WCM2068

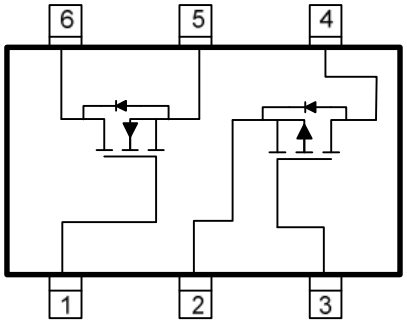
N- and P-Channel Complementary, 20V,MOSFET

Http://www. sh- willsemi.com

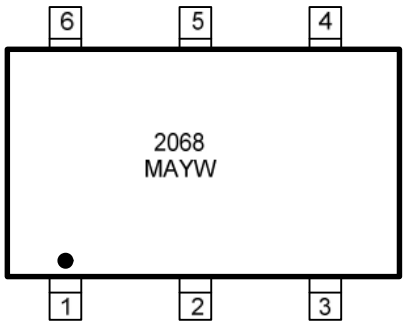
V_{DS} (V)	Typical $R_{DS(on)}$ (Ω)
N-Channel 20	0.033@ V_{GS}=4.5V
	0.037@ V_{GS}=3.3V
	0.041@ V_{GS}=2.5V
P-Channel -20	0.085@V_{GS}=- 4.5V
	0.097@V_{GS}= -3.3V
	0.110@V_{GS}= -2.5V



SOT-23-6L



Pin configuration (Top View)



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

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

Order Information

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

Absolute Maximum Ratings (T_A=25°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°C	4.4	-2.8	A
		T_A=70°C	3.5	-2.2	
I_{DM}	Pulsed Drain Current [c]		16	-10	A
P_D	Power Dissipation [a d]	T_A=25°C	0.72		W
		T_A=70°C	0.46		
T_J	Operation junction temperature		-55~150		°C
T_{stg}	Storage temperature range		-55~150		°C

Thermal Resistance Ratings (T_A=25°C unless otherwise noted)

Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	74	92	°C/W
	Steady State		115	143	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	90	112	
	Steady State		138	172	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	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<380μs, Duty Cycle<2%

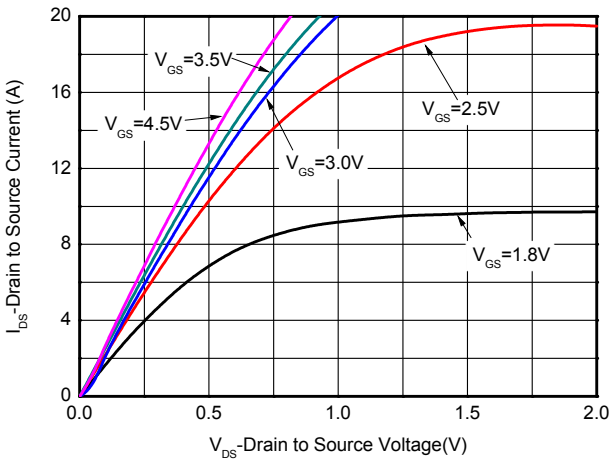
d Maximum junction temperature T_J=150°C.

Electronics Characteristics (T_A=25°C unless otherwise noted)

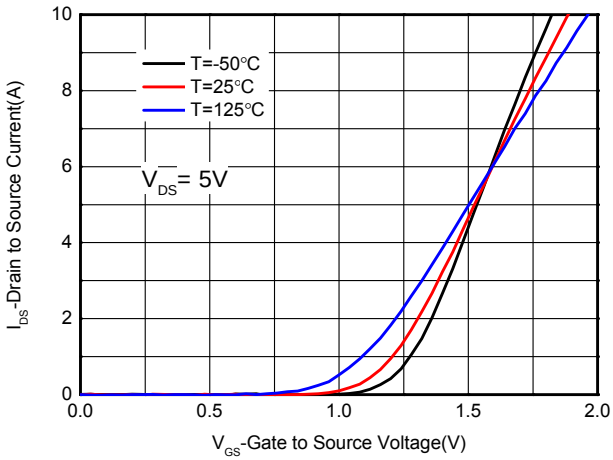
Symbol	Parameter	Test Condition		Min	Typ.	Max	Unit
Off Characteristics							
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	N-Ch	20			V
		V_{GS}=0V, I_D=-250uA	P-Ch	-20			
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=16V, V_{GS}=0V	N-Ch			1	uA
		V_{DS}=-16V, V_{GS}=0V	P-Ch			-1	
I_{GSS}	Gate –Source leakage current	V_{DS}=0V, V_{GS}=±8V	N-Ch			±1	uA
			P-Ch			±1	
ON Characteristics							
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250uA	N-Ch		0.65	1.0	V
		V_{DS}= V_{GS}, I_D=-250uA	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	mΩ
		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							
Ciss	Input Capacitance	Nmos: V_{DS}=10V,V_{GS}=0V, F=1MHz Pmos: V_{DS}=-10V,V_{GS}=0V, f=1MH_Z	N-Ch		345		pF
			P-Ch		531		
Coss	Output Capacitance		N-Ch		55		
			P-Ch		61		
Crss	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		
td(on)	Turn-On Delay Time	Nmos: V_{DD}=10V,V_{GS}=4.5V, I_D=1.0A, R_G=6Ω Pmos: V_{DD}=-10V, I_D=-1.2A, V_{GS}=-4.5V, R_G=6Ω	N-Ch		18.6		ns
			P-Ch		21.6		
tr	Turn-On Rise Time		N-Ch		8.2		
			P-Ch		8.6		
td(off)	Turn-Off Delay Time		N-Ch		55		
			P-Ch		58		
tf	Turn-Off Fall Time		N-Ch		7.6		
			P-Ch		8.4		

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

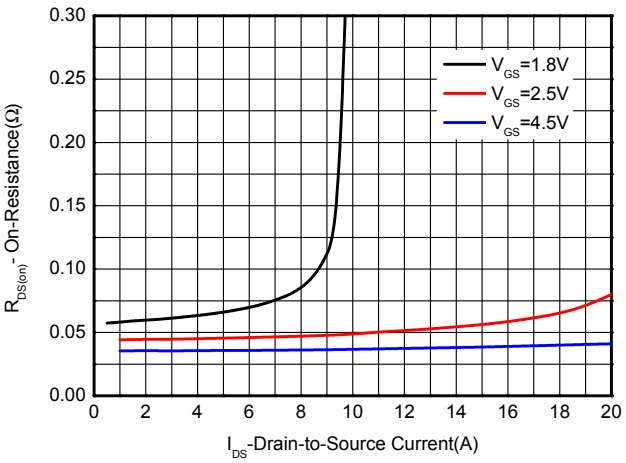
Typical Characteristics (N-Channel T_A=25°C,unless otherwise noted)



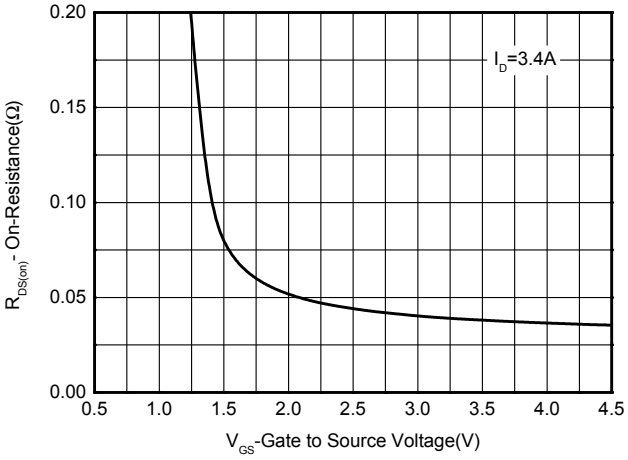
Output Characteristics



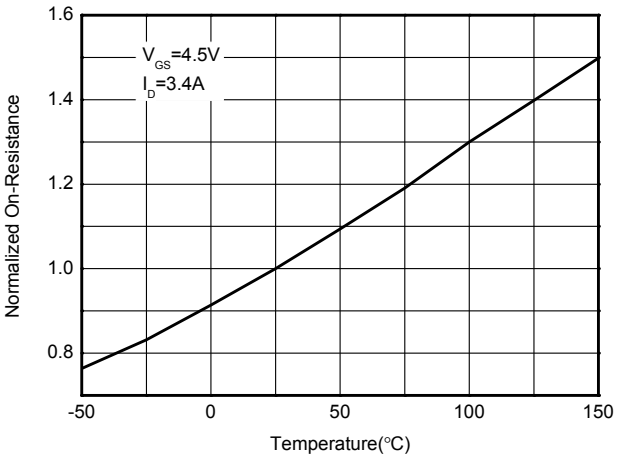
Transfer Characteristics



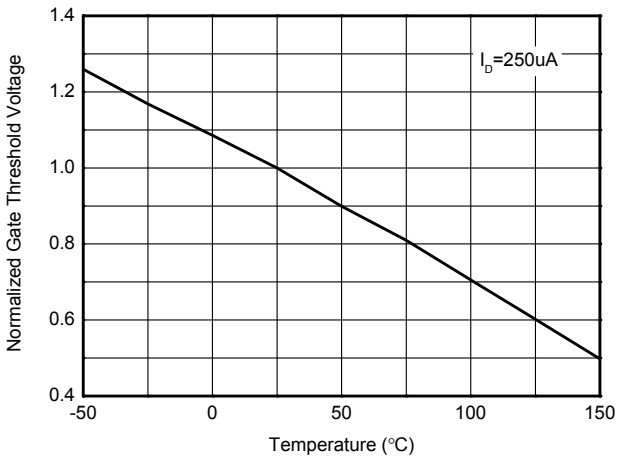
On-Resistance vs. Drain Current



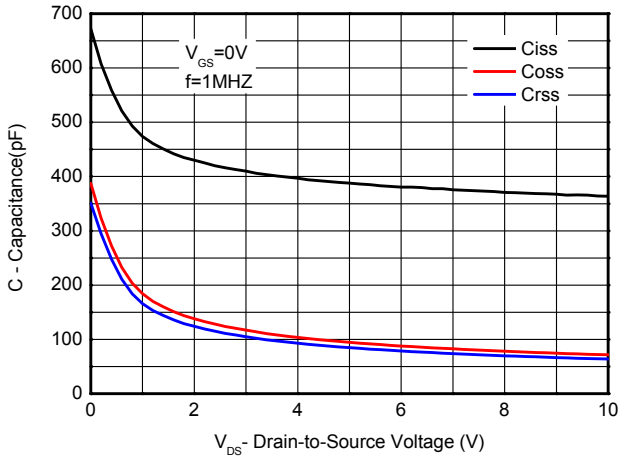
On-Resistance vs. Gate-to-Source Voltage



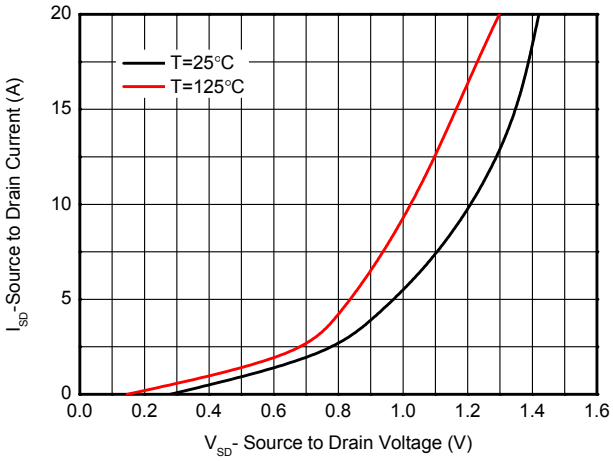
On-Resistance vs. Junction Temperature



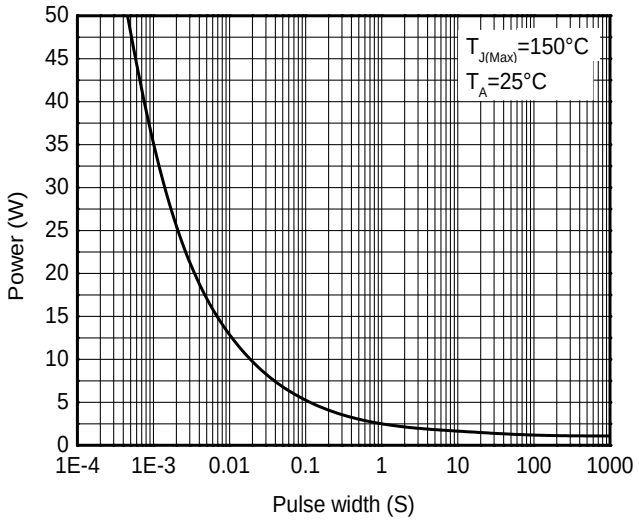
Threshold Voltage vs. Temperature



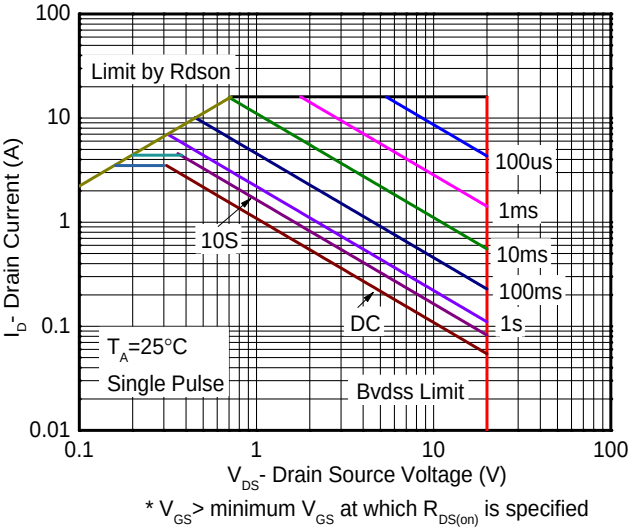
Capacitance



Body Diode Forward Voltage

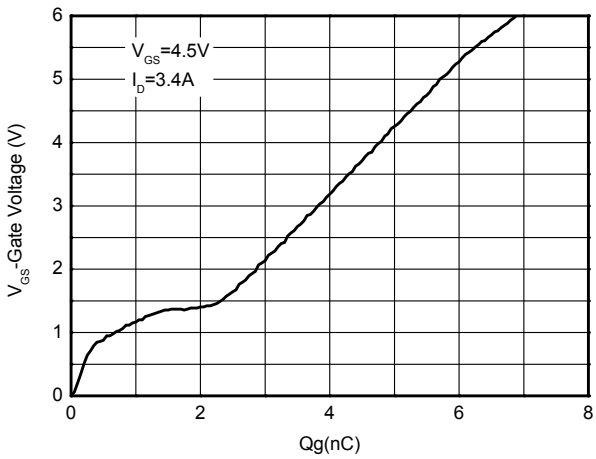


Single pulse power

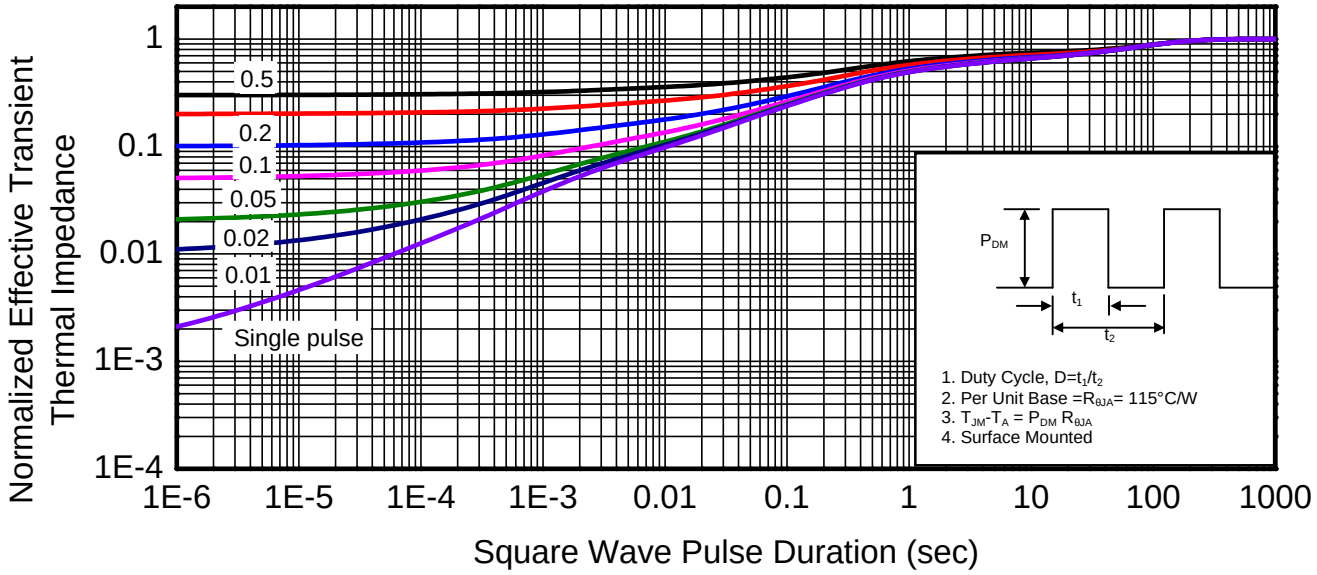


* V_{GS}> minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe operating power

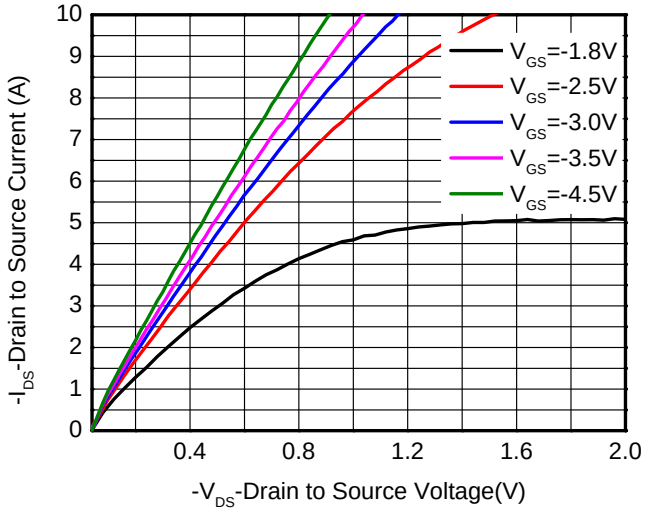


Gate charge Characteristics

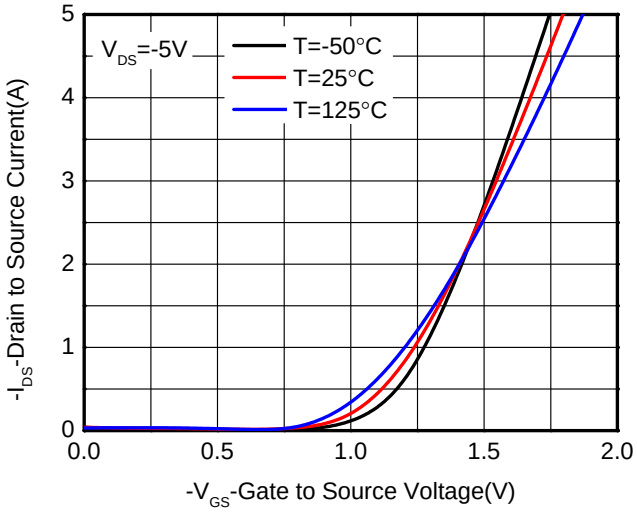


Transient thermal response (Junction-to-Ambient)

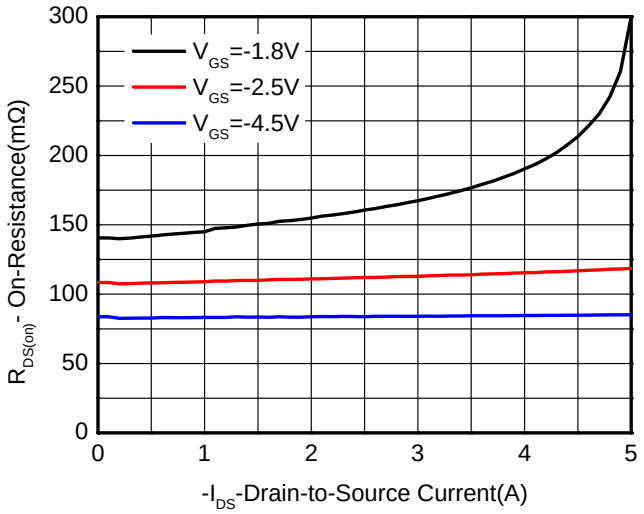
Typical Characteristics (P-Channel T_A=25°C, unless otherwise noted)



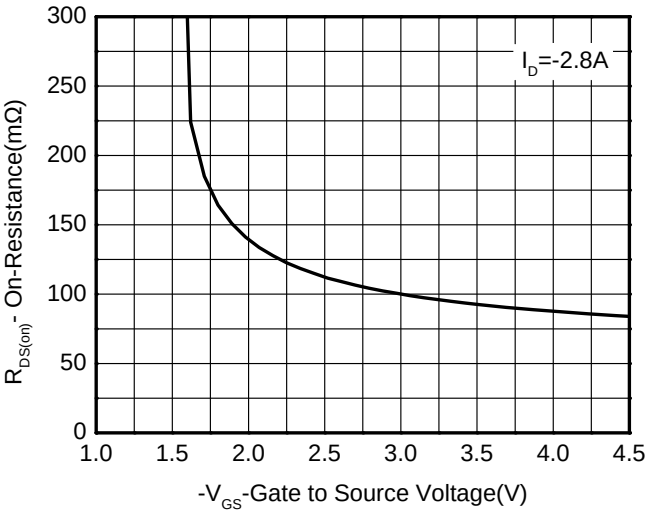
Output characteristics



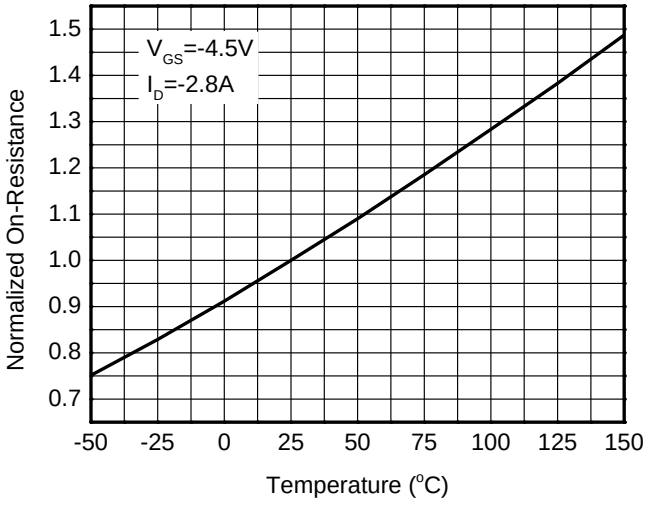
Transfer characteristics



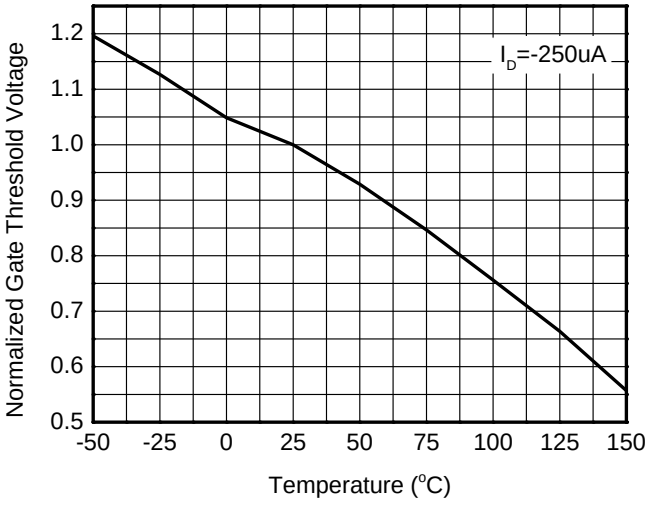
On-Resistance vs. Drain current



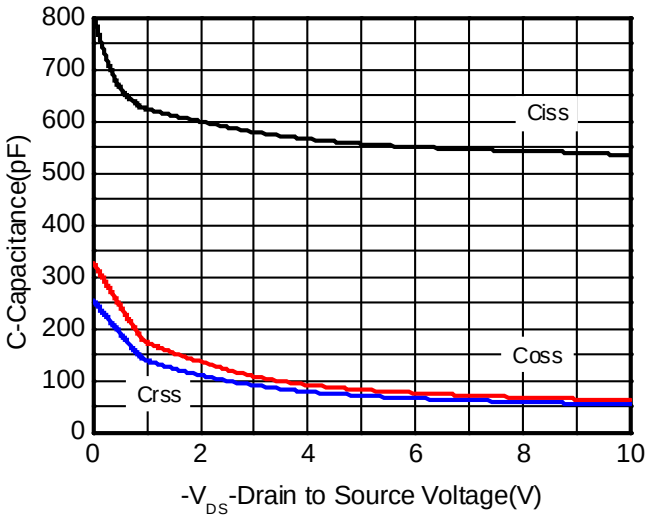
On-Resistance vs. Gate-to-Source voltage



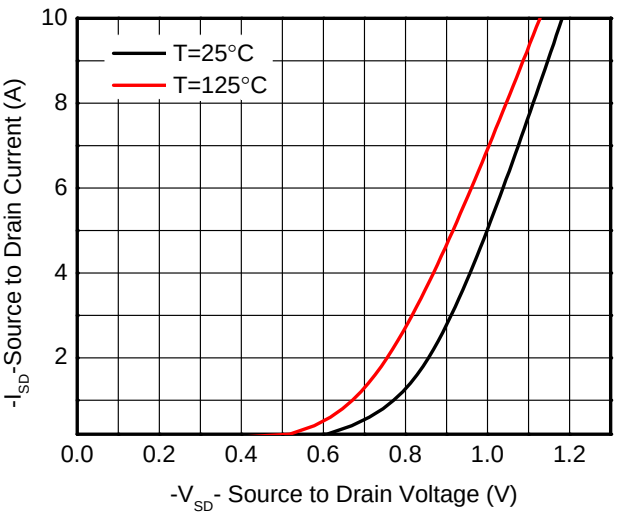
On-Resistance vs. Junction temperature



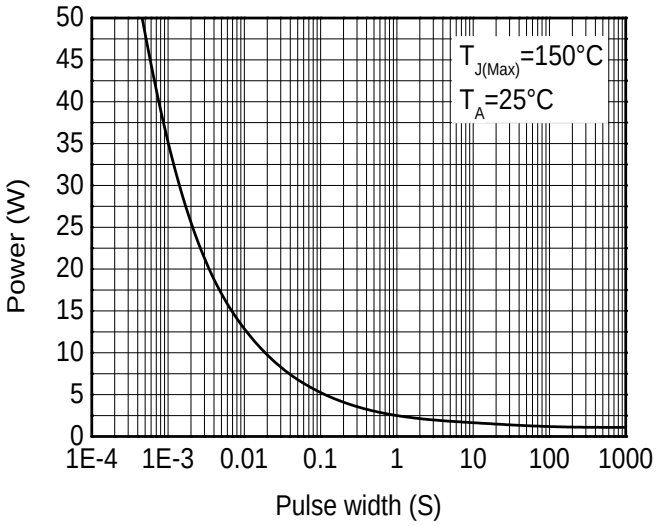
Threshold voltage vs. Temperature



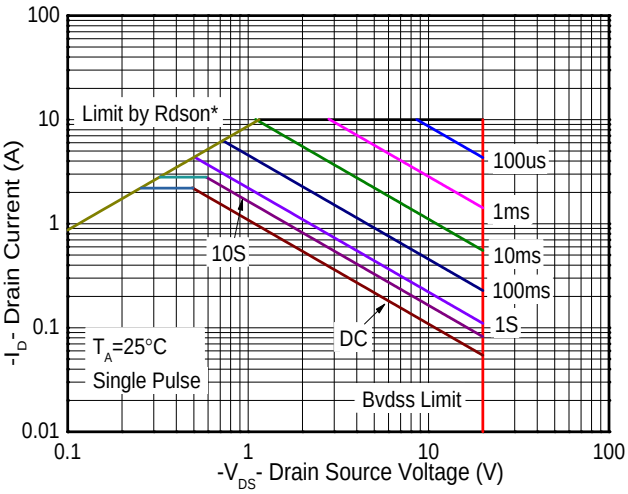
Capacitor



Body diode forward voltage

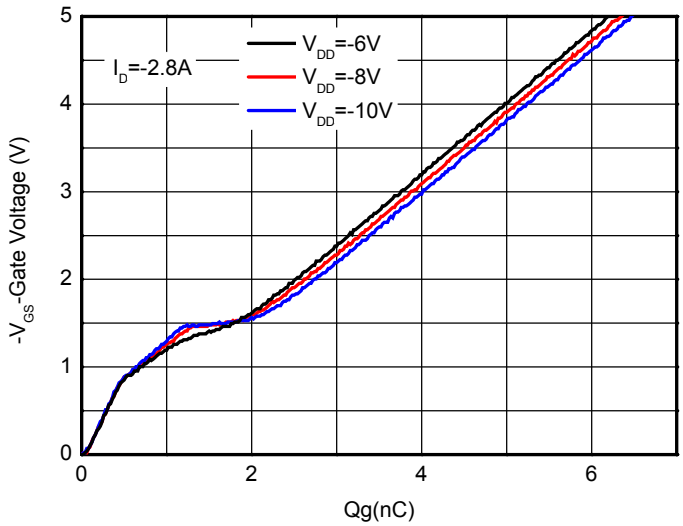


Single pulse power (Junction-to-ambient)

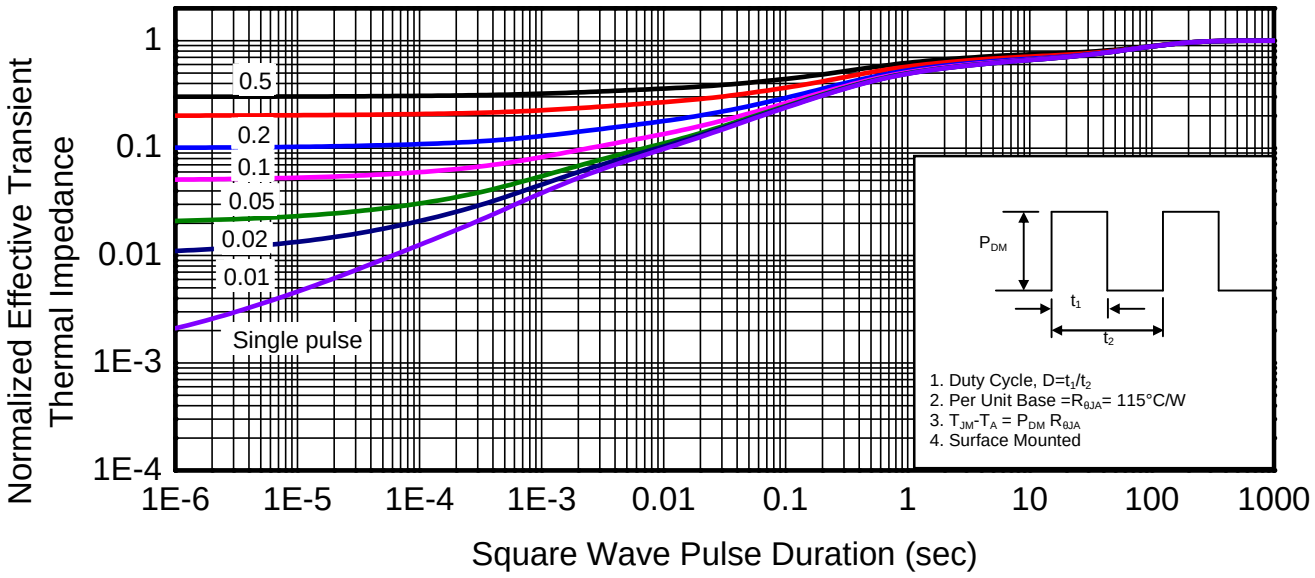


* V_{GS}> minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe operating power



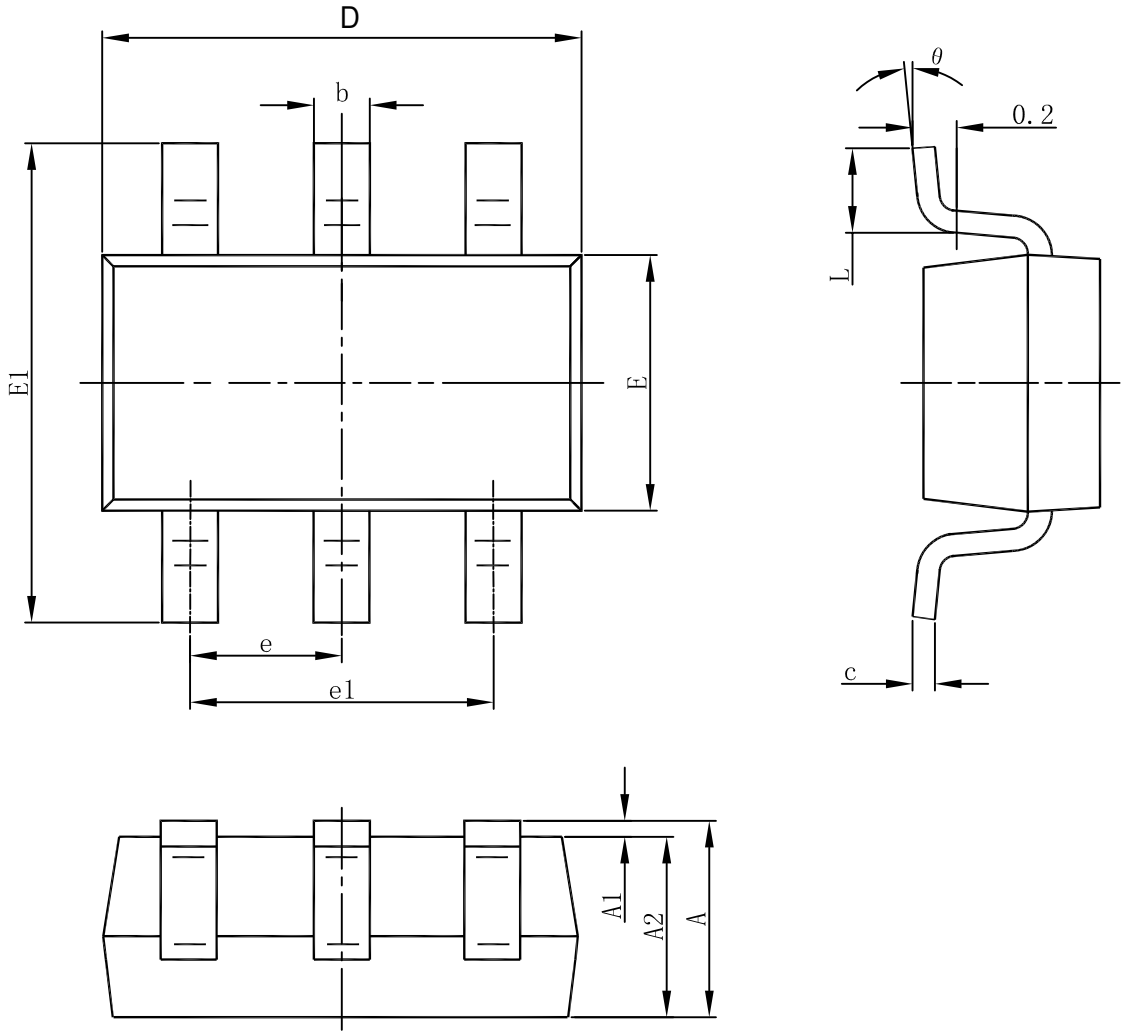
Gate charge Characteristics



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
θ	0°	8°	0°	8°