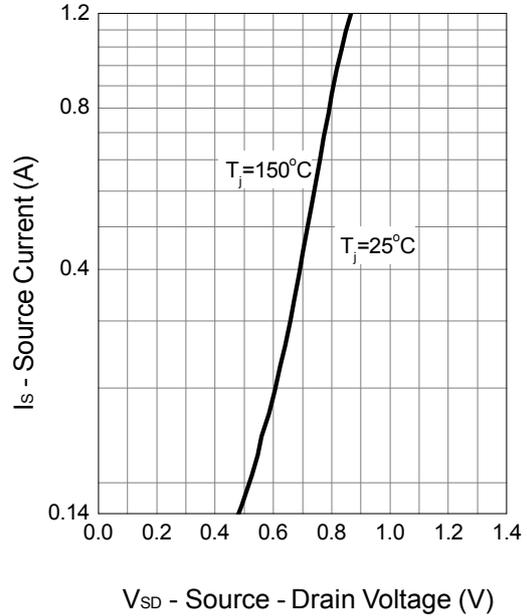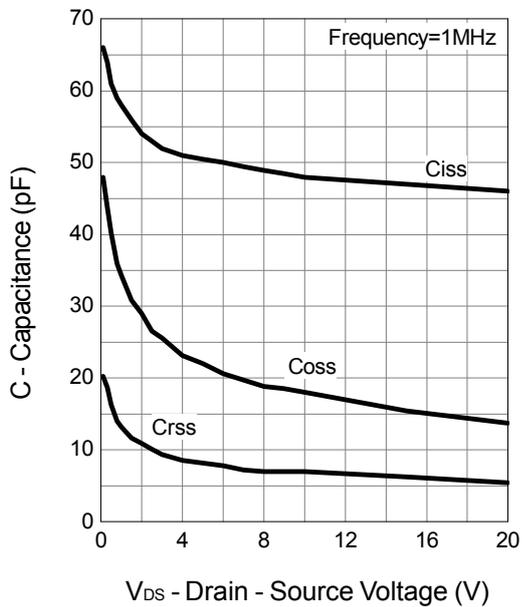
Q_G - Gate Charge (nC)
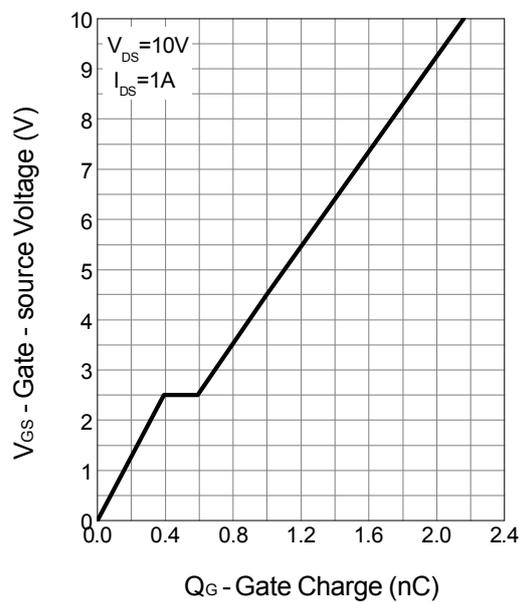
Avalanche Test Circuit and Waveforms
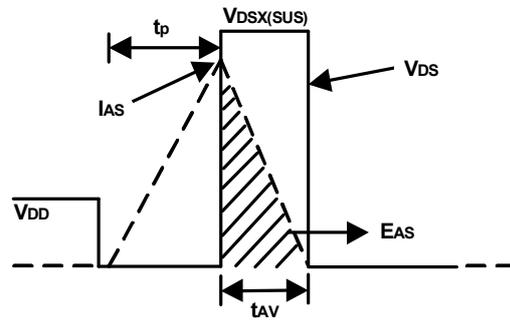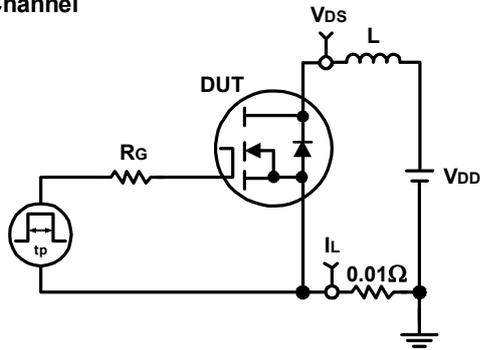
N Channel

Switching Time Test Circuit and Waveforms

N Channel
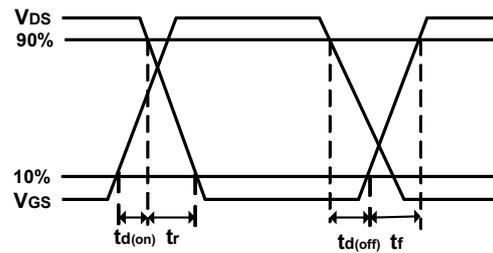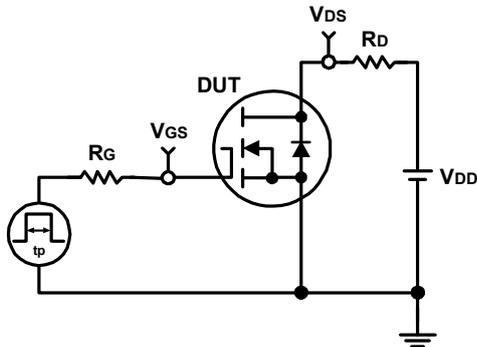
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