WCM2007

N- and P-Channel, 20V, MOSFET

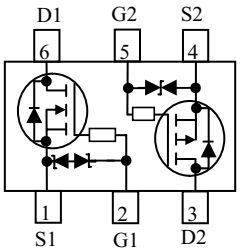
Http://www.sh-willsemi.com

$V_{(BR)DSS}$	$R_{DS(on)}$ Typical. (Ω)
N-Channel 20 V	0.18@ 4.5V
	0.23@ 2.5V
	0.30@ 1.8V
ESD protection	
P-Channel -20 V	0.45@-4.5V
	0.60@ -2.5V
	0.75@ -1.8V
ESD protection	

SOT-563

Descriptions

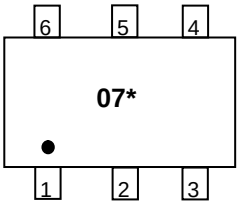
The WCM2007 is the N- and P-Channel enhancement MOS Field Effect Transistor as a single package for DC-DC converter or level shift applications, uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Standard Product WCM2007 is Pb-free.



Pin configuration (Top view)

Features

- Trench Technology
- Supper high density cell design for extremely low Rds(on)
- Exceptional ON resistance and maximum DC current capability
- Small package design with SOT-563.



07 = Device Code

* = Date Code

Marking

Applications

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

Order Information

Device	Package	Shipping
WCM2007-6/TR	SOT-563	3000/Tape&Reel

Absolute Maximum Ratings

(T_A=25°C unless otherwise noted)

Parameter		Symbol	N-Channel		P-Channel		Unit
			10 s	Steady State	10 s	Steady State	
Drain-Source Voltage		V_{DS}	+20		-20		V
Gate-Source Voltage		V_{GS}	±6				V
Continuous Drain Current [a]	T_A=25°C	I_D	0.89	0.79	-0.56	-0.50	A
	T_A=70°C		0.71	0.63	-0.45	-0.40	
Maximum Power Dissipation [a]	T_A=25°C	P_D	0.37	0.29	0.37	0.29	W
	T_A=70°C		0.23	0.18	0.23	0.18	
Continuous Drain Current [b]	T_A=25°C	I_D	0.76	0.69	-0.48	-0.44	A
	T_A=70°C		0.61	0.55	-0.38	-0.35	
Maximum Power Dissipation [b]	T_A=25°C	P_D	0.27	0.22	0.27	0.22	W
	T_A=70°C		0.17	0.14	0.17	0.14	
Pulsed Drain Current [c]		I_{DM}	1.4		-1.0		A
Operating Junction Temperature		T_J	150				°C
Lead Temperature		T_L	260				°C
Storage Temperature Range		T_{stg}	-55 to 150				°C

Thermal resistance ratings

Parameter		Symbol	Typical	Maximum	
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	290	335	°C/W
	Steady State		340	430	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	385	460	
	Steady State		465	555	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	280	320	

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 Repetitive rating, pulse width limited by junction temperature, Pulse width<380μs, Duty Cycle<2%

d Repetitive rating, pulse width limited by junction temperature T_J=150°C.

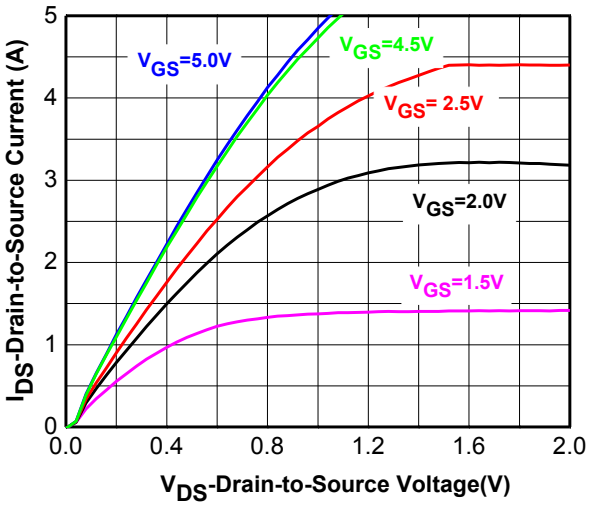
Electronics Characteristics

(T_A=25°C unless otherwise noted)

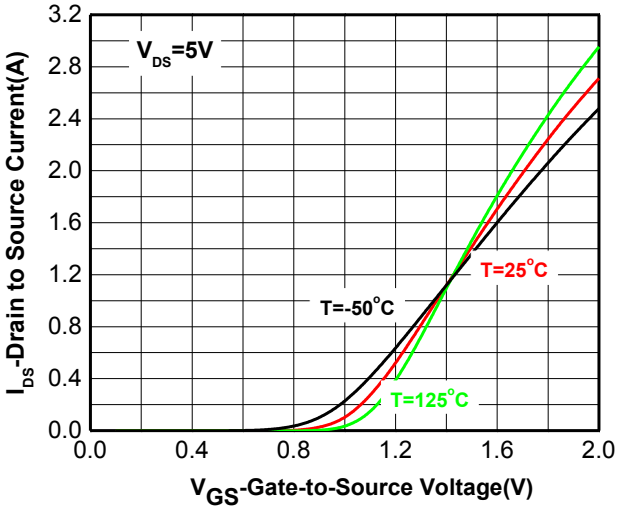
Symbol	Parameter	Test Condition		Min	Typ.	Max	Unit
Off Characteristics							
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	N-Ch	20			V
		V_{GS}=0V, I_D=-250uA	P-Ch	-20			
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20V, V_S=0V	N-Ch			+1	uA
		V_{DS}=-20V, V_S=0V	P-Ch			-1	
I_{GSS}	Gate –Source leakage current	V_{DS}=0V, V_{GS}=±5V	N-Ch			±5	uA
			P-Ch			±5	
ON Characteristics							
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250uA	N-Ch	0.40	0.72	0.90	V
		V_{DS}= V_{GS}, I_D=-250uA	P-Ch	-0.40	-0.62	-0.90	
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=4.5V, I_D=0.55A	N-Ch		0.18	0.31	Ω
		V_{GS}=-4.5V, I_D=-0.45A	P-Ch		0.45	0.81	
		V_{GS}=2.5V, I_D=0.45A	N-Ch		0.23	0.36	
		V_{GS}=-2.5V, I_D=-0.35A	P-Ch		0.60	1.050	
		V_{GS}=1.8V, I_D=0.35A	N-Ch		0.30	0.46	
		V_{GS}=-1.8V, I_D=-0.25A	P-Ch		0.75	1.30	
g_{FS}	Forward Transconductance	VDS = 5 V, ID = 0.55A	N-Ch		2.0		S
		V_{DS} = -5 V, I_D =-0.45A	P-Ch		1.25		
Dynamic Characteristics							
Ciss	Input Capacitance	NMOS: V_{DS}=10V, V_{GS}=0V, F=10KHz PMOS:V_{DS}=-10V, V_{GS}=0V, F=10KHz	N-Ch		90		pF
			P-Ch		65.8		
Coss	Output Capacitance		N-Ch		17.7		
			P-Ch		19.8		
Crss	Reverse Transfer Capacitance		N-Ch		11.2		
			P-Ch		7.7		
$Q_{G(TOT)}$	Total Gate Charge	NMOS: V_{DS}=10V, V_{GS}=4.5V, I_D=0.6A PMOS: V_{DS}=-10V, V_{GS}=-4.5V, I_D=-0.6A	N-Ch		1.05		nC
			P-Ch		0.90		
$Q_{G(TH)}$	Threshold Gate Charge		N-Ch		0.06		
			P-Ch		0.05		
Q_{GS}	Gate-Source Charge		N-Ch		0.12		
			P-Ch		0.10		
Q_{GD}	Gate-Drain Charge		N-Ch		0.38		
			P-Ch		0.44		

Symbol	Parameter	Test Condition		Min	Typ.	Max	Unit
Switching Characteristics							
$t_{d(on)}$	Turn-On Delay Time	NMOS:V_{DD}=10V, V_{GEN}=4.5V, I_D=0.55A, , R_G=6Ω	N-Ch		46		ns
			P-Ch		420		
t_r	Turn-On Rise Time		N-Ch		87		
			P-Ch		1320		
$t_{d(off)}$	Turn-Off Delay Time	PMOS:V_{DD}=-10V, V_{GEN}=-4.5V, I_D=-0.5A, , R_G=6Ω	N-Ch		776		
			P-Ch		8000		
t_f	Turn-Off Fall Time		N-Ch		368		
			P-Ch		8600		
Drain-to-Source Diode Characteristics							
V_{SD}	Forward Diode Voltage	V_{GS}=0V, I_S=0.35A	N-Ch	0.5	0.74	1.5	V
		V_{GS}=0V, I_S=-0.25A	P-Ch	-0.5	-0.80	-1.5	

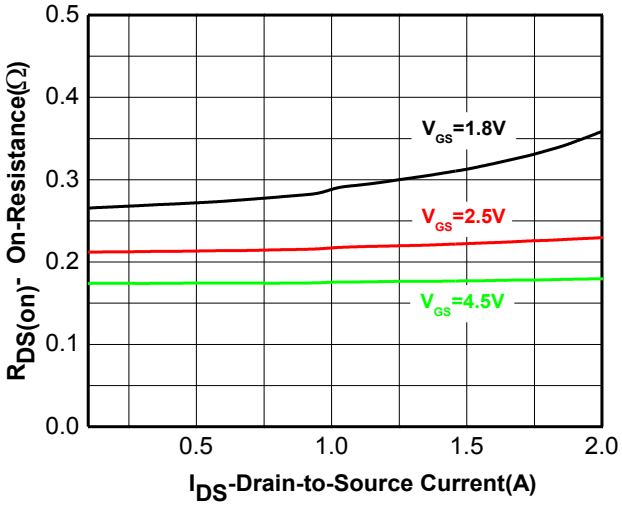
NMOS Typical Characteristics (Ta=25°C, unless otherwise noted)



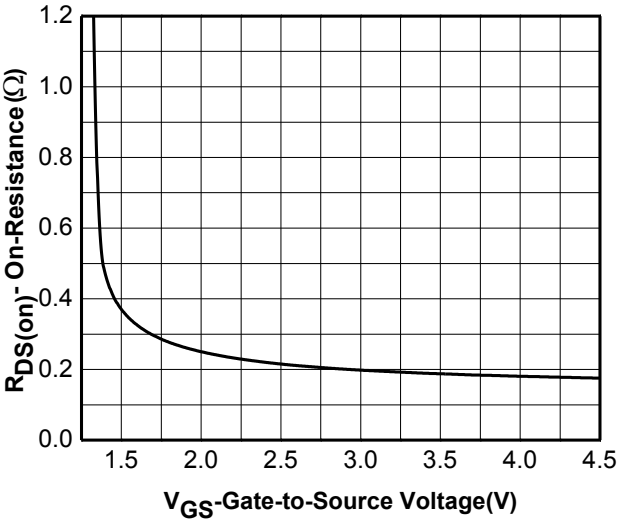
Output characteristics



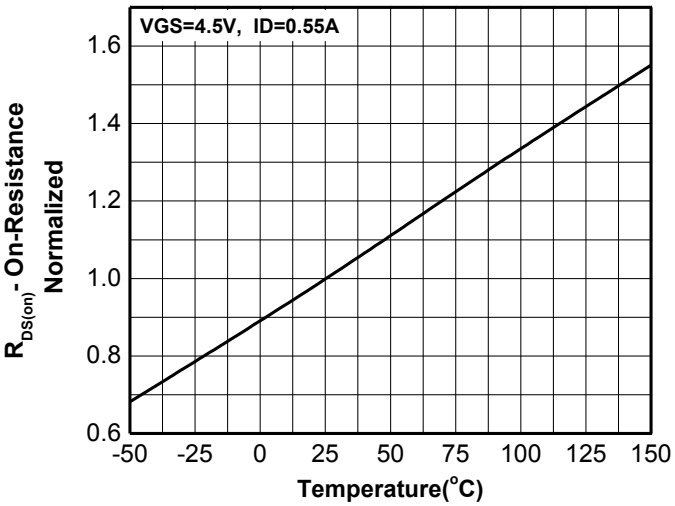
Transfer characteristics



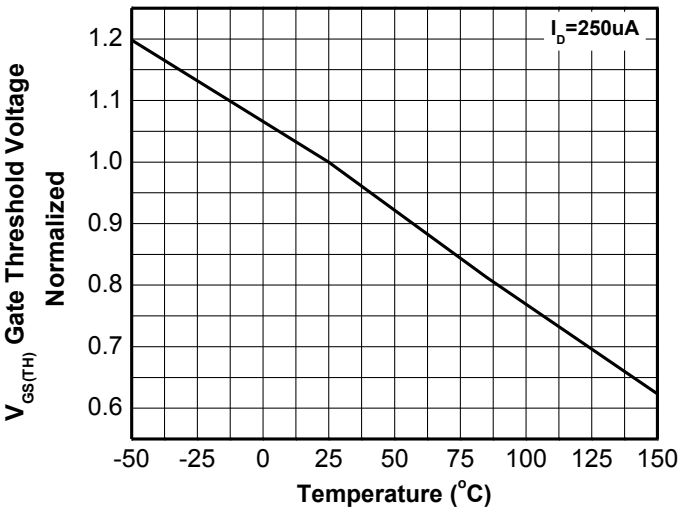
On-Resistance vs. Drain current



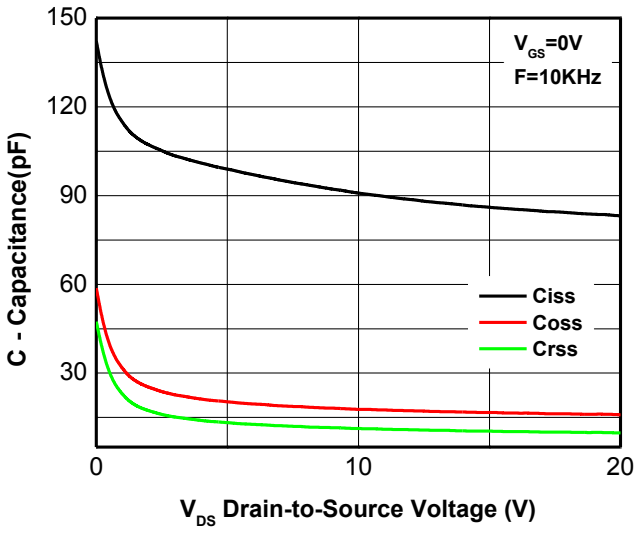
On-Resistance vs. Gate-to-Source voltage



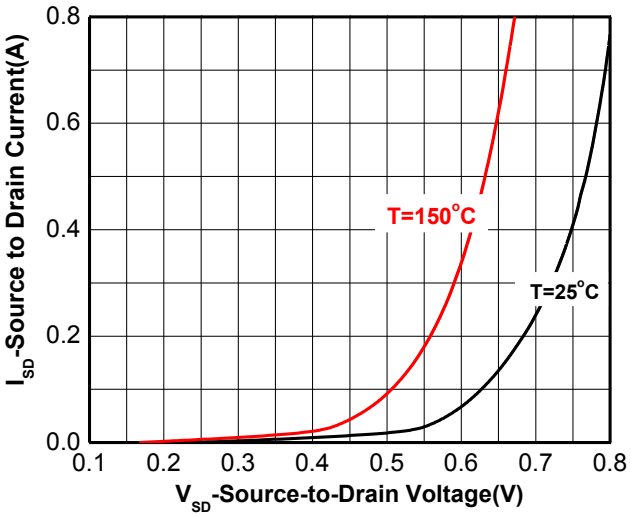
On-Resistance vs. Junction temperature



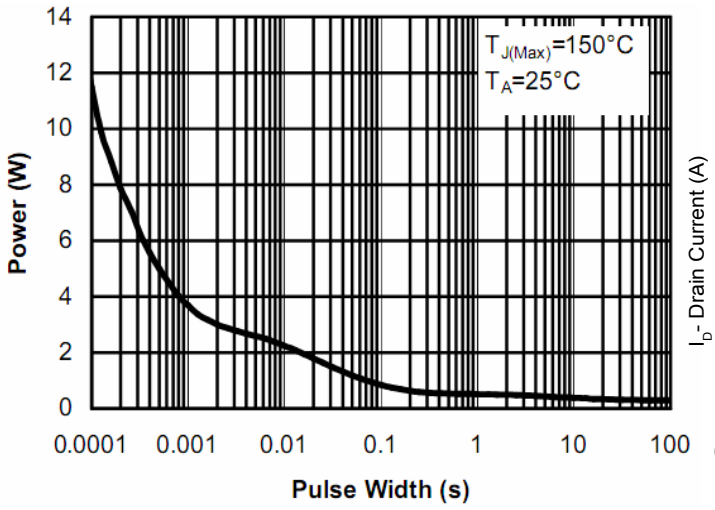
Threshold voltage vs. Temperature



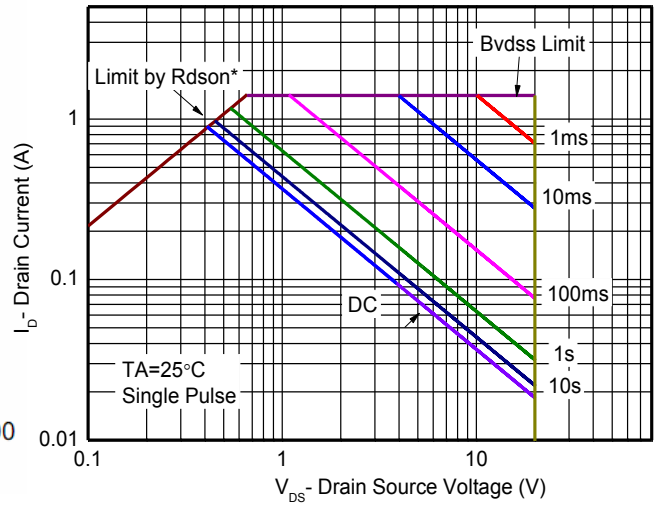
Capacitance



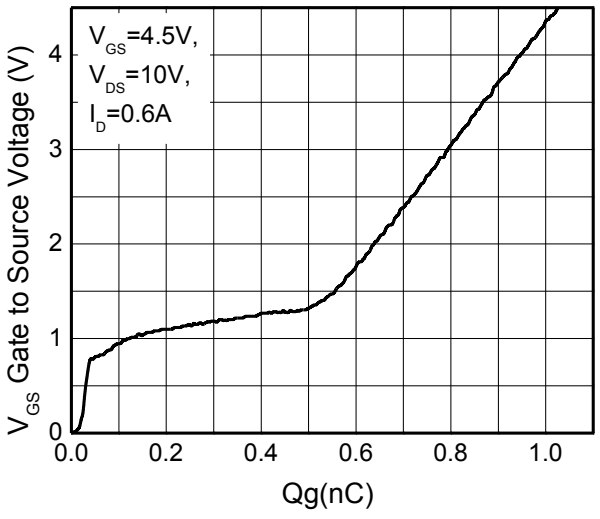
Body diode forward voltage



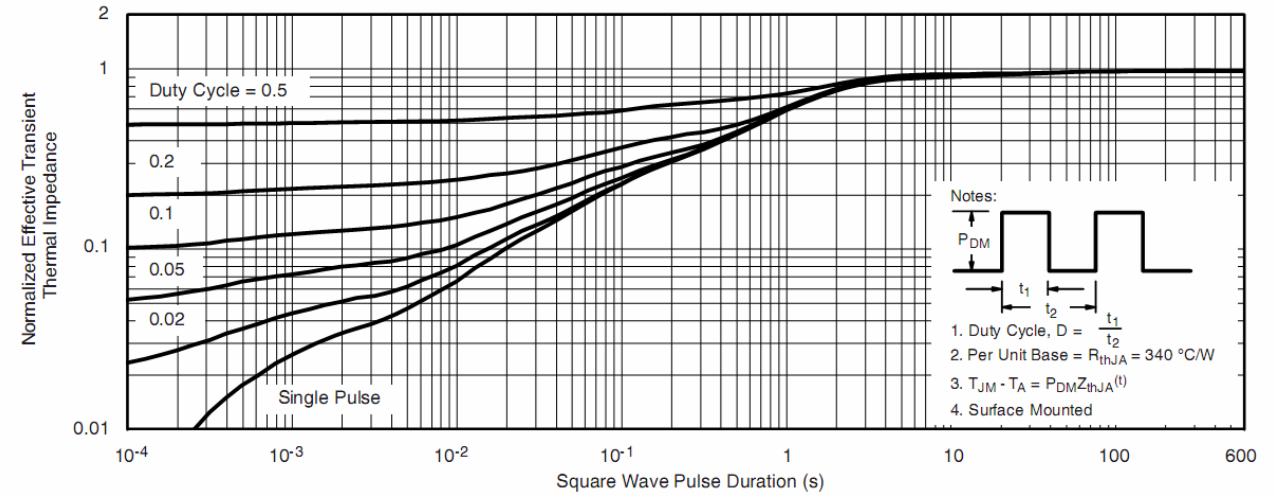
Single pulse powe



Safe operating power

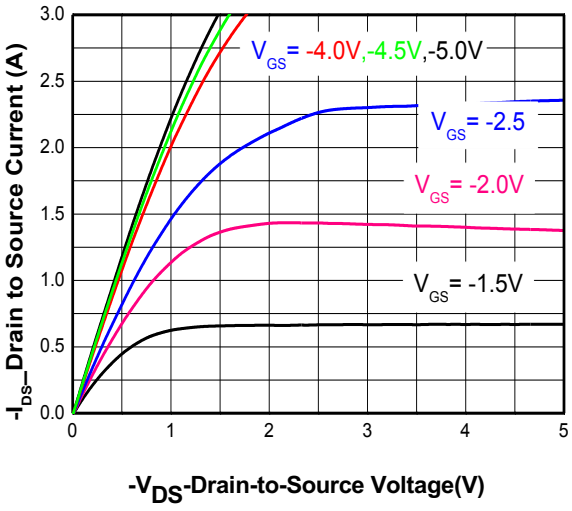


Gate Charge Characteristics

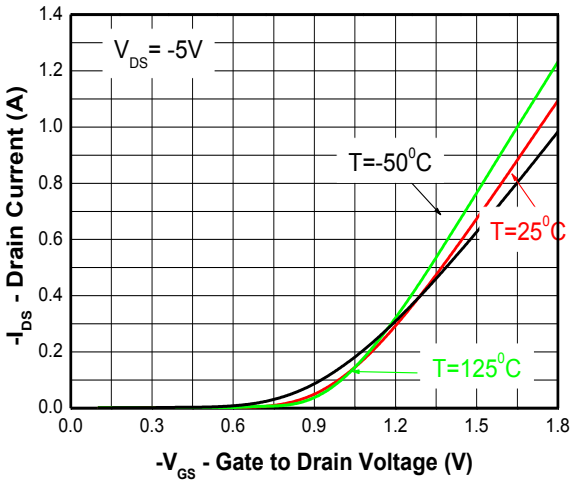


Transient thermal response (Junction-to-Ambient)

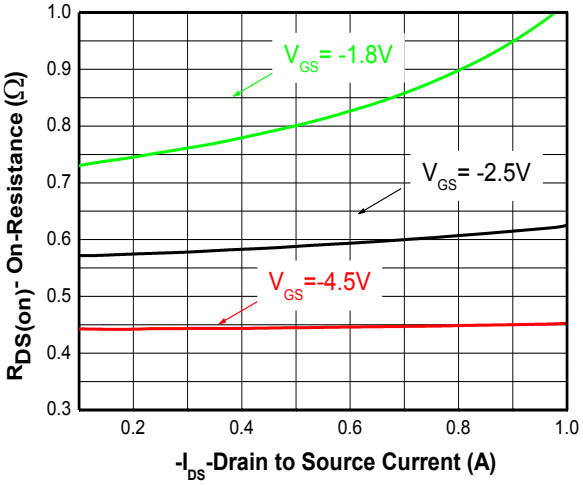
PMOS Typical Characteristics (Ta=25°C, unless otherwise noted)



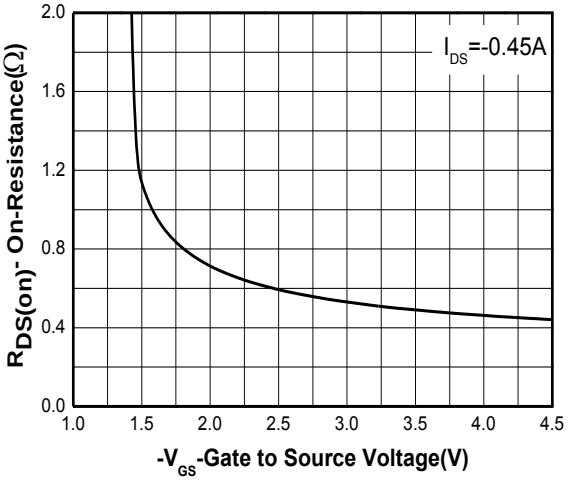
Output characteristics



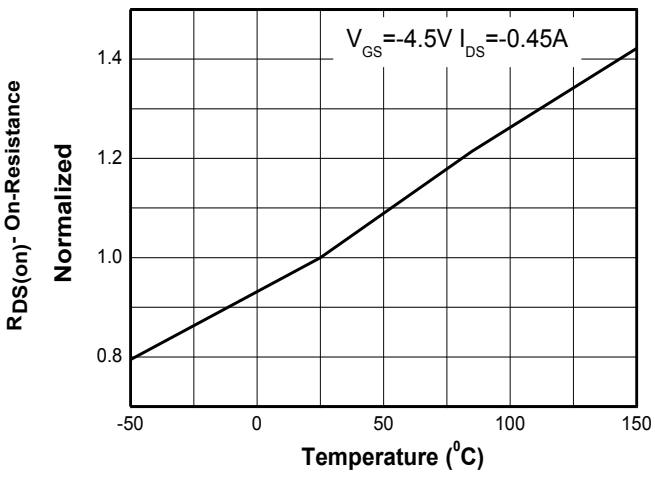
Transfer characteristics



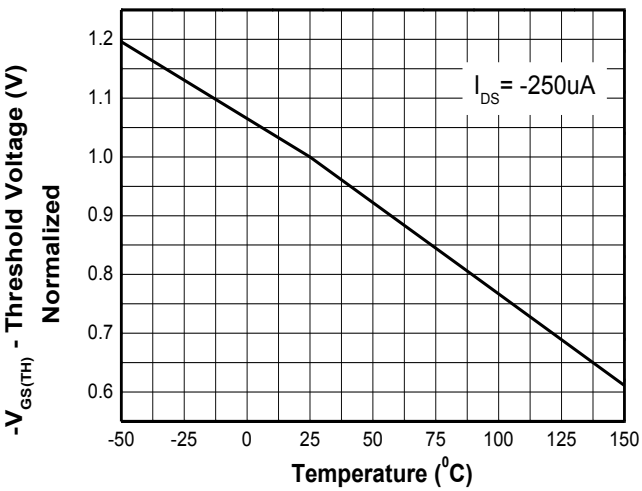
On-Resistance vs. Drain current



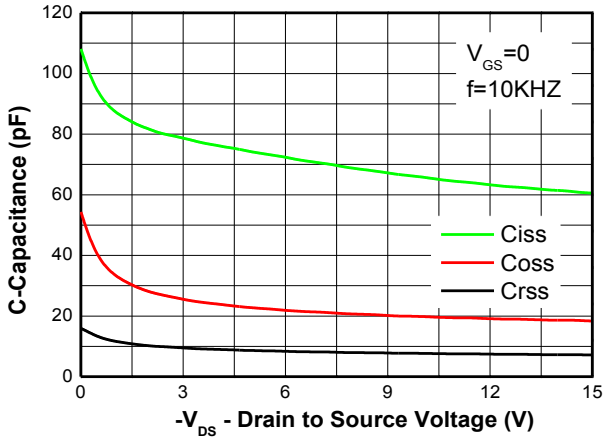
On-Resistance vs. Gate-to-Source voltage



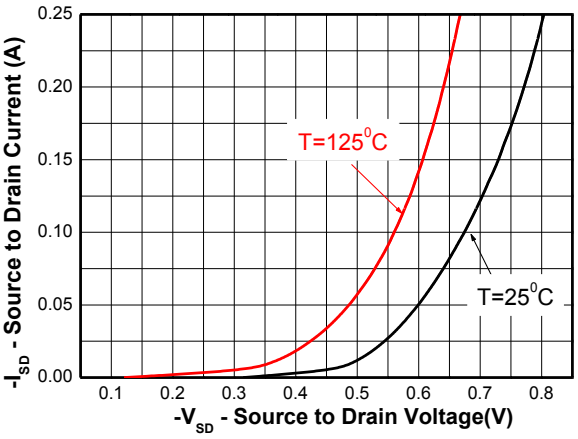
On-Resistance vs. Junction temperature



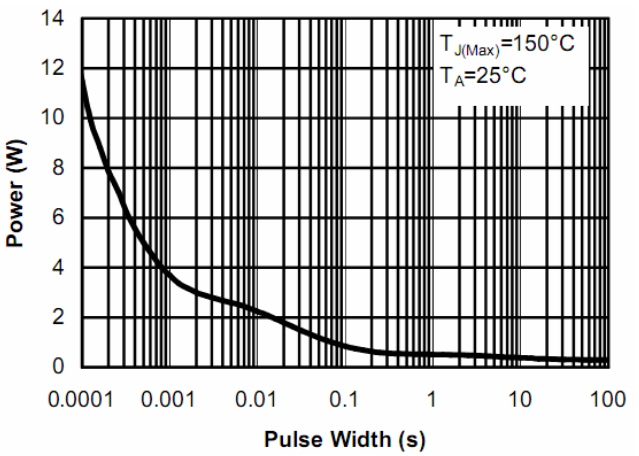
Threshold voltage vs. Temperature



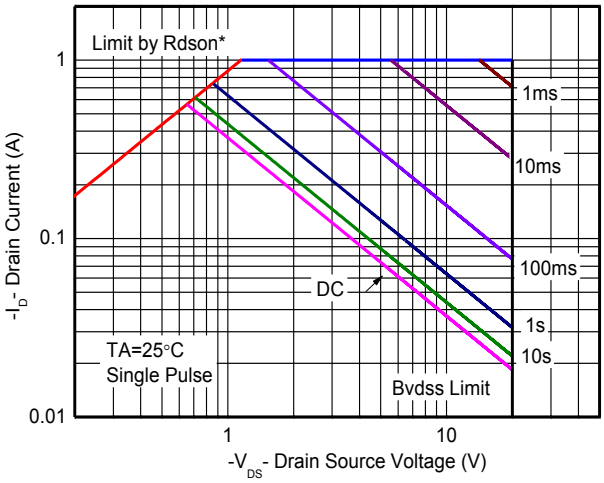
Capacitance



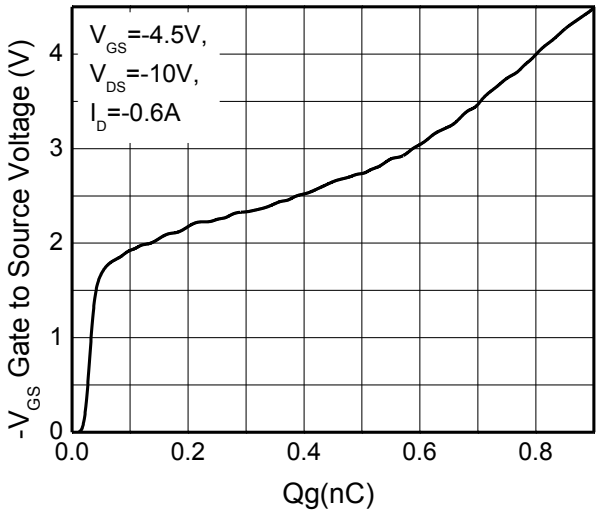
Body diode forward voltage



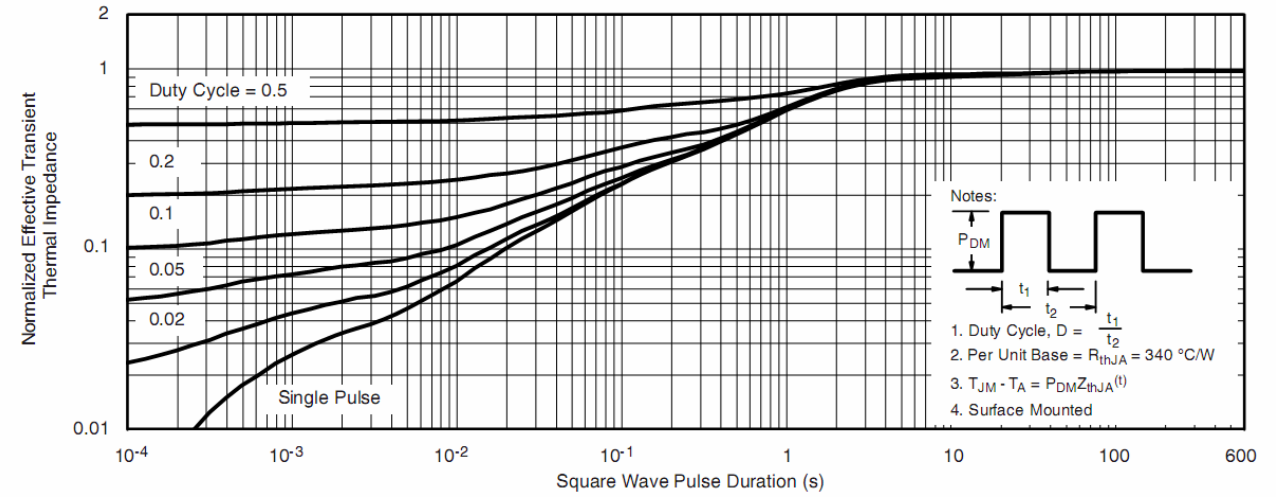
Single pulse power



Safe operating power



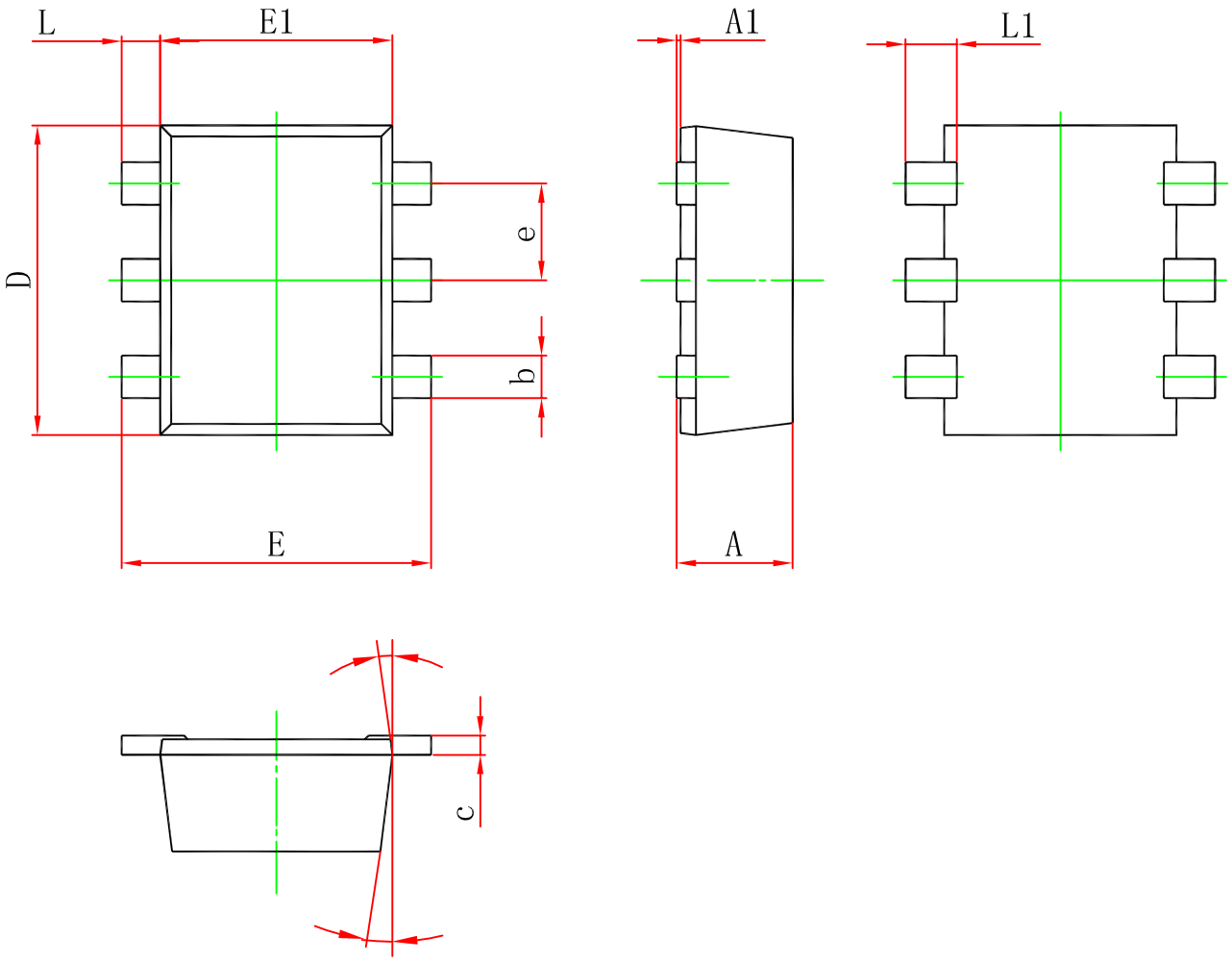
Gate Charge Characteristics



Transient thermal response (Junction-to-Ambient)

Package Outline Dimension

SOT-563



Symbol	Dimensions In Millimeters		Dimensions in inches	
	Min.	Max.	Min.	Max.
A	0.525	0.600	0.021	0.024
A1	0.000	0.050	0.000	0.002
e	0.450	0.550	0.018	0.022
c	0.090	0.160	0.004	0.006
D	1.500	1.700	0.059	0.067
b	0.170	0.270	0.007	0.011
E1	1.100	1.300	0.043	0.051
E	1.500	1.700	0.059	0.067
L	0.100	0.300	0.004	0.012
L1	0.200	0.400	0.008	0.016
θ	7 °REF.		7 °REF.	