

RoHS Compliant Product
A suffix of “-C” specifies halogen and lead-free

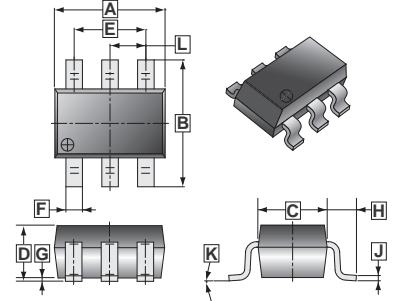
DESCRIPTION

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low $R_{DS(on)}$ and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

FEATURES

- Low $R_{DS(on)}$ provides higher efficiency and extends battery life.
- Low thermal impedance copper leadframe TSOP-6 saves board space.
- Fast switching speed.
- High performance trench technology.

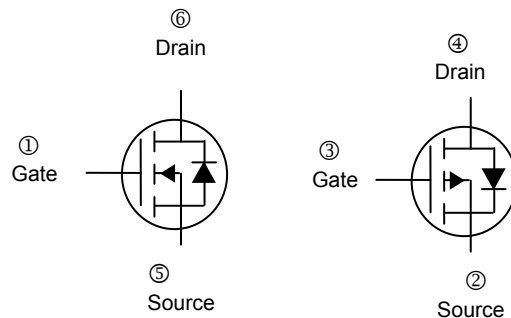
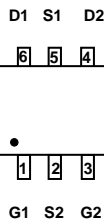
TSOP-6



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	0	0.10
B	2.60	3.00	H	0.60	REF.
C	1.40	1.80	J	0.12	REF.
D	1.10	MAX.	K	0°	10°
E	1.90	REF.	L	0.95	REF.
F	0.30	0.50			

PRODUCT SUMMARY

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$V_{DS}(V)$	$R_{DS(on)} (\Omega)$	$I_D(A)$
30	0.063@ $V_{GS}=10V$	3.7
	0.090@ $V_{GS}=4.5V$	3.1
-30	0.112@ $V_{GS}=-10V$	-2.7
	0.172@ $V_{GS}=-4.5V$	-2.2



ABSOLUTE MAXIMUM RATINGS($T_A=25^\circ C$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Ratings		Unit
		N-Channel	P-Channel	
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current ^a	$I_D @T_A=25^\circ C$	3.7	-2.7	A
	$I_D @T_A=70^\circ C$	2.9	-2.1	
Pulsed Drain Current ^b	I_{DM}	8	-8	A
Continuous Source Current (Diode Conduction) ^a	I_S	1.05	-1.05	A
Power Dissipation ^a	$P_D @T_A=25^\circ C$	1.15		W
	$P_D @T_A=70^\circ C$	0.7		
Operating Junction and Storage Temperature Range	T_j, T_{stg}	-55 ~ +150		$^\circ C$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	N-Channel		P-Channel		Unit
		Typ	Max	Typ	Max	
Maximum Junction to Ambient ^a	$R_{\theta JA}$	93	110	93	110	$^\circ C / W$
		Steady State		130	150	

Notes

- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature.

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate-Threshold Voltage	N-Ch	$V_{GS(th)}$	1	1.6	2.5	V	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$
	P-Ch		-1	-1.6	-2.5		$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$
Gate-Body Leakage Current	N-Ch	I_{GSS}	-	4.5nA	100	uA	$V_{DS}=0\text{ V}$, $V_{GS}=20\text{ V}$
	P-Ch		-	-4.5nA	-100		$V_{DS}=0\text{ V}$, $V_{GS}=-20\text{ V}$
Zero Gate Voltage Drain Current	N-Ch	I_{DSS}	-	12nA	1	uA	$V_{DS}=24\text{ V}$, $V_{GS}=0\text{ V}$
	P-Ch		-	-12nA	-1		$V_{DS}=-24\text{ V}$, $V_{GS}=0\text{ V}$
	N-Ch		-	-	10		$V_{DS}=24\text{ V}$, $V_{GS}=0\text{ V}$, $T_J=55^\circ\text{C}$
	P-Ch		-	-	-10		$V_{DS}=-24\text{ V}$, $V_{GS}=0\text{ V}$, $T_J=55^\circ\text{C}$
On-State Drain Current ^a	N-Ch	$I_{D(on)}$	5	-	-	A	$V_{DS}=5\text{ V}$, $V_{GS}=10\text{ V}$
	P-Ch		-5	-	-		$V_{DS}=-5\text{ V}$, $V_{GS}=-10\text{ V}$
Drain-Source On-Resistance ^a	N-Ch	$R_{DS(ON)}$	-	0.057	0.063	Ω	$V_{GS}=10\text{ V}$, $I_D=3.7\text{ A}$
	P-Ch		-	0.100	0.112		$V_{GS}=-10\text{ V}$, $I_D=-2.7\text{ A}$
	N-Ch		-	0.075	0.090		$V_{GS}=4.5\text{ V}$, $I_D=3.1\text{ A}$
	P-Ch		-	0.148	0.172		$V_{GS}=-4.5\text{ V}$, $I_D=-2.2\text{ A}$
Forward Transconductance ^a	N-Ch	g_{fs}	-	10	-	S	$V_{DS}=5\text{ V}$, $I_D=3.7\text{ A}$
	P-Ch		-	5	-		$V_{DS}=-5\text{ V}$, $I_D=3.1\text{ A}$
Diode Forward Voltage ^a	N-Ch	V_{SD}	-	0.80	-	S	$I_S=1.05\text{ A}$, $V_{GS}=0\text{ V}$
	P-Ch		-	-0.83	-		$I_S=-1.05\text{ A}$, $V_{GS}=0\text{ V}$

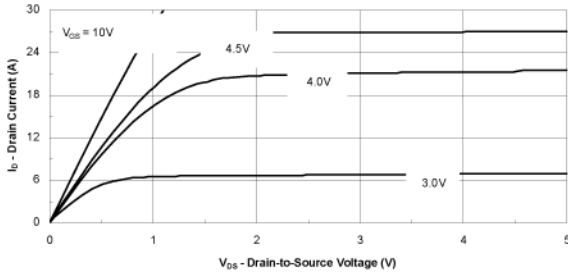
DYNAMIC^b

		DYNAMIC ^b					
Total Gate Charge	N-Ch	Q _g	-	2.2	5	nC	N-Channel V _{DS} =15V, V _{GS} = 4.5V, I _D = 2.7A
	P-Ch		-	3.8	8		
Gate-Source Charge	N-Ch	Q _{gs}	-	0.5	1		
	P-Ch		-	0.6	2		
Gate-Drain Charge	N-Ch	Q _{gd}	-	0.8	2		
	P-Ch		-	1.5	3		
Input Capacitance	N-Ch	C _{iss}	-	184	400	pF	N-Channel V _{DS} = 15V, V _{GS} = 0V, f= 1MHz
	P-Ch		-	378	800		
Output Capacitance	N-Ch	C _{oss}	-	62	200		
	P-Ch		-	126	300		
Reverse Transfer Capacitance	N-Ch	C _{rss}	-	30	200		
	P-Ch		-	52	300		
Turn-on Delay Time	N-Ch	T _{d(on)}	-	5	10	nS	N-Channel V _{DD} = 15V, R _{GEN} = 15 , V _{GS} = 4.5V, I _D = 1A
	P-Ch		-	5	10		
Rise Time	N-Ch	T _r	-	12	30		
	P-Ch		-	15	30		
Turn-off Delay Time	N-Ch	T _{d(off)}	-	13	30		
	P-Ch		-	20	40		
Fall Time	N-Ch	T _f	-	7	20		
	P-Ch		-	20	40		

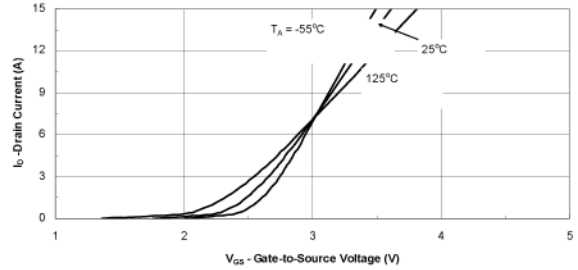
Notes

- Pulse test : PW ≤ 300 us duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

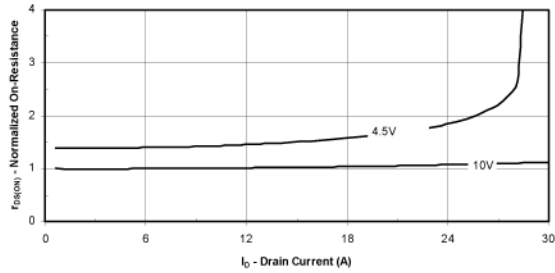
CHARACTERISTIC CURVES (N-Channel)



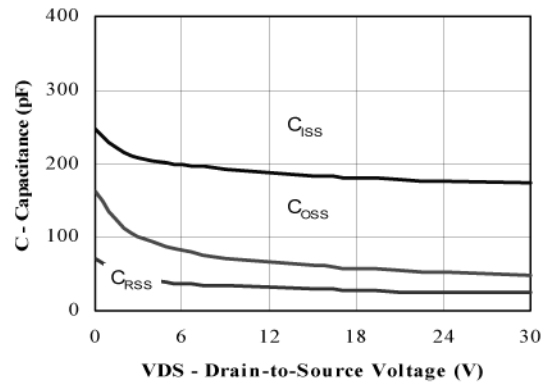
Output Characteristics



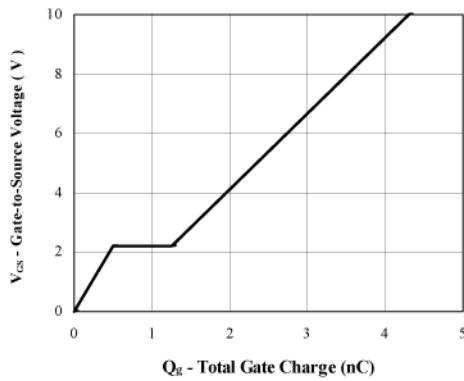
Transfer Characteristics



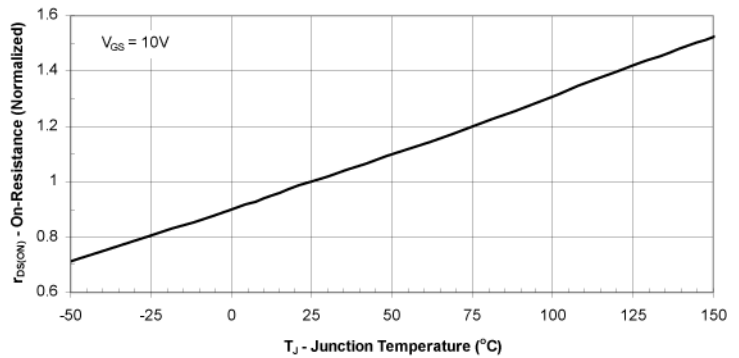
On-Resistance vs. Drain Current



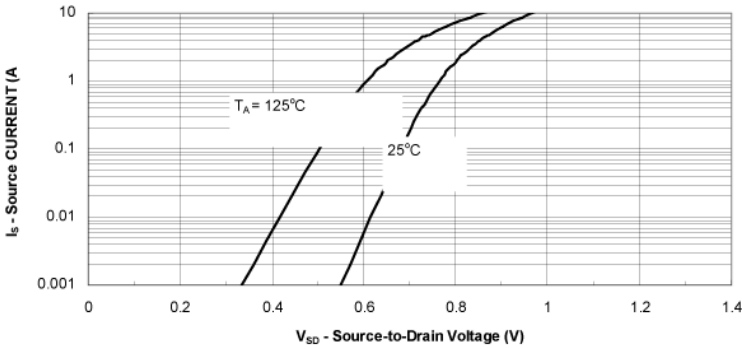
Capacitance



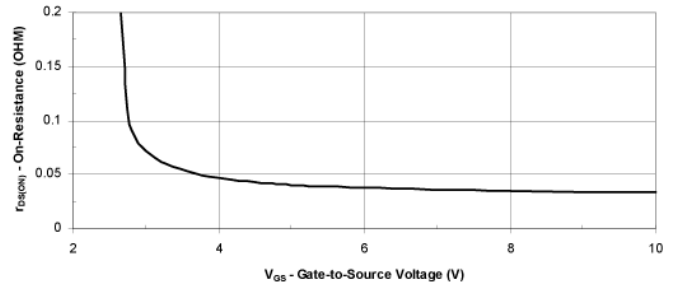
Gate Charge



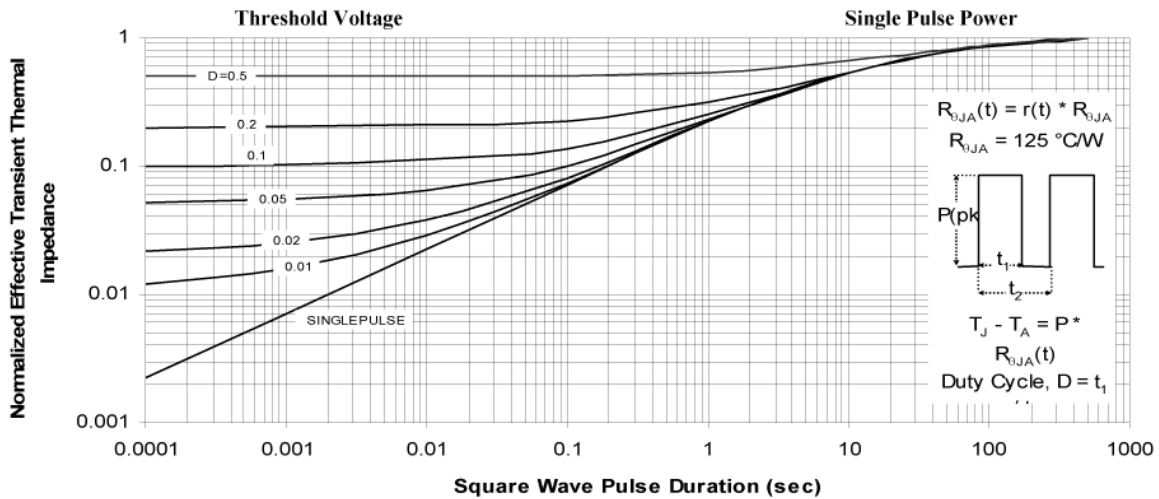
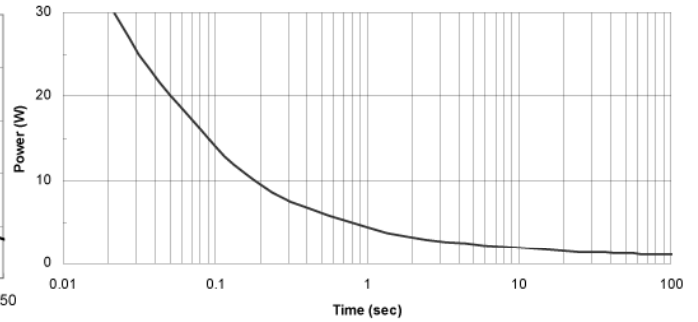
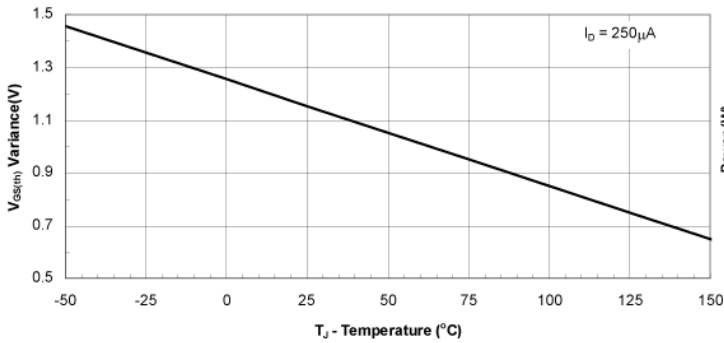
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

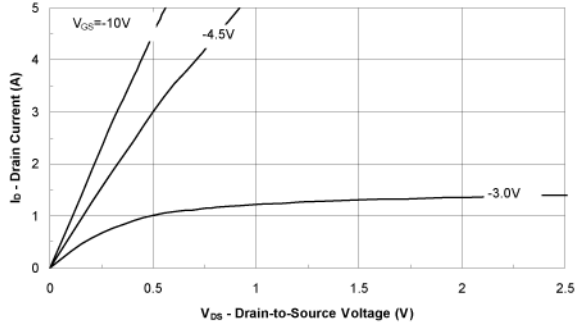


On-Resistance vs. Gate-to Source Voltage

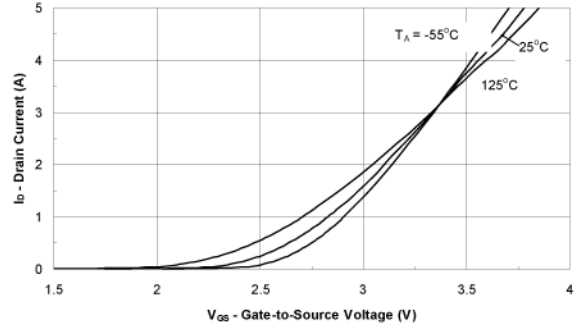


Normalized Thermal Transient Impedance, Junction-to-Ambient

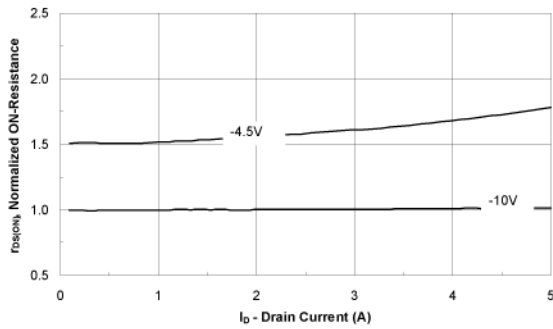
CHARACTERISTIC CURVES (P-Channel)



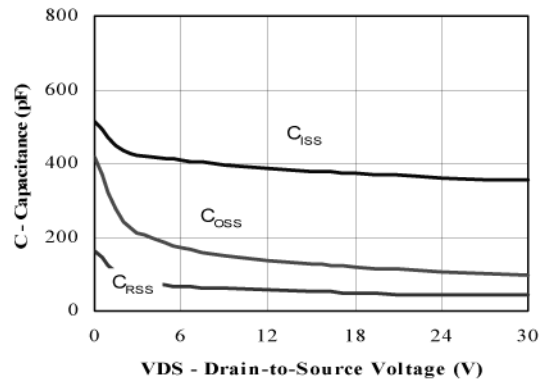
Output Characteristics



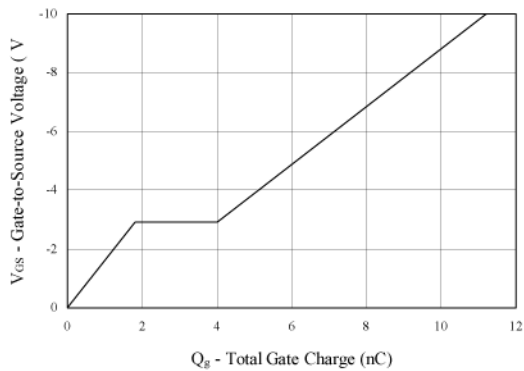
Transfer Characteristics



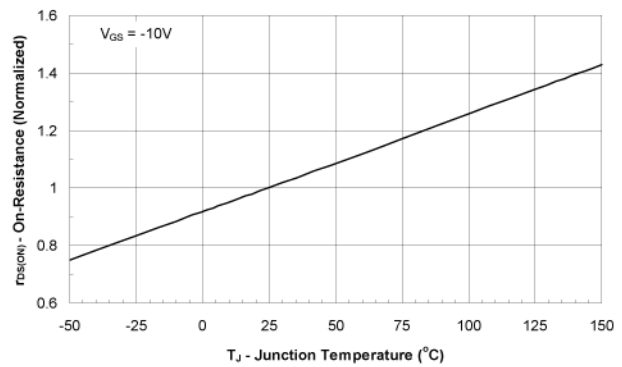
On-Resistance vs. Drain Current



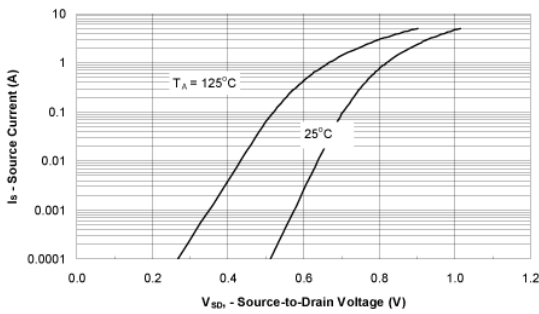
Capacitance



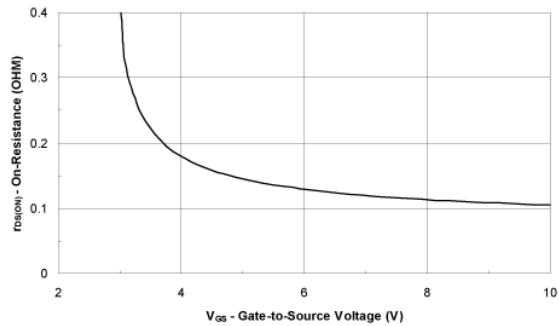
Gate Charge



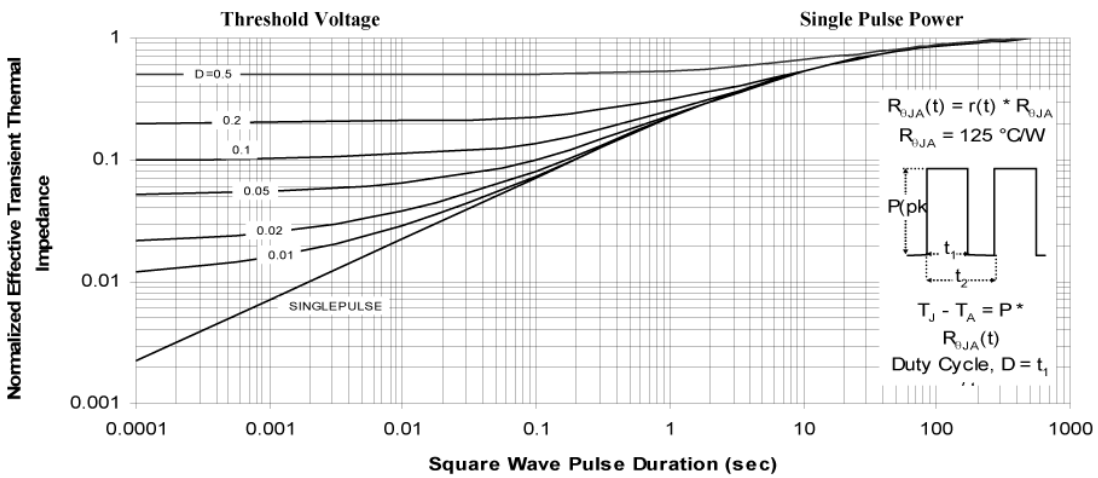
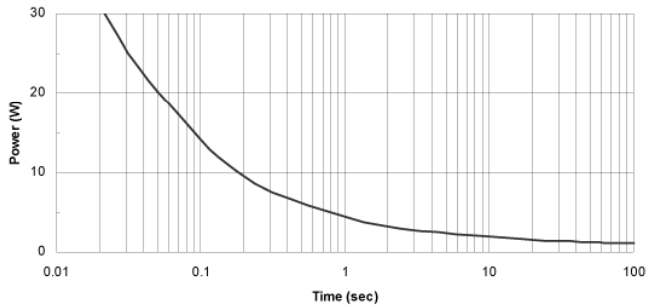
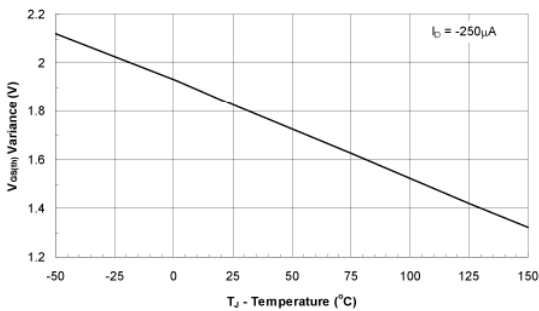
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to Source Voltage



Normalized Thermal Transient Impedance, Junction-to-Ambient