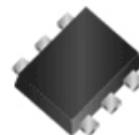


**N- and P-Channel, 20V, MOSFET**

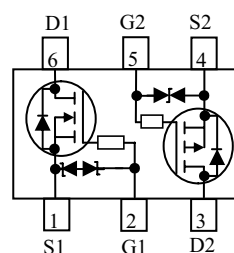
$V_{(BR)DSS}$	$R_{DS(on)}$ Max. (mΩ)
N-Channel 20 V	220@ 4.5V
	260@ 2.5V
	320@ 1.8V
P-Channel -20 V	600@- 4.5V
	780@ -2.5V
	960@ -1.8V



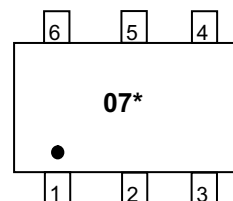
SOT-563

**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)



07 = Device Code  
\* = Date Code

**Marking**

**Features**

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

**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<sub>A</sub>=25°C unless otherwise noted)

Parameter	Symbol	N-Channel		P-Channel		Unit	
		10 S	Steady State	10 S	Steady State		
Drain-Source Voltage	V <sub>DS</sub>	+20		-20		V	
Gate-Source Voltage	V <sub>GS</sub>	±6				V	
Continuous Drain Current <sup>a</sup>	T <sub>A</sub> =25°C	I <sub>D</sub>	0.88	0.80	-0.64	-0.56	A
	T <sub>A</sub> =70°C	I <sub>D</sub>	0.71	0.64	-0.51	-0.45	
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> =25°C	P <sub>D</sub>	0.37	0.30	0.37	0.29	W
	T <sub>A</sub> =70°C	P <sub>D</sub>	0.23	0.19	0.23	0.18	
Continuous Drain Current <sup>b</sup>	T <sub>A</sub> =25°C	I <sub>D</sub>	0.76	0.69	-0.54	-0.50	A
	T <sub>A</sub> =70°C	I <sub>D</sub>	0.60	0.55	-0.43	-0.40	
Maximum Power Dissipation <sup>b</sup>	T <sub>A</sub> =25°C	P <sub>D</sub>	0.27	0.22	0.27	0.22	W
	T <sub>A</sub> =70°C	P <sub>D</sub>	0.17	0.14	0.17	0.14	
Pulsed Drain Current <sup>c</sup>	I <sub>DM</sub>	1.4		-1.0		A	
Operating Junction Temperature	T <sub>J</sub>	150				°C	
Lead Temperature	T <sub>L</sub>	260				°C	
Storage Temperature Range	T <sub>stg</sub>	-55 to 150				°C	

**Thermal resistance ratings**

Parameter	Symbol	N-Channel		P-Channel		Unit	
		Typical	Maximum	Typical	Maximum		
Junction-to-Ambient Thermal Resistance <sup>a</sup>	t ≤ 10 s	R <sub>θJA</sub>	285	335	290	335	°C/W
	Steady State	R <sub>θJA</sub>	340	405	350	430	
Junction-to-Ambient Thermal Resistance <sup>b</sup>	t ≤ 10 s	R <sub>θJA</sub>	385	450	385	460	
	Steady State	R <sub>θJA</sub>	455	545	465	555	
Junction-to-Case Thermal Resistance	Steady State	R <sub>θJC</sub>	260	300	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, t<sub>p</sub>=10μs, Duty Cycle=1%

d Repetitive rating, pulse width limited by junction temperature T<sub>J</sub>=150°C.

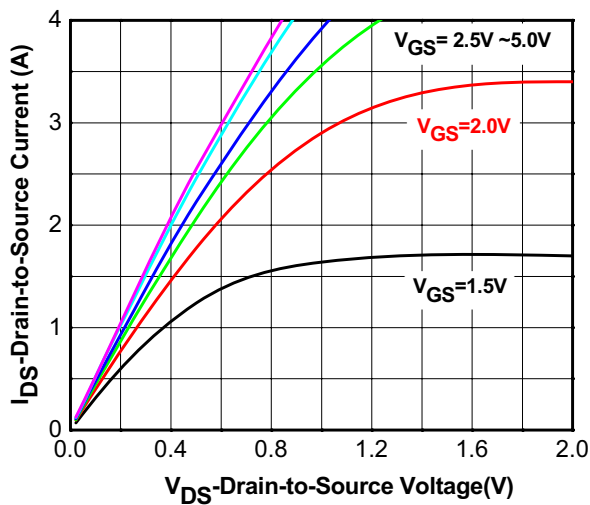
**Electronics Characteristics**

 (T<sub>A</sub>=25°C unless otherwise noted)

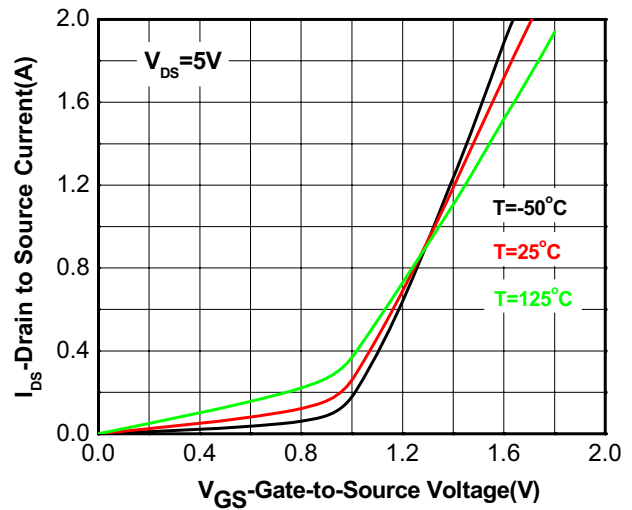
Symbol	Parameter	Test Condition	Min	Typ.	Max	Unit	
<b>Off Characteristics</b>							
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	N-Ch	20		V	
		V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	P-Ch	-20			
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =16V, V <sub>S</sub> =0V	N-Ch		+1	uA	
		V <sub>DS</sub> =-16V, V <sub>S</sub> =0V	P-Ch		-1		
I <sub>GSS</sub>	Gate -Source leakage current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±5V	N-Ch		±5	uA	
			P-Ch		±5		
<b>ON Characteristics</b>							
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250uA	N-Ch	0.40	0.58	0.90	V
		V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =-250uA	P-Ch	-0.40	-0.55	-0.90	
R <sub>DS(on)</sub>	Drain-Source On-Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.55A	N-Ch		220	310	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-0.45A	P-Ch		600	810	
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =0.45A	N-Ch		260	360	
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-0.35A	P-Ch		780	1050	
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =0.35A	N-Ch		320	460	
		V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-0.25A	P-Ch		960	1300	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> = 5 V, I <sub>D</sub> = 0.55A	N-Ch		2.0	S	
		V <sub>DS</sub> = -5 V, I <sub>D</sub> =-0.45A	P-Ch		1.25		
<b>Dynamic Characteristics</b>							
C <sub>iss</sub>	Input Capacitance	NMOS: V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, F=100KHz PMOS: V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, F=100KHz	N-Ch		50	pF	
C <sub>oss</sub>	Output Capacitance		P-Ch		74.5		
			N-Ch		13		
C <sub>rss</sub>	Reverse Transfer Capacitance		P-Ch		10.8		
			N-Ch		8		
			P-Ch		10.2		
Q <sub>G(TOT)</sub>	Total Gate Charge	NMOS: V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> = 0.55A  PMOS: V <sub>DS</sub> =-10V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-0.45A	N-Ch		1.15	nC	
			P-Ch		1.8		
Q <sub>G(TH)</sub>	Threshold Gate Charge		N-Ch		0.06		
			P-Ch		0.12		
Q <sub>GS</sub>	Gate-Source Charge		N-Ch		0.15		
			P-Ch		0.18		
Q <sub>GD</sub>	Gate-Drain Charge	N-Ch		0.23			
		P-Ch		0.74			

Symbol	Parameter	Test Condition	Min	Typ.	Max	Unit		
<b>Switching Characteristics</b>								
td(on)	Turn-On Delay Time	NMOS: $V_{DD}=10V$ , $V_{GEN}=4.5V$ , $R_G=6\Omega$ $I_D=0.55A$	N-Ch	22		ns		
			P-Ch	45				
tr	Turn-On Rise Time		PMOS: $V_{DD}=-10V$ , $V_{GEN}=-4.5V$ , $R_G=6\Omega$ $I_D=-0.45A$	N-Ch	80			
				P-Ch	140			
td(off)	Turn-Off Delay Time				N-Ch		700	
					P-Ch		1500	
tf	Turn-Off Fall Time				N-Ch	380		
					P-Ch	2100		
<b>Drain-to-Source Diode Characteristics</b>								
V <sub>SD</sub>	Forward Diode Voltage		$V_{GS}=0V$ , $I_S=0.15A$		N-Ch	0.5	0.70	1.5
			$V_{GS}=0V$ , $I_S=-0.15A$	P-Ch	-0.5	-0.65	-1.5	

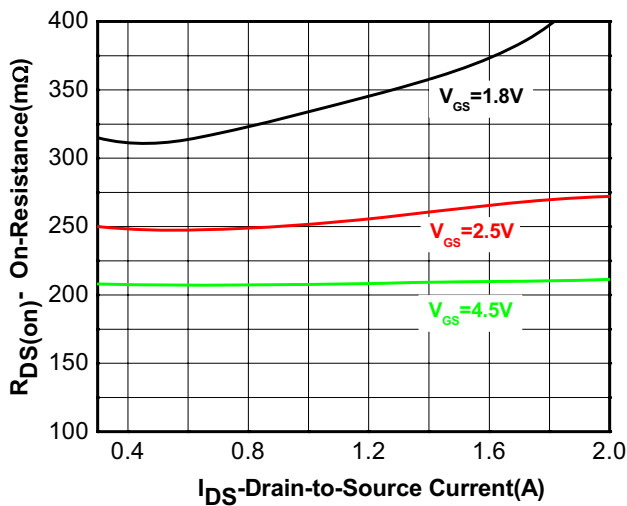
NMOS Typical Characteristics (Ta=25°C, unless otherwise noted)



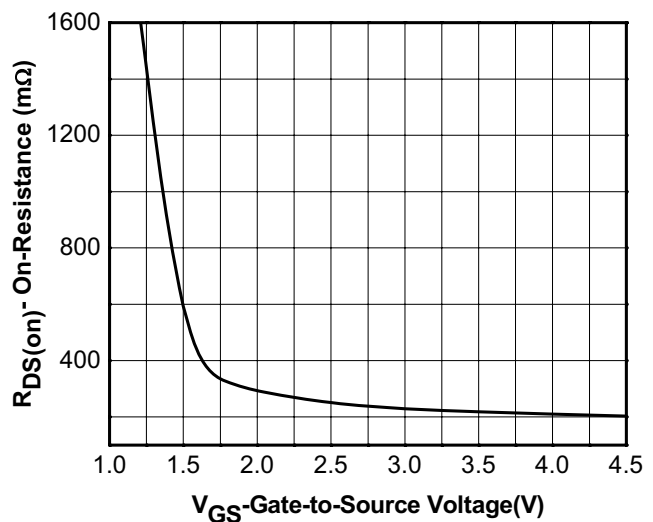
Output characteristics



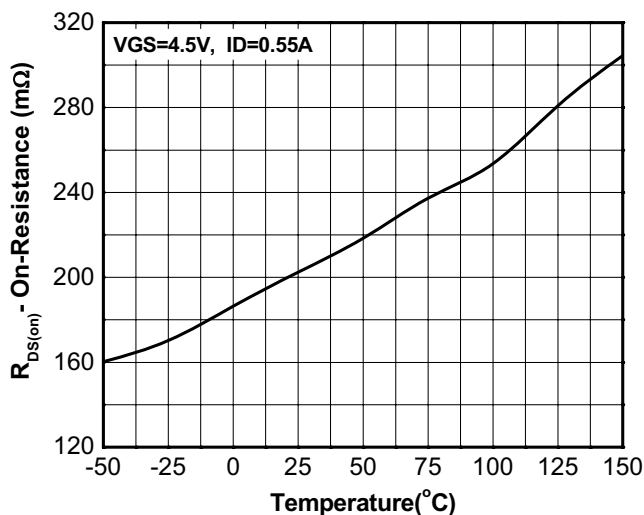
Transfer characteristics



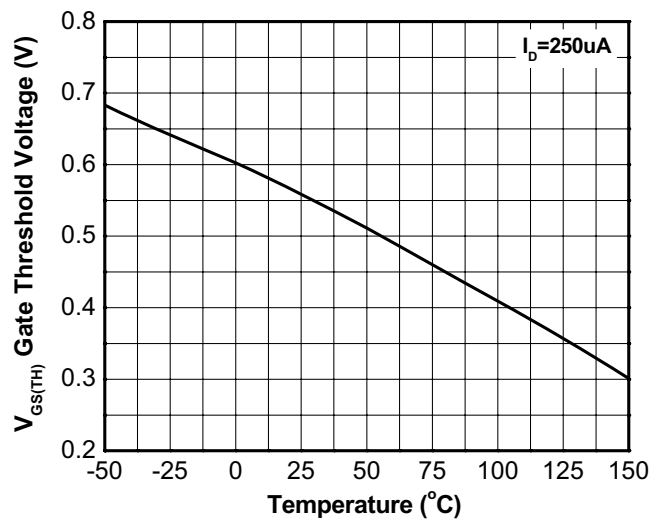
On-Resistance vs. Drain current



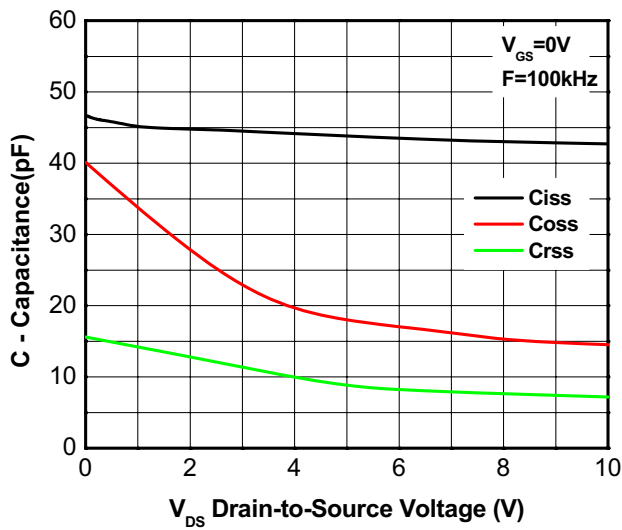
On-Resistance vs. Gate-to-Source voltage



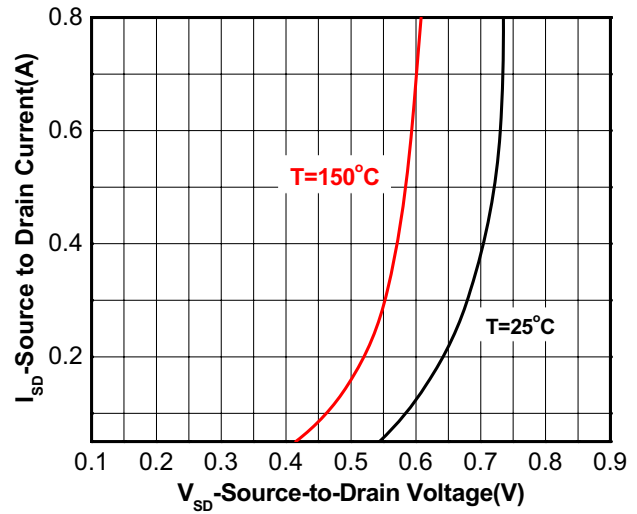
On-Resistance vs. Junction temperature



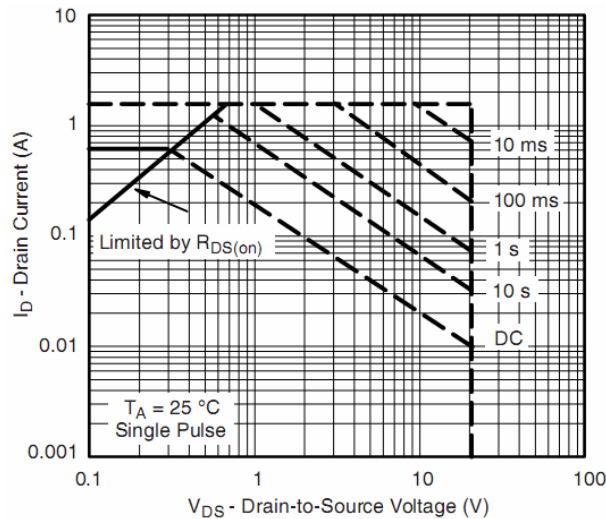
Threshold voltage vs. Temperature



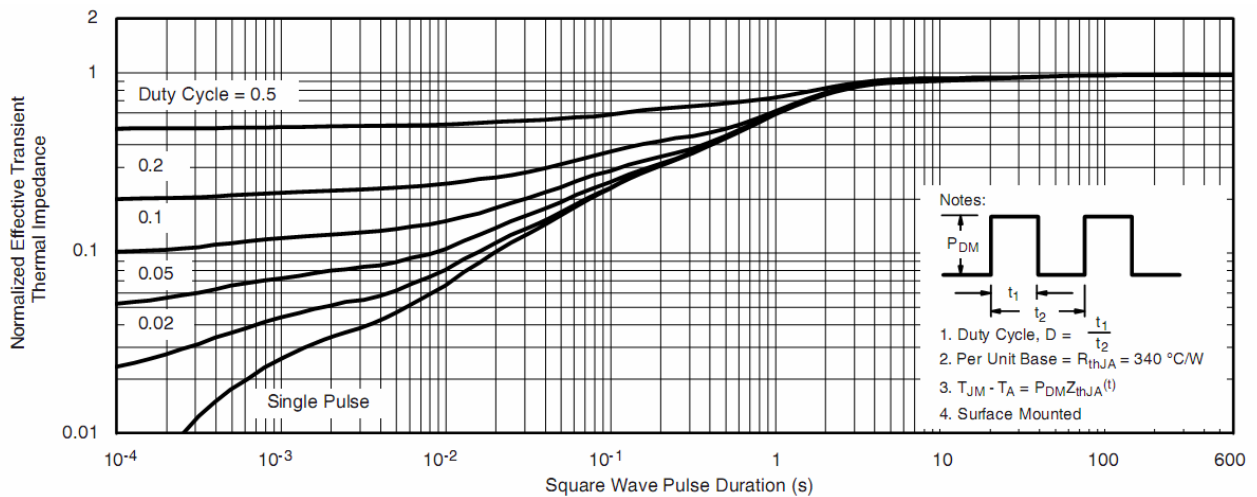
Capacitance



Body diode forward voltage

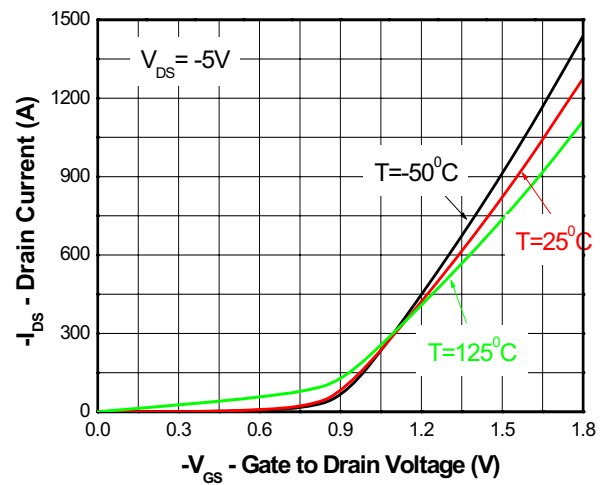
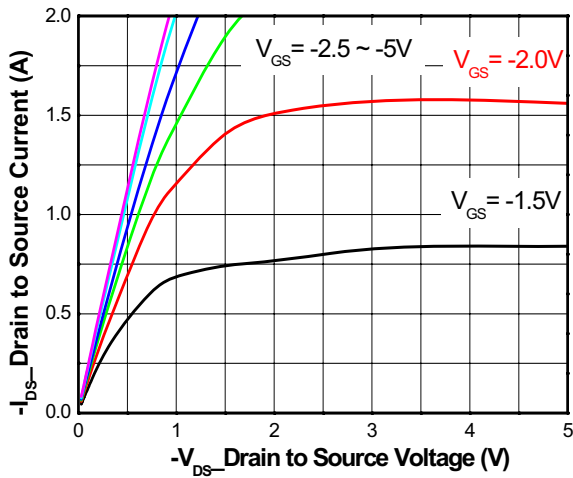


Safe operating power

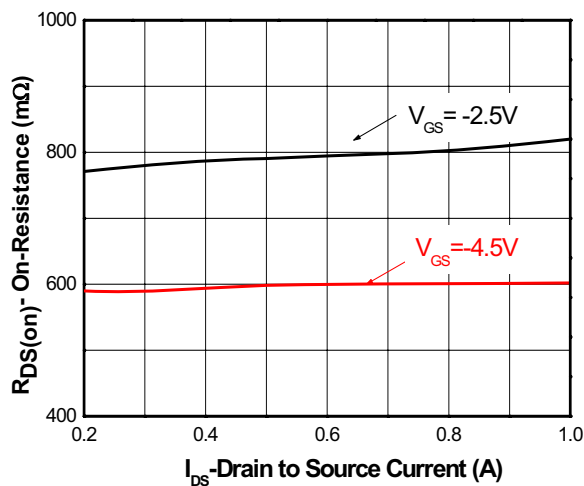


Transient thermal response (Junction-to-Ambient)

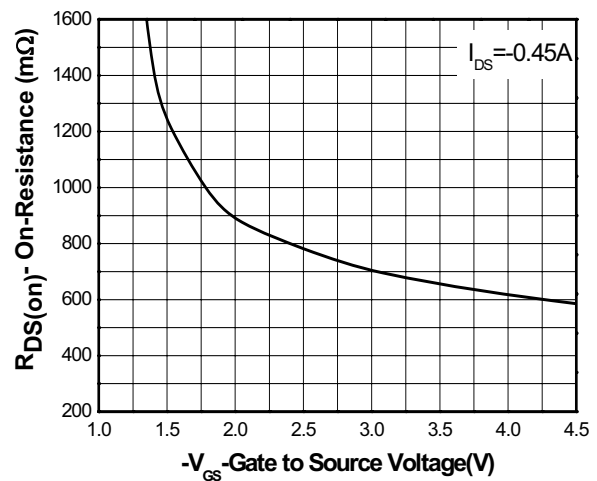
PMOS Typical Characteristics (Ta=25°C, unless otherwise noted)



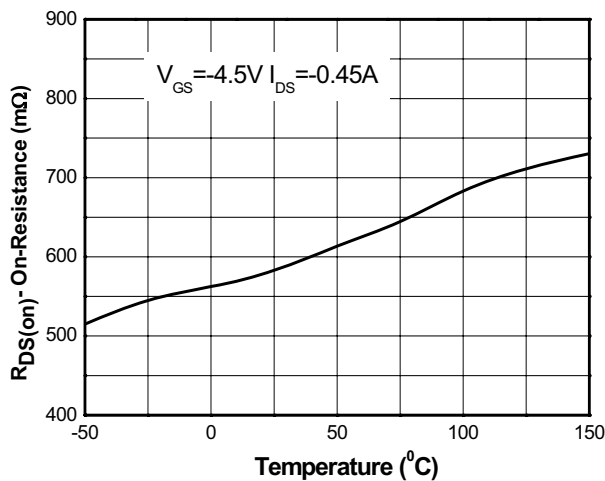
Output characteristics



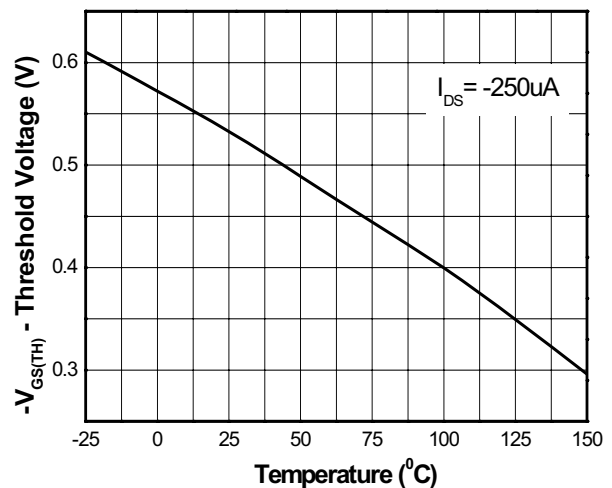
Transfer characteristics



On-Resistance vs. Drain current

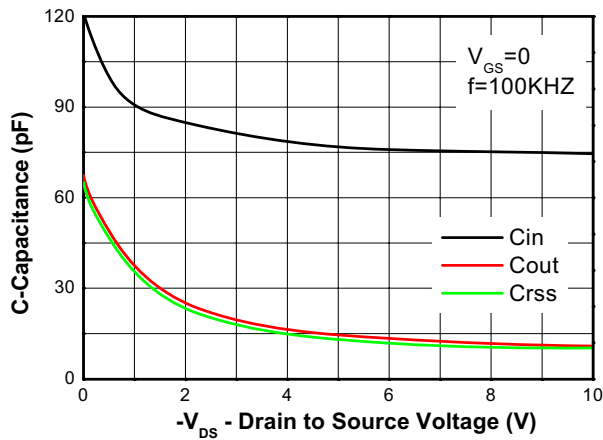


On-Resistance vs. Gate-to-Source voltage

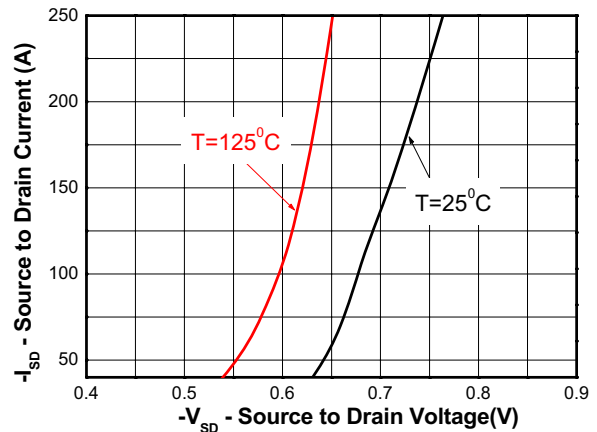


On-Resistance vs. Junction temperature

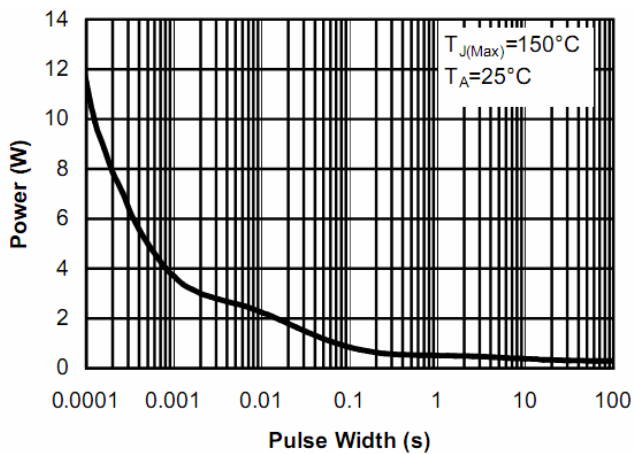
Threshold voltage vs. Temperature



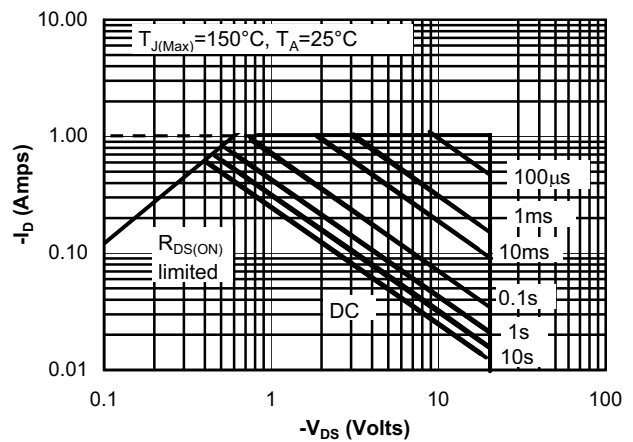
Capacitance



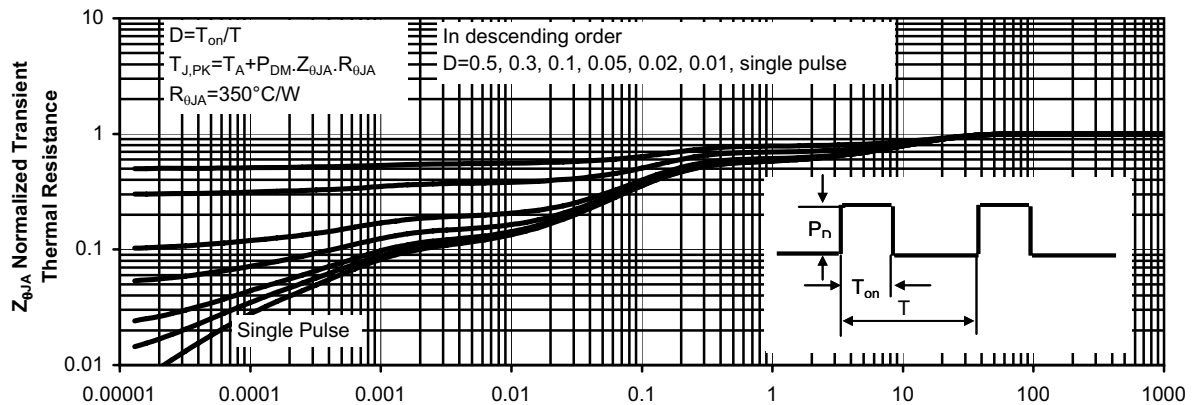
Body diode forward voltage



Single pulse power



Safe operating power

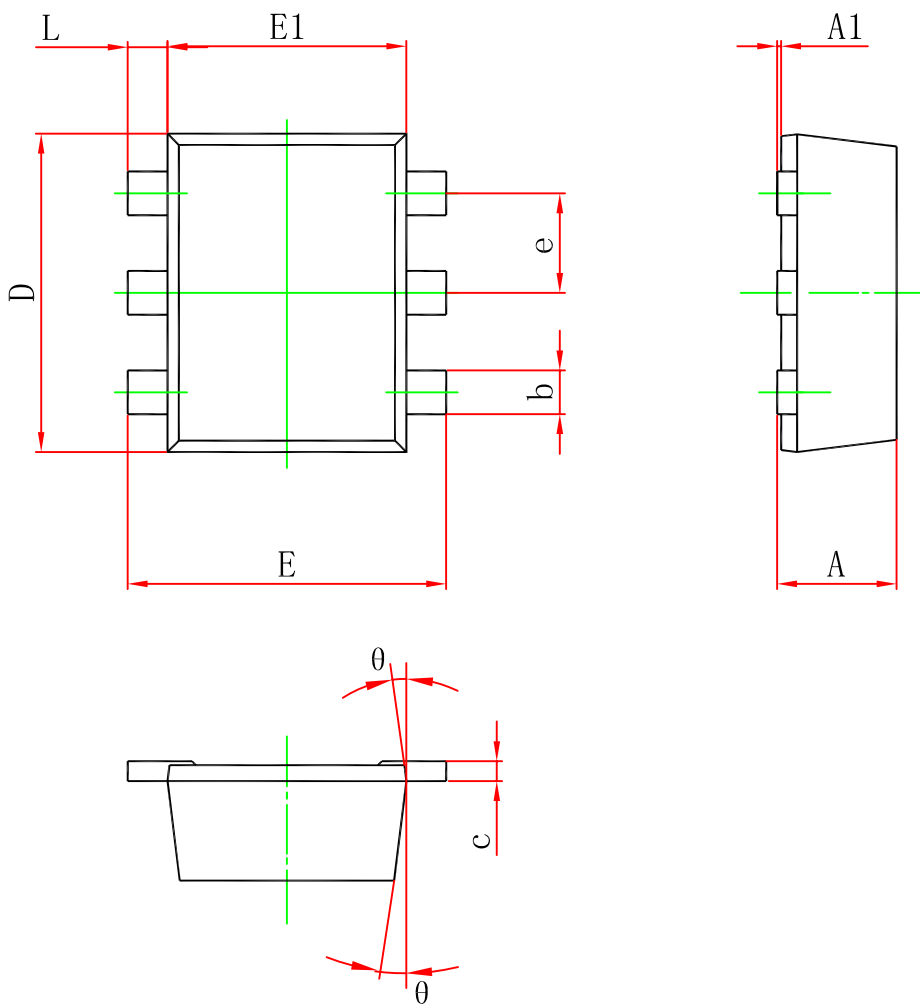


Transient thermal response (Junction-to-Ambient)



Package Outline Dimension

SOT-563



Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	0.525	0.563	0.600
A1	0.000	0.025	0.050
e	0.450	0.500	0.550
c	0.090	0.125	0.160
D	1.500	1.600	1.700
b	0.170	0.22	0.270
E1	1.100	1.200	1.300
E	1.500	1.600	1.700
L	0.100	0.200	0.300
θ	7° REF		