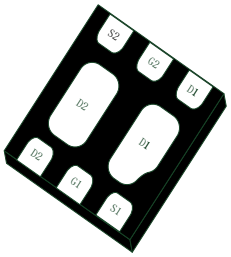
WCM2070

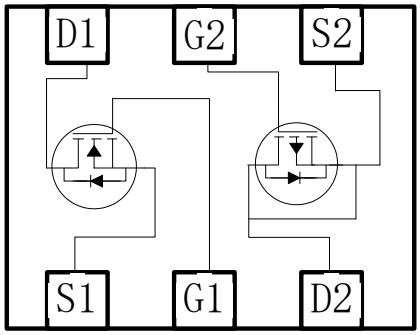
N- and P-Channel Complementary, 12V,MOSFET

Http://www.sh-willsemi.com

	V_{DS} (V)	Typical $R_{DS(on)}$ (Ω)
N-Channel	12	0.028@ V_{GS}=4.5V
		0.035@ V_{GS}=2.5V
		0.046@ V_{GS}=1.8V
P-Channel	-12	0.057@V_{GS}=- 4.5V
		0.087@V_{GS}= -2.5V
		0.140@V_{GS}= -1.8V



DFN2*2-6L



Pin configuration (Top View)

Descriptions

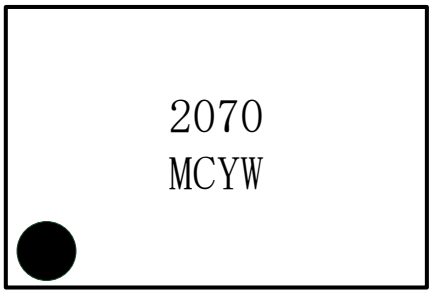
The WCM2070 is the N-Channel and P-Channel enhancement MOS Field Effect Transistor as a single package for DC-DC converter or level shift applications, uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Standard Product WCM2070 is Pb-free and Halogen-free..

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage
- Small package DFN2*2-6L

Applications

- Power supply converters circuit
- Load/Power Switching for portable device



2070 = Device Code
MC = Special Code
YW = Date Code

Marking

Order Information

Device	Package	Shipping
WCM2070-6/TR	DFN2*2-6L	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			12	-12	V
V_{GSS}	Gate-to-Source Voltage			±8	±8	V
I_D	Continuous Drain Current [a d]	t ≤ 10 s	T_A=25°C	5.1	-4.0	A
			T_A=70°C	4.0	-3.2	
		Steady State	T_A=25°C	4.4	-3.4	
			T_A=70°C	3.5	-2.7	
I_{DM}	Pulsed Drain Current [c]			17.6	-13.6	A
P_D	Power Dissipation [a d]	t ≤ 10 s	T_A=25°C	1.8		W
			T_A=70°C	1.15		
		Steady State	T_A=25°C	1.37		
			T_A=70°C	0.87		
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	$R_{\theta JA}$	55	69	°C/W
	Steady State		70	91	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	88	115	
	Steady State		125	179	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	34	44	

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%

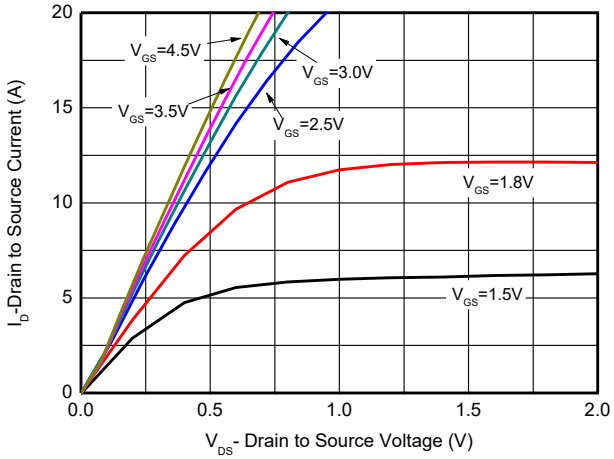
d Maximum junction temperature T_J=150°C.

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

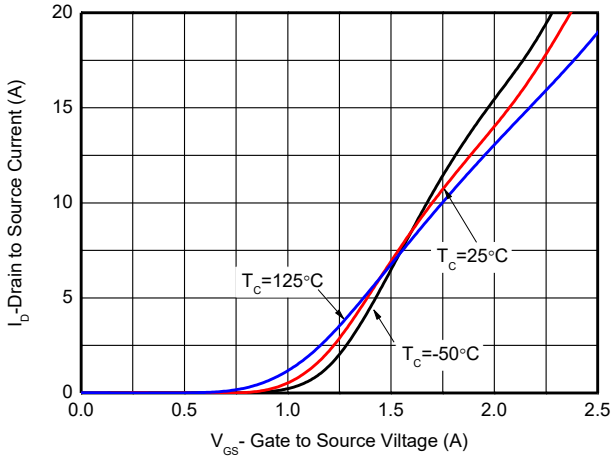
Symbol	Parameter	Test Condition		Min	Typ.	Max	Unit
Off Characteristics							
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	N-Ch	12			V
		V_{GS}=0V, I_D=-250uA	P-Ch	-12			
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=10V, V_{GS}=0V	N-Ch			1	uA
		V_{DS}=-10V, V_{GS}=0V	P-Ch			-1	
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		0.70	1.2	V
		V_{DS}= V_{GS}, I_D=-250uA	P-Ch		-0.80	-1.2	
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=4.5V, I_D=5.0A	N-Ch		28	46	mΩ
		V_{GS}=-4.5V, I_D=-3.6A	P-Ch		57	75	
		V_{GS}=2.5V, I_D=4.6A	N-Ch		35	66	
		V_{GS}=-2.5V, I_D=-3.2A	P-Ch		87	110	
		V_{GS}=1.8V, I_D=4.1A	N-Ch		46	80	
		V_{GS}=-1.8V, I_D=-1.0A	P-Ch		140	171	
Dynamic Characteristics							
Ciss	Input Capacitance	Nmos: V_{DS}=6V,V_{GS}=0V, f=1MHz Pmos: V_{DS}=-6V,V_{GS}=0V, f=1MHz	N-Ch		469		pF
			P-Ch		673		
Coss	Output Capacitance		N-Ch		125		
			P-Ch		175		
Crss	Reverse Transfer Capacitance		N-Ch		95		
			P-Ch		162		
$Q_{G(TOT)}$	Total Gate Charge	Nmos: V_{DD}=10V, V_{GS}=4.5V, I_D=6.5A Pmos: V_{DD}=-10V,V_{GS}=-4.5V I_D=-4.3A	N-Ch		5.38		nC
			P-Ch		6.56		
$Q_{G(TH)}$	Threshold gate charge		N-Ch		0.72		
			P-Ch		0.81		
Q_{GS}	Gate-Source Charge		N-Ch		1.3		
			P-Ch		1.2		
Q_{GD}	Gate-Drain Charge		N-Ch		0.76		
			P-Ch		2.1		
td(on)	Turn-On Delay Time	Nmos: V_{DD}=6V,V_{GS}=4.5V, I_D=5.2A, R_G=1Ω Pmos: V_{DD}=-6V, I_D=-3.8A, V_{GS}=-4.5V, R_G=1Ω	N-Ch		20		ns
			P-Ch		30		
tr	Turn-On Rise Time		N-Ch		22		
			P-Ch		32		
td(off)	Turn-Off Delay Time		N-Ch		48		
			P-Ch		62		
tf	Turn-Off Fall Time		N-Ch		15		
			P-Ch		18		

BODY DIODE CHARACTERISTICS							
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 5.2A	N-Ch		0.7	1.5	V
		V_{GS} = 0 V, I_S =–3.4A	P-Ch		-0.8	-1.5	
Body-Diode Continuous Current	I_S		N-Ch			5.3	A
			P-Ch			-4.1	
Body-Diode Pulsed Current	I_{SM}		N-Ch			20	A
			P-Ch			-15	
Body Diode Reverse Recovery Time	T_{rr}	Nmos： I_F=5.2A,dI/dt=100A/us V_{GS}=0V (NOTE C) Pmos： I_F=-3.8A,dI/dt=-100A/us V_{GS}=0V (NOTE C)	N-Ch		18	50	nS
			P-Ch		27	65	
Body Diode Reverse Recovery Charge	Q_{rr}		N-Ch		4.5	10	uC
			P-Ch		11	25	
Reverse Recovery Fall Time	t_a		N-Ch		7		nS
			P-Ch		15		
Reverse Recovery Rise Time	t_b		N-Ch		11		
			P-Ch		12		

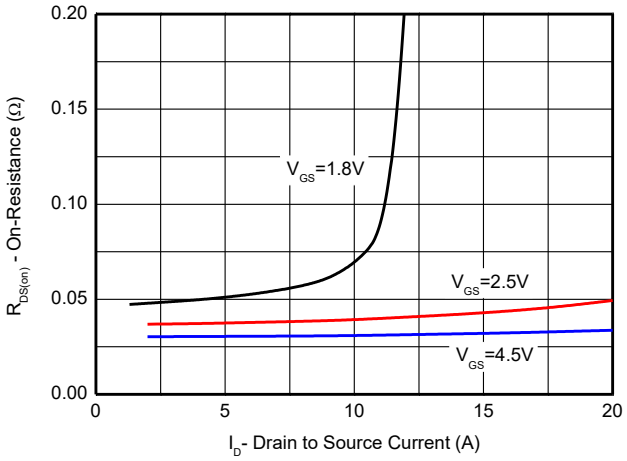
Typical Characteristics（N-Channel T_A=25°C,unless otherwise noted)



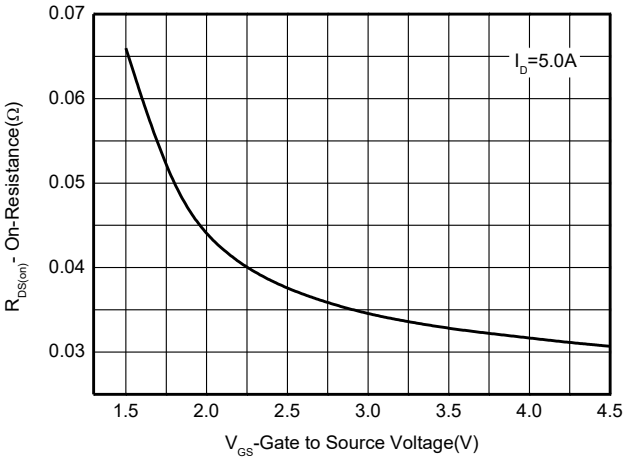
Output Characteristics



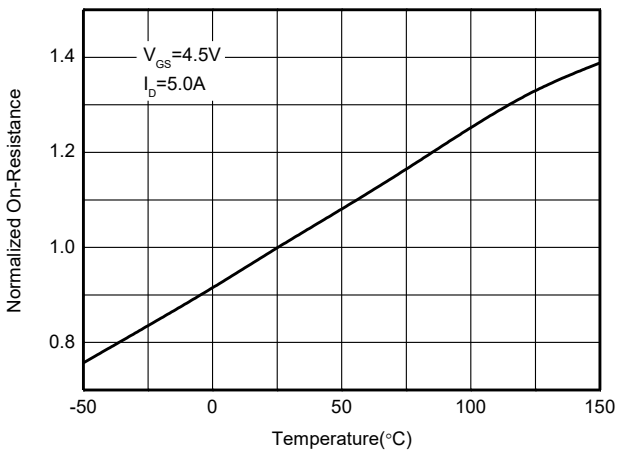
Transfer Characteristics



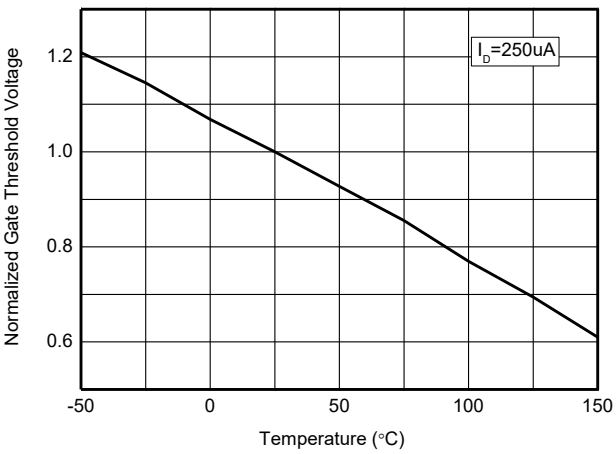
On-Resistance vs. Drain Current



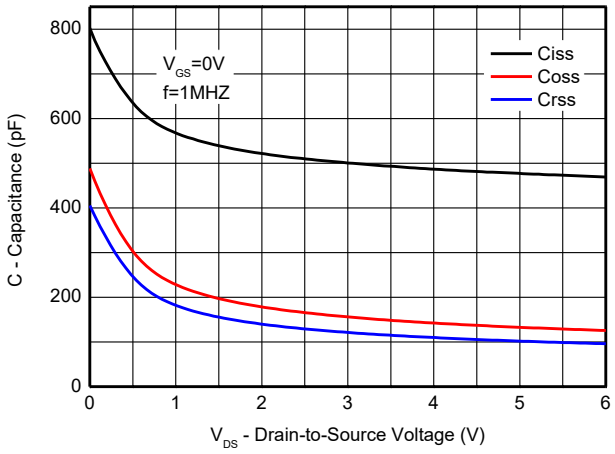
On-Resistance vs. Gate-to-Source Voltage



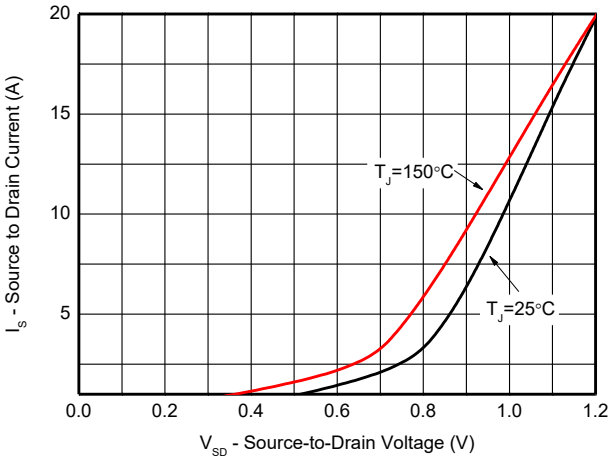
On-Resistance vs. Junction Temperature



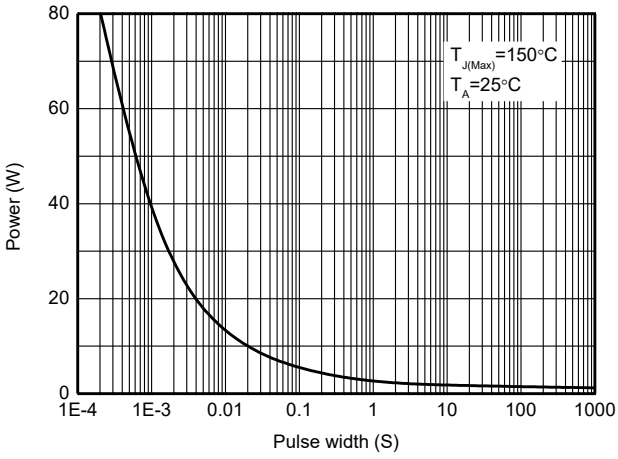
Threshold Voltage vs. Temperature



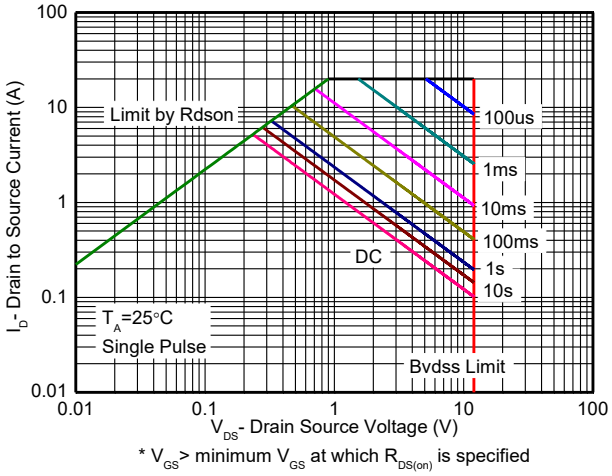
Capacitance



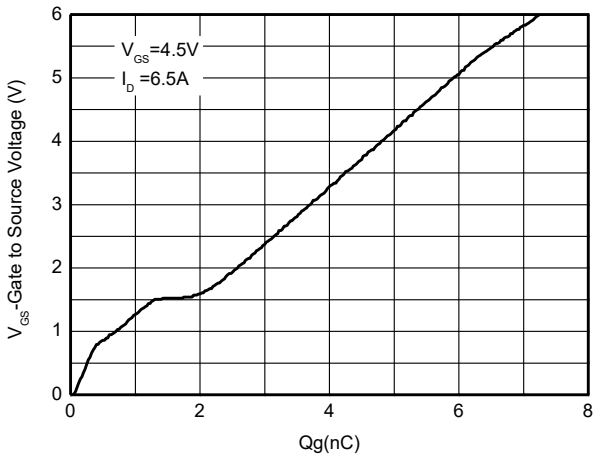
Body Diode Forward Voltage



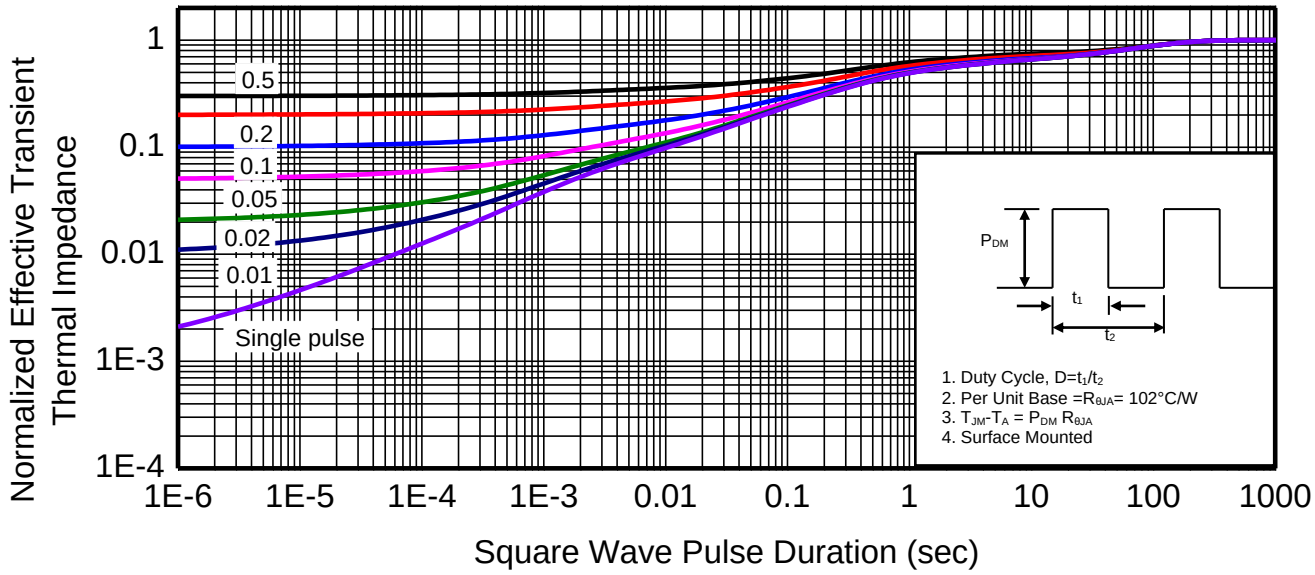
Single pulse power



Safe operating power

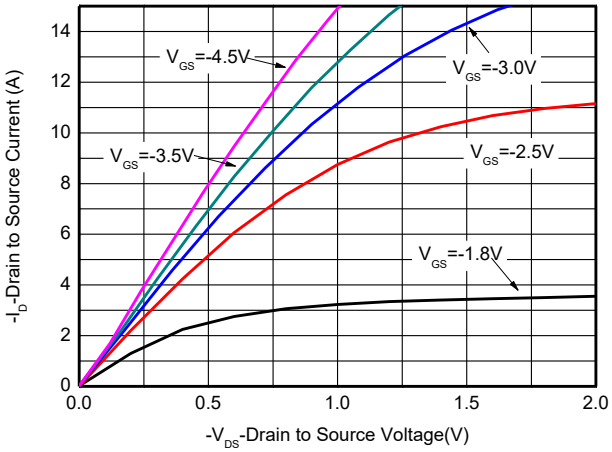


Gate charge Characteristics

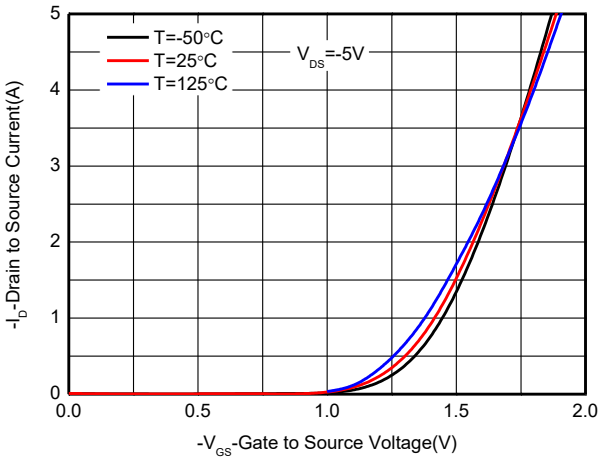


Transient thermal response (Junction-to-Ambient)

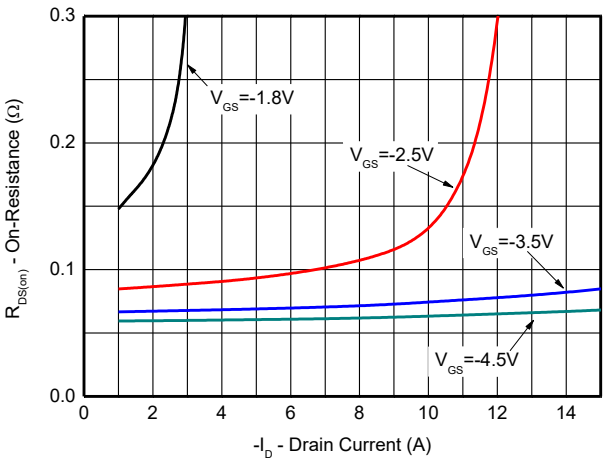
Typical Characteristics（P-Channel T_A=25°C,unless otherwise noted）



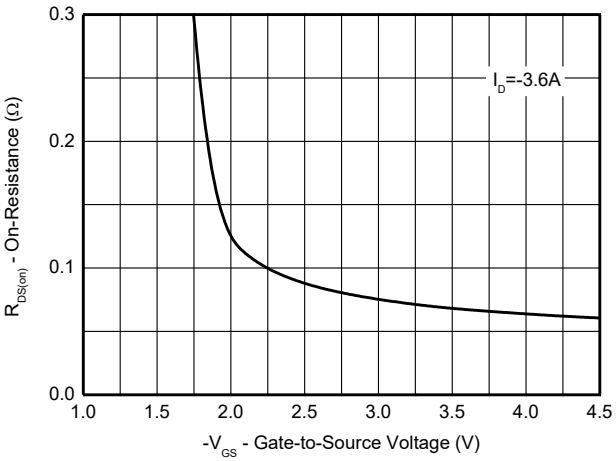
Output characteristics



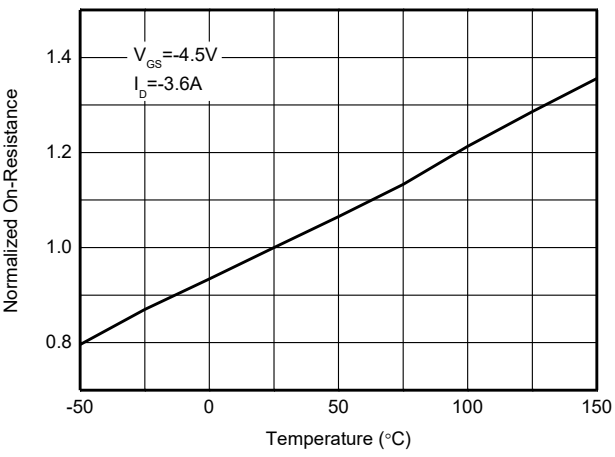
Transfer characteristics



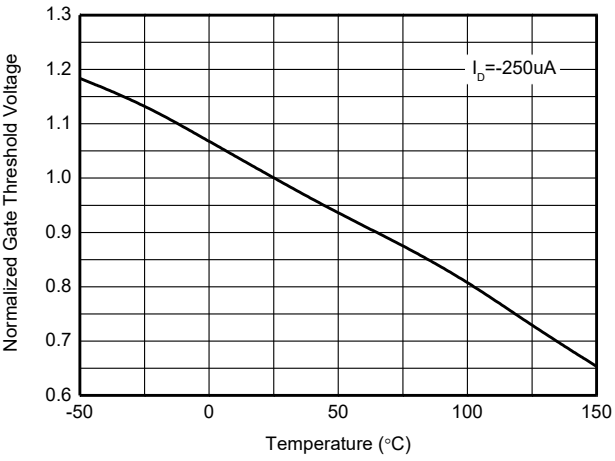
On-Resistance vs. Drain current



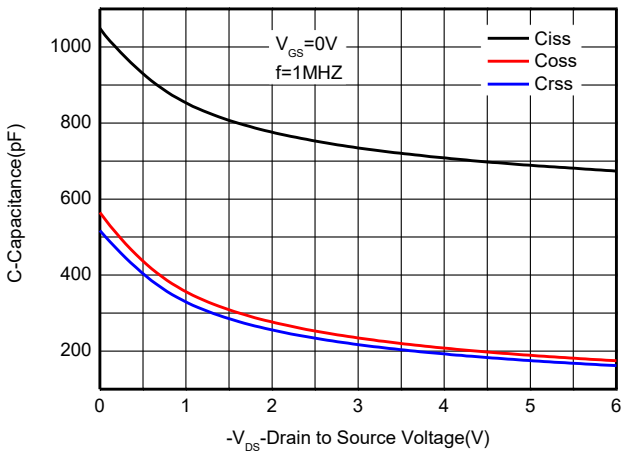
On-Resistance vs. Gate-to-Source voltage



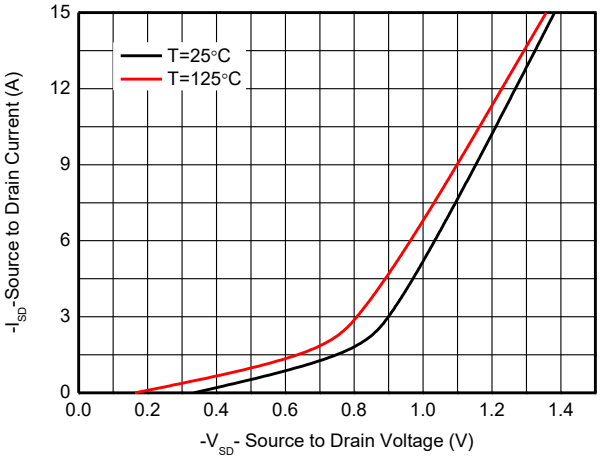
On-Resistance vs. Junction temperature



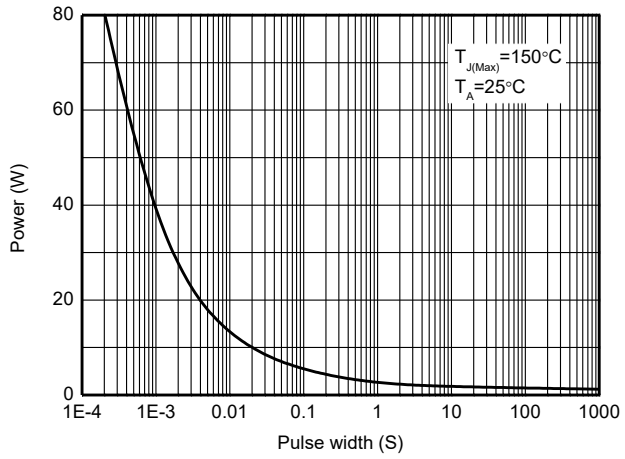
Threshold voltage vs. Temperature



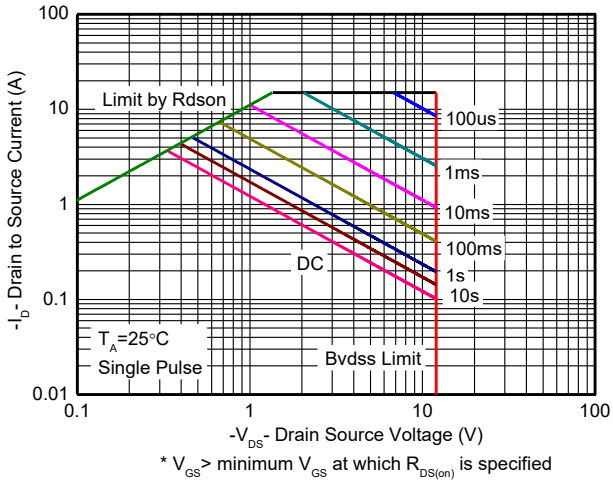
Capacitor



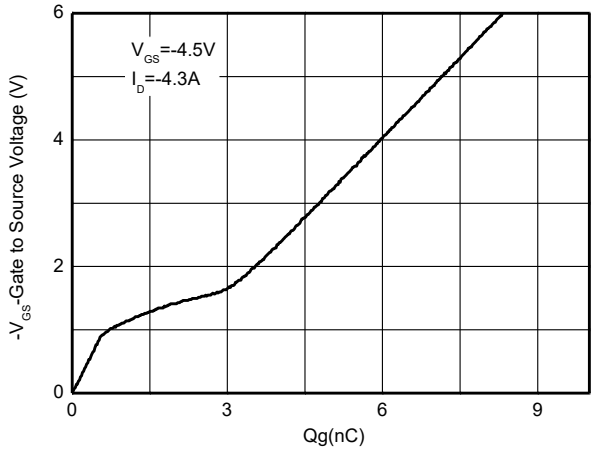
Body diode forward voltage



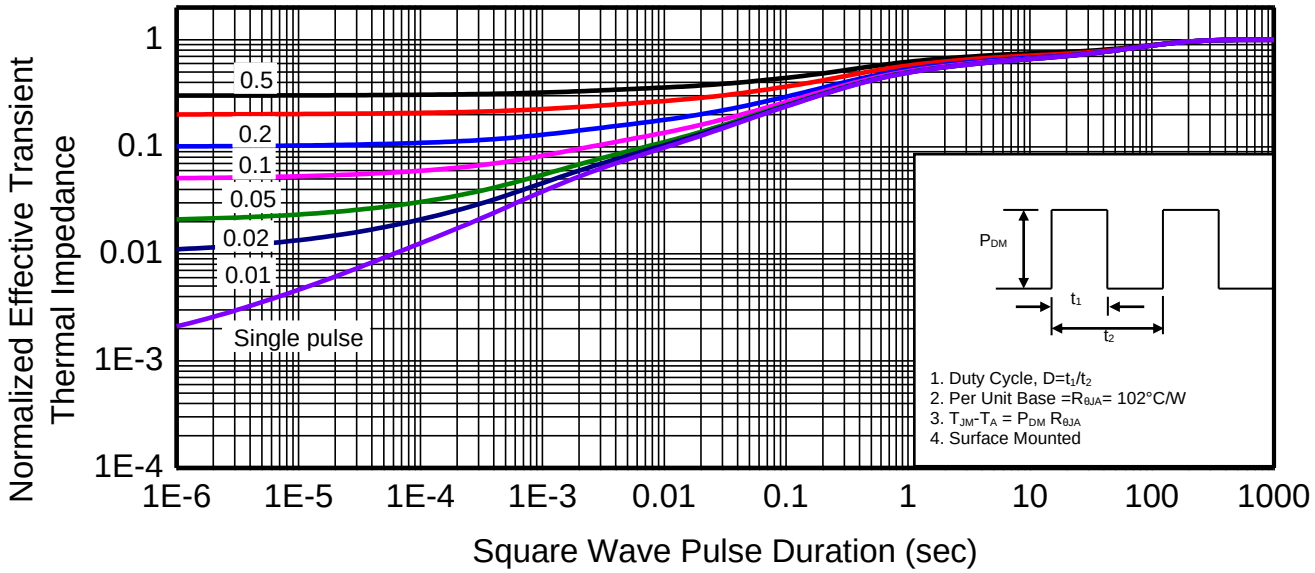
Single pulse power (Junction-to-ambient)



Safe operating power



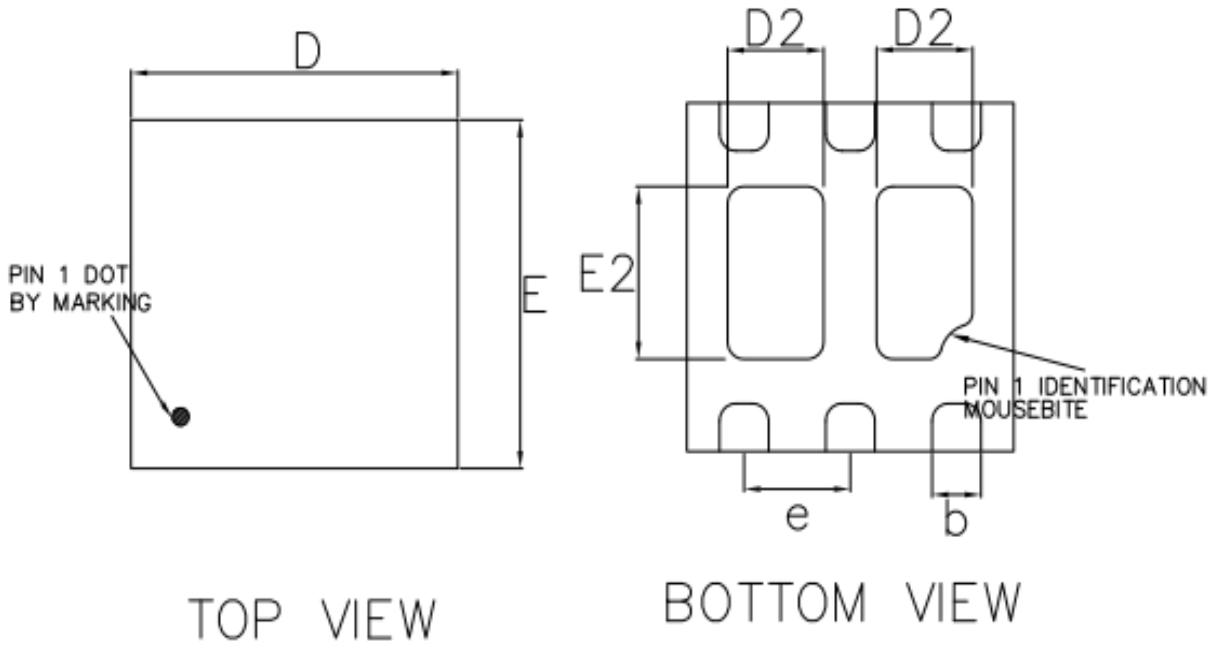
Gate charge Characteristics

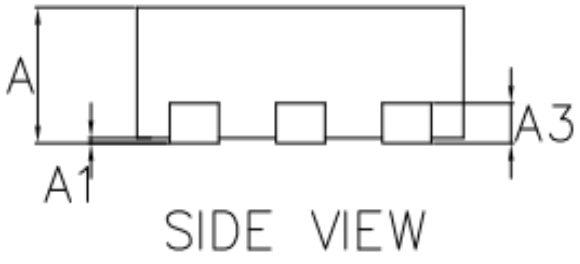


Transient thermal response (Junction-to-Ambient)

Package Outline Dimension

DFN2*2-6L





COMMON DIMENSIONS(MM)			
PKG.	W: VERY VERY THIN		
REF.	MIN.	NOM.	MAX
A	0.70	0.75	0.80
A1	0.00	–	0.05
A3	0.20 REF.		
D	1.95	2.00	2.05
E	1.95	2.00	2.05
D2	0.44	0.59	0.69
E2	0.84	0.99	1.09
b	0.25	0.30	0.35
L	0.175	0.275	0.375
e	0.65 BSC		