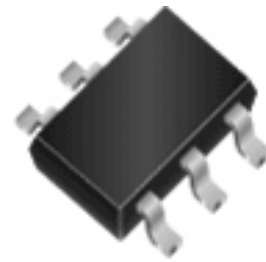
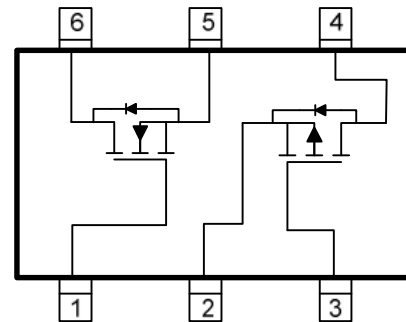
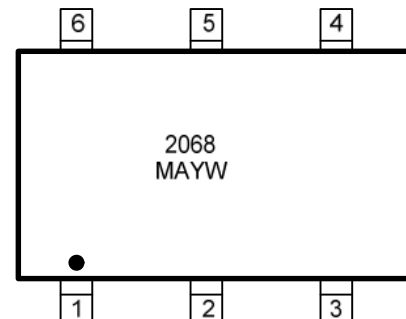


WCM2068
N- and P-Channel Complementary, 20V,MOSFET
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

V _{DS} (V)	Typical R _{DS(on)} ()
N-Channel 20	0.033@ V _{GS} =4.5V
	0.037@ V _{GS} =3.3V
	0.041@ V _{GS} =2.5V
P-Channel -20	0.085@V _{GS} =- 4.5V
	0.097@V _{GS} = -3.3V
	0.110@V _{GS} = -2.5V


SOT-23-6L

Pin configuration (Top View)


2068 = Device Code
 MA = Special Code
 YW= Date Code

Marking
Order Information

Device	Package	Shipping
WCM2068-6/TR	SOT-23-6L	3000/Tape&Reel

Descriptions

The WCM2068 is the N-Channel and P-Channel enhancement MOS Field Effect Transistor as a single package for DC-DC converter or level shift applications, uses advanced trench technology and design to provide excellent R_{DS(ON)} with low gate charge. Standard Product WCM2068 is Pb-free and Halogen-free.

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage
- Small package SOT-23-6L

Applications

- Driver: Relays, Solenoids, Lamps, Hammers
- Power supply converters circuit
- Load/Power Switching for portable device

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Unit	
V_{DSS}	Drain-to-Source Voltage	20	-20	V	
V_{GSS}	Gate-to-Source Voltage	± 8	± 8	V	
I_D	Continuous Drain Current ^{a d}	$T_A=25^\circ\text{C}$	4.4	-2.8	A
		$T_A=70^\circ\text{C}$	3.5	-2.2	
I_{DM}	Pulsed Drain Current ^c	16	-10	A	
P_D	Power Dissipation ^{a d}	$T_A=25^\circ\text{C}$	0.72		W
		$T_A=70^\circ\text{C}$	0.46		
T_J	Operation junction temperature	-55~150		$^\circ\text{C}$	
T_{stg}	Storage temperature range	-55~150		$^\circ\text{C}$	

Thermal Resistance Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ^a	t 10 s	R_{JA}	74	92	$^\circ\text{C}/\text{W}$
	Steady State		115	143	
Junction-to-Ambient Thermal Resistance ^b	t 10 s	R_{JA}	90	112	
	Steady State		138	172	
Junction-to-Case Thermal Resistance	Steady State	R_{JC}	63	78	

a Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper

b Surface mounted on FR4 board using minimum pad size, 1oz copper

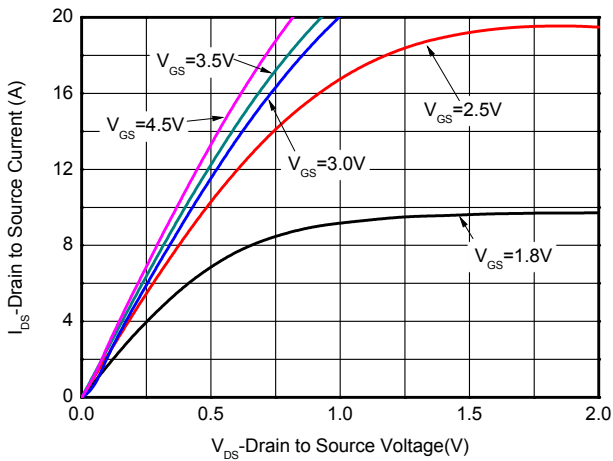
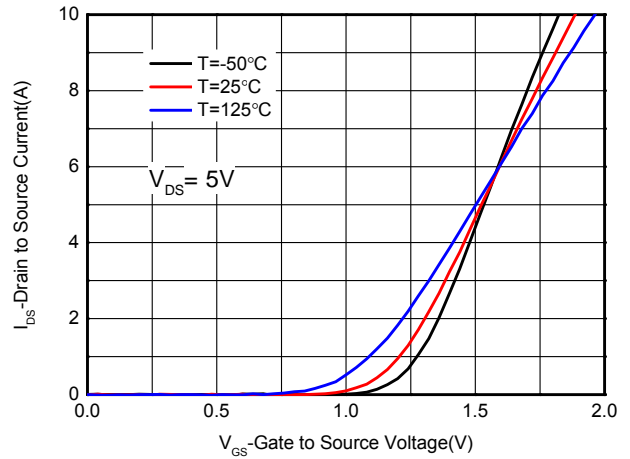
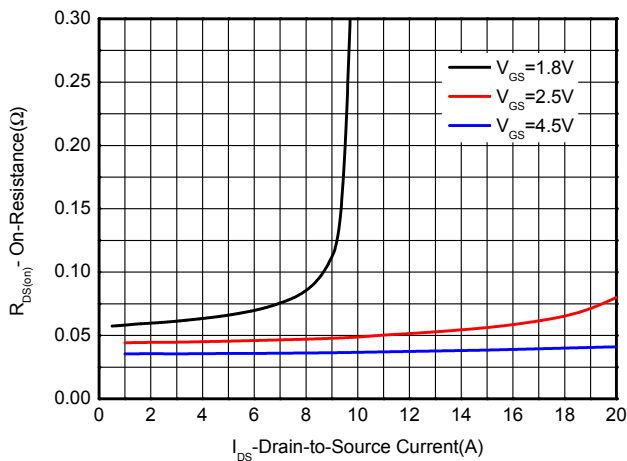
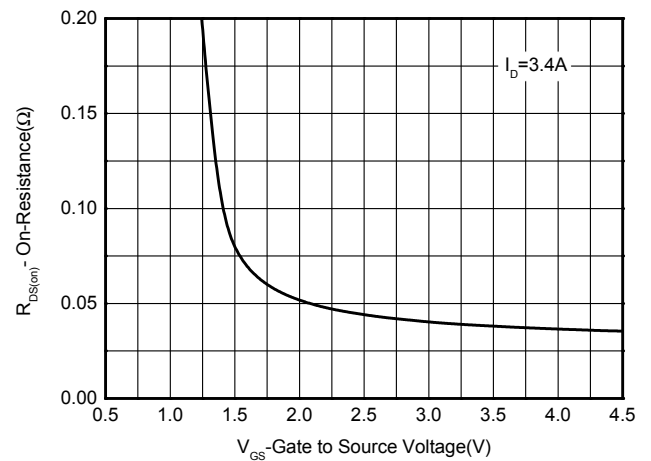
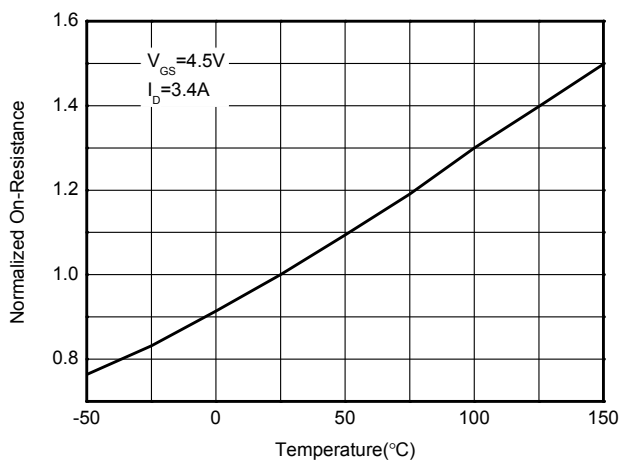
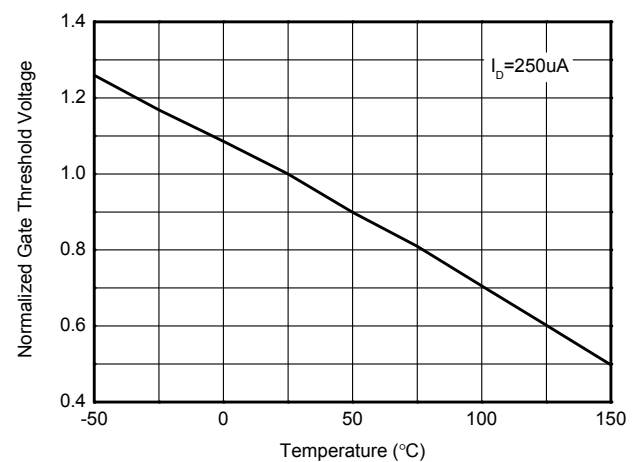
c Pulse width<380 μs , Duty Cycle<2%

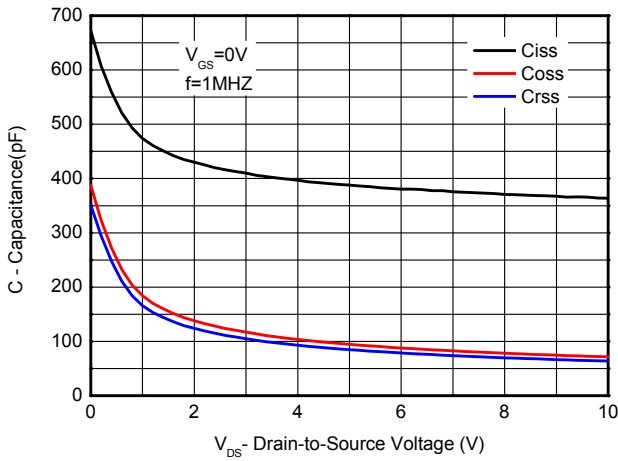
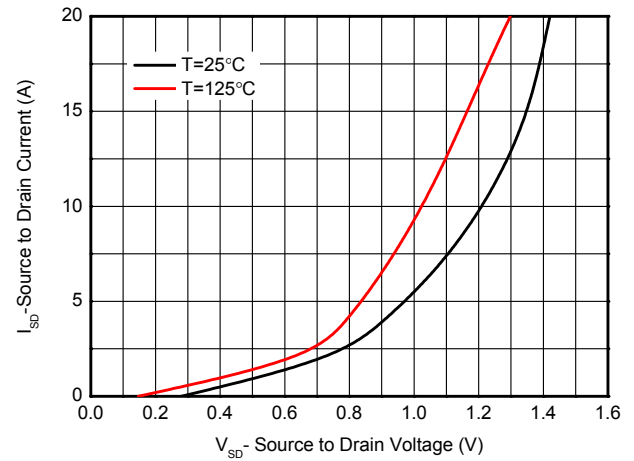
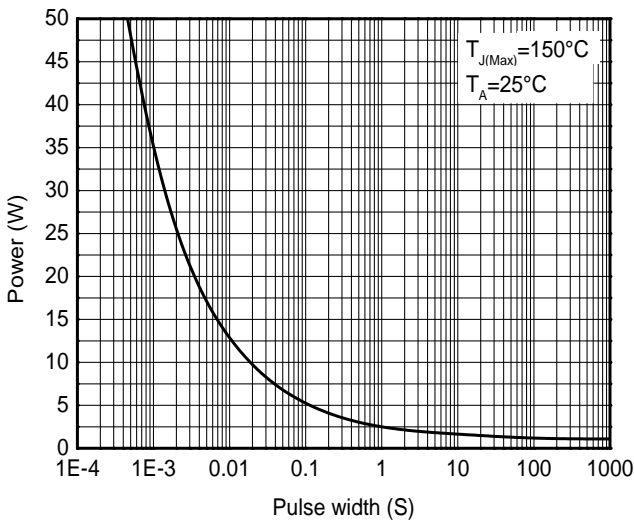
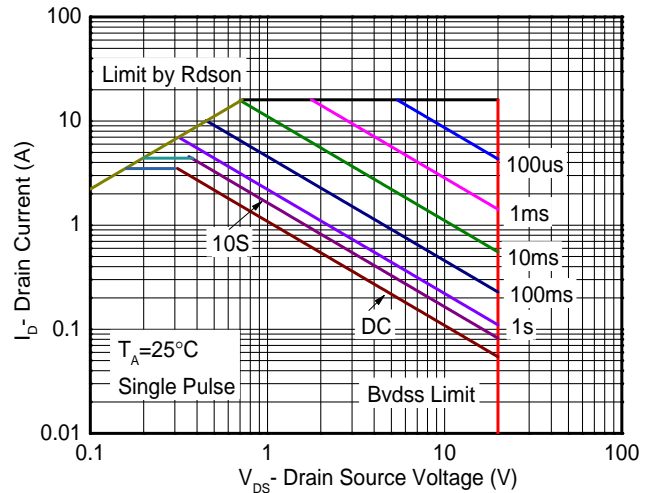
d Maximum junction temperature $T_J=150^\circ\text{C}$.

Electronics Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

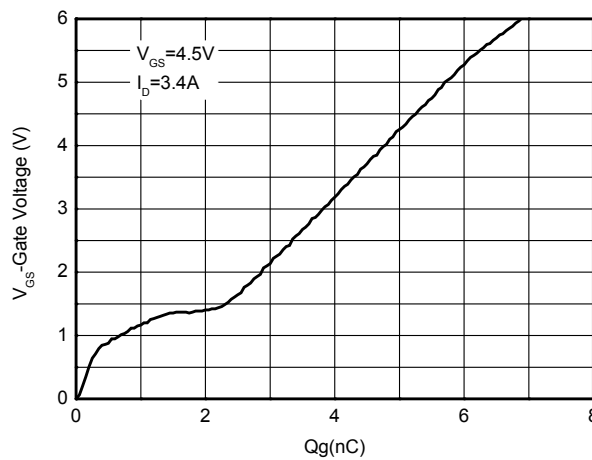
Symbol	Parameter	Test Condition	Min	Typ.	Max	Unit		
Off Characteristics								
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	N-Ch	20		V		
		$V_{GS}=0V, I_D=-250\mu A$	P-Ch	-20				
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=16V, V_{GS}=0V$	N-Ch		1	uA		
		$V_{DS}=-16V, V_{GS}=0V$	P-Ch		-1			
I_{GSS}	Gate –Source leakage current	$V_{DS}=0V, V_{GS}=\pm 8V$	N-Ch		± 1	uA		
			P-Ch		± 1			
ON Characteristics								
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	N-Ch		0.65	1.0	V	
		$V_{DS}=V_{GS}, I_D=-250\mu A$	P-Ch		-0.70	-1.0		
$R_{DS(on)}$	Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=3.4A$	N-Ch		33	46	m	
		$V_{GS}=-4.5V, I_D=-2.8A$	P-Ch		85	116		
		$V_{GS}=3.3V, I_D=3.0A$	N-Ch		37	55		
		$V_{GS}=-3.3V, I_D=-2.0A$	P-Ch		100	125		
		$V_{GS}=2.5V, I_D=3.0A$	N-Ch		41	69		
		$V_{GS}=-2.5V, I_D=-2.0A$	P-Ch		110	131		
Dynamic Characteristics								
C_{iss}	Input Capacitance	Nmos: $V_{DS}=10V, V_{GS}=0V,$ $F=1MHz$ Pmos: $V_{DS}=-10V, V_{GS}=0V,$ $f=1MHz$	N-Ch		345	pF		
			P-Ch		531			
C_{oss}	Output Capacitance		N-Ch		55			
			P-Ch		61			
C_{rss}	Reverse Transfer Capacitance		N-Ch		48			
			P-Ch		54			
$Q_{G(TOT)}$	Total Gate Charge	Nmos: $V_{DD}=10V, V_{GS}=4.5V,$ $I_D=3.4A$ Pmos: $V_{DD}=-10V, V_{GS}=-4.5V$ $I_D=-2.8A$	N-Ch		5.25	nC		
			P-Ch		5.8			
$Q_{G(TH)}$	Threshold gate charge		N-Ch		0.65			
			P-Ch		0.72			
Q_{GS}	Gate-Source Charge		N-Ch		1.2			
			P-Ch		1.1			
Q_{GD}	Gate-Drain Charge		N-Ch		1.05			
			P-Ch		1.0			
$t_{d(on)}$	Turn-On Delay Time		Nmos: $V_{DD}=10V, V_{GS}=4.5V,$ $I_D=1.0A, R_G=6$ Pmos: $V_{DD}=-10V, I_D=-1.2A,$ $V_{GS}=-4.5V, R_G=6$	N-Ch			18.6	ns
				P-Ch			21.6	
t_r	Turn-On Rise Time			N-Ch			8.2	
				P-Ch			8.6	
$t_{d(off)}$	Turn-Off Delay Time	N-Ch			55			
		P-Ch			58			
t_f	Turn-Off Fall Time	N-Ch			7.6			
		P-Ch			8.4			

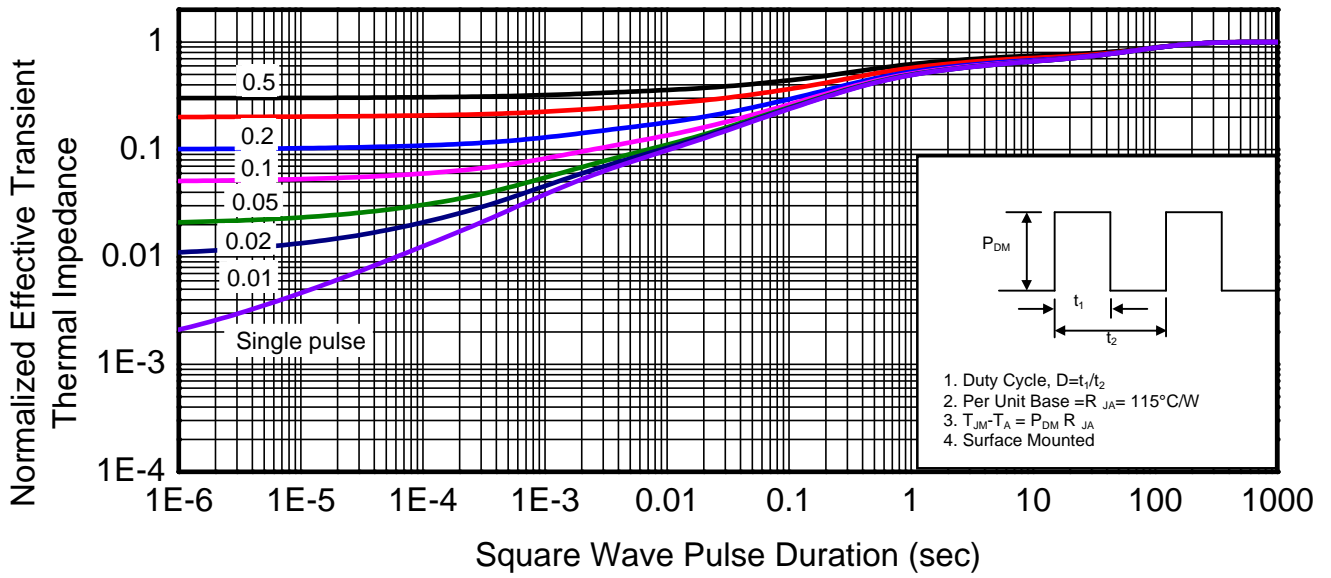
BODY DIODE CHARACTERISTICS							
Forward Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 1.0\text{ A}$	N-Ch		0.7	1.5	V
		$V_{GS} = 0\text{ V}, I_S = -1.0\text{ A}$	P-Ch		-0.8	-1.5	

Typical Characteristics (N-Channel $T_A=25^\circ\text{C}$, unless otherwise noted)

Output Characteristics

Transfer Characteristics

On-Resistance vs. Drain Current

On-Resistance vs. Gate-to-Source Voltage

On-Resistance vs. Junction Temperature

Threshold Voltage vs. Temperature

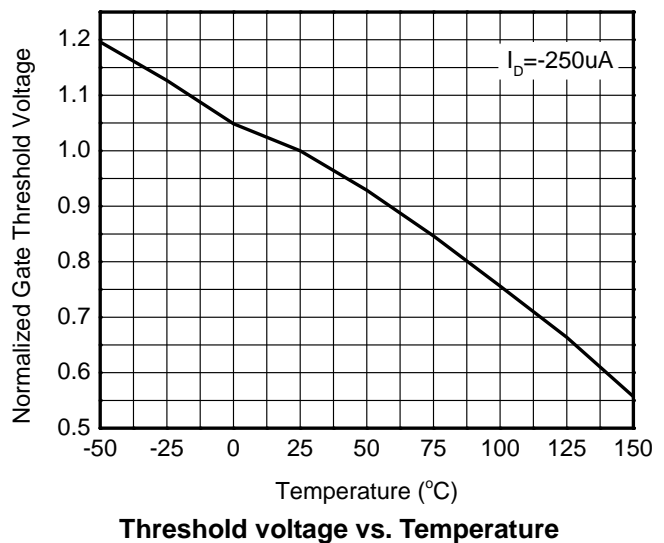
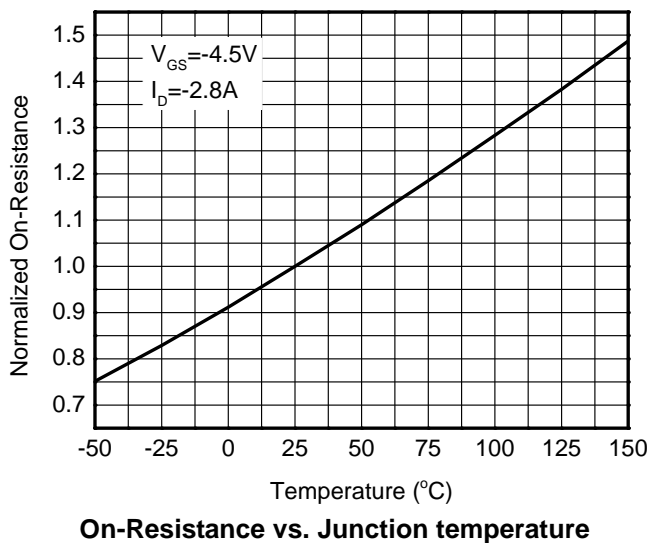
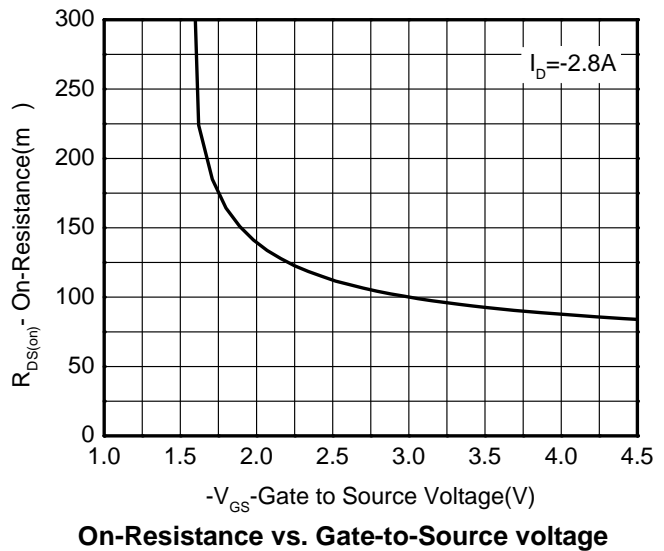
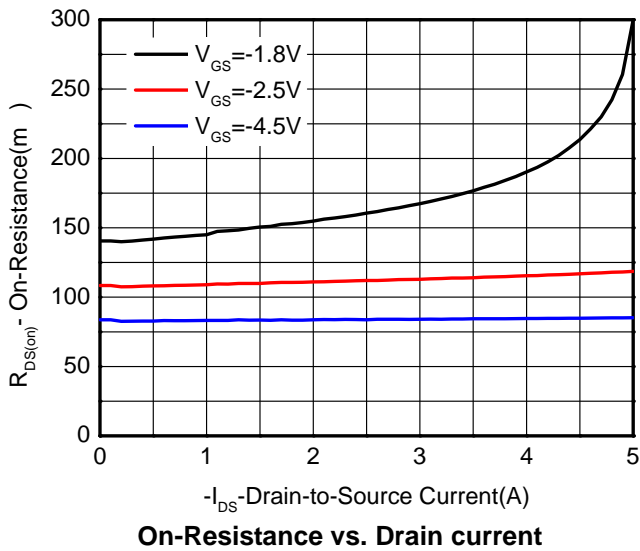
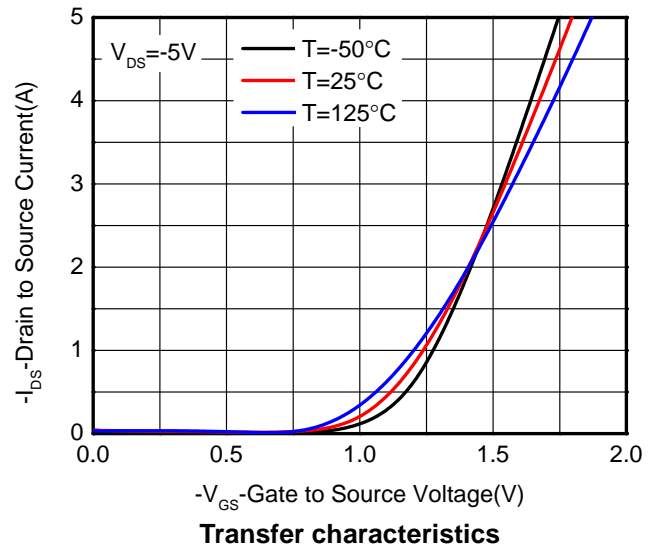
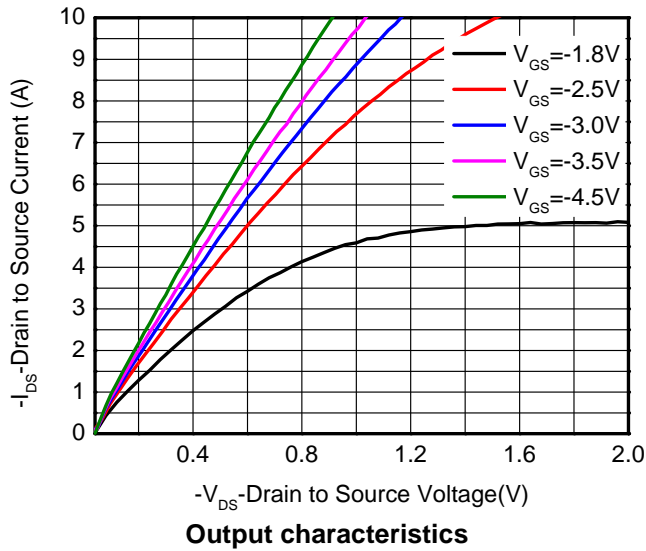

Capacitance

Body Diode Forward Voltage

Single pulse power


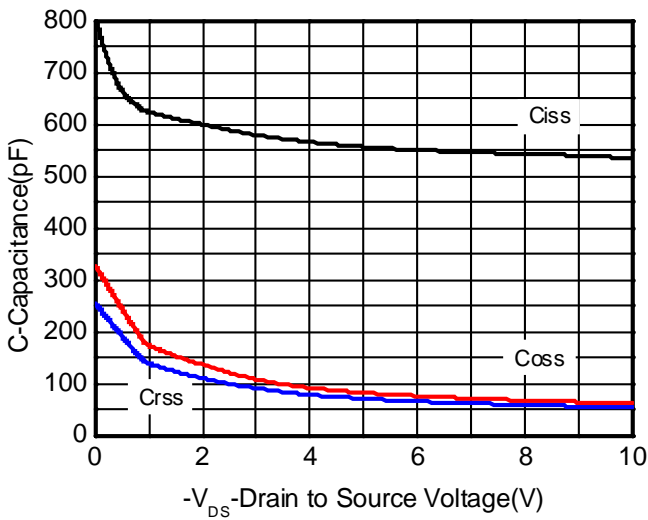
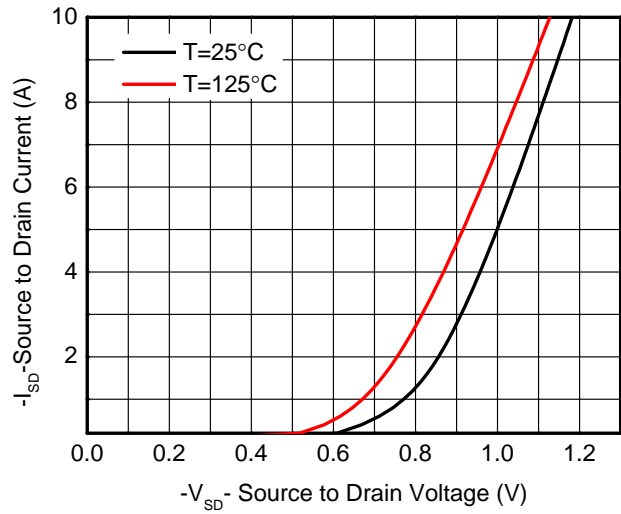
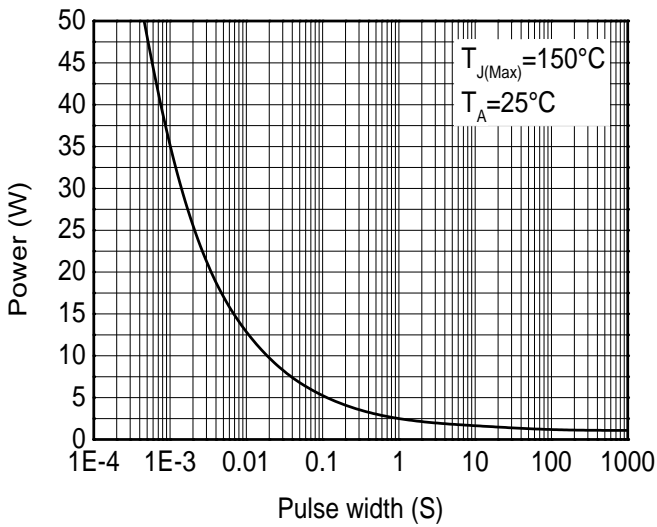
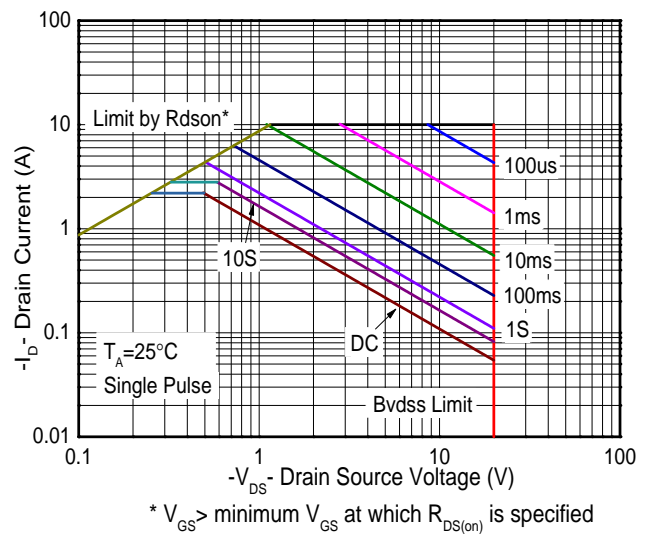
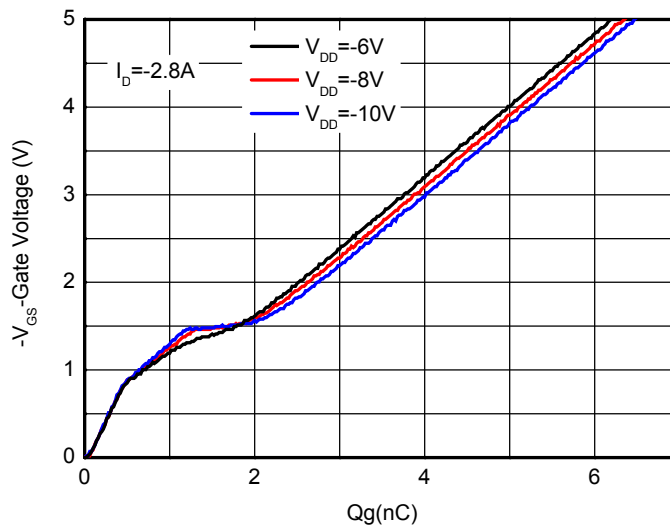
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

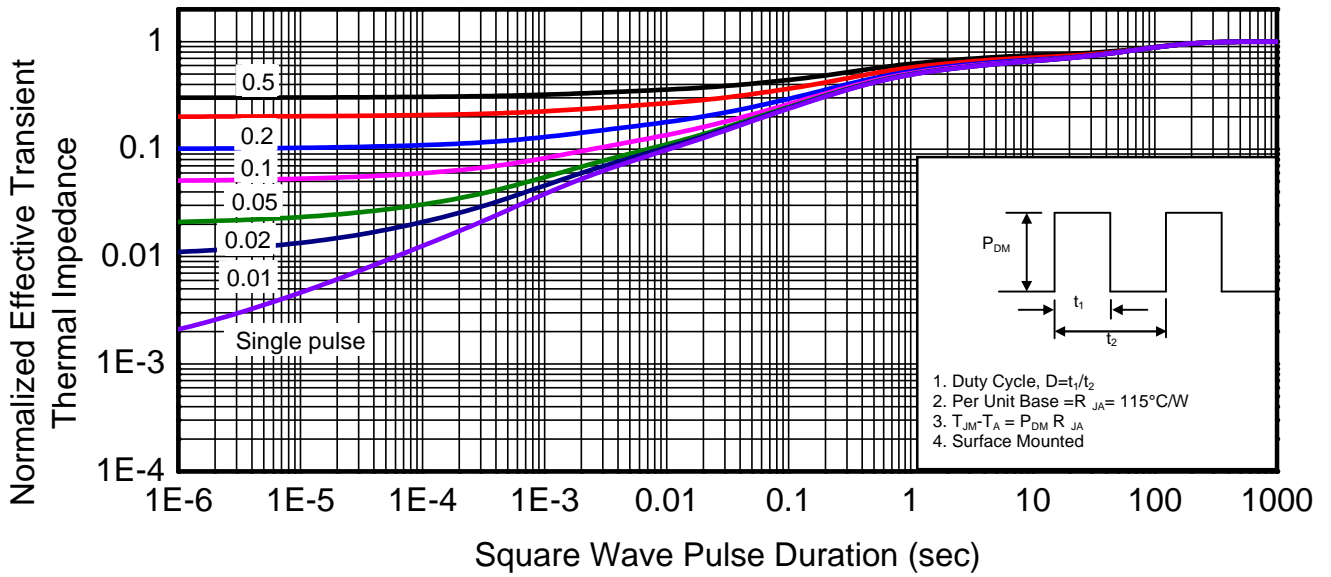
Safe operating power

Gate charge Characteristics



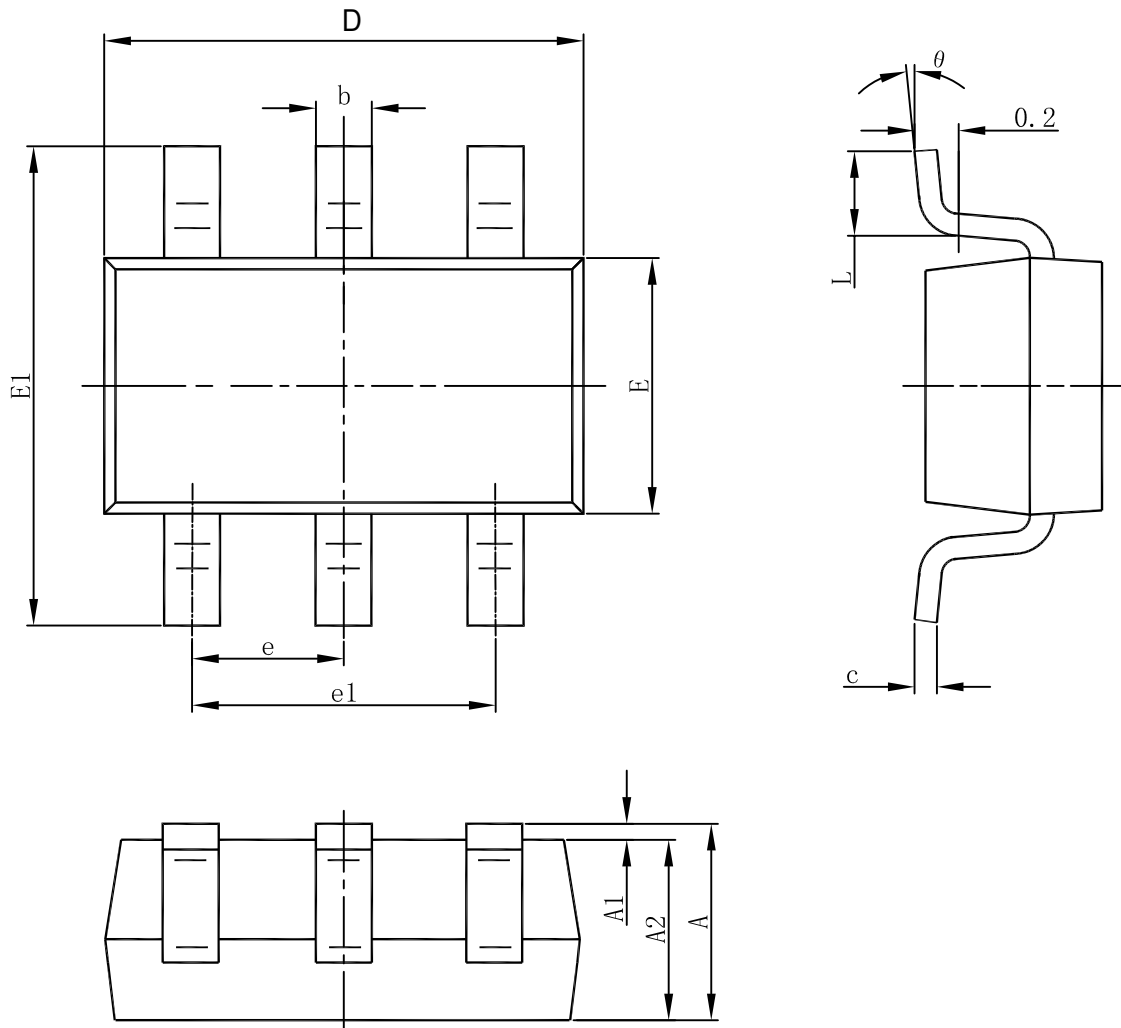
Transient thermal response (Junction-to-Ambient)

Typical Characteristics (P-Channel $T_A=25^\circ\text{C}$, unless otherwise noted)



Capacitor

Body diode forward voltage

Single pulse power (Junction-to-ambient)

Safe operating power

Gate charge Characteristics



Transient thermal response (Junction-to-Ambient)

Package Outline Dimension
SOT-23-6L


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
theta	0°	8°	0°	8°