



Dual N-Channel 2.5-V (G-S) MOSFET



Available

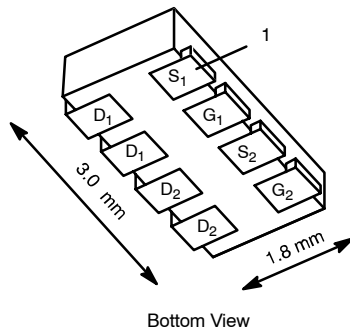
PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
20	0.075 @ $V_{GS} = 4.5$ V	± 4.2
	0.134 @ $V_{GS} = 2.5$ V	± 3.1

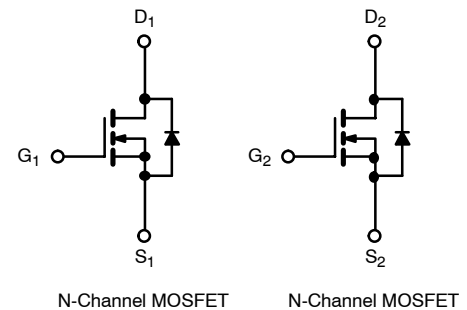
FEATURES

- TrenchFET® Power MOSFET
- 2.5-V Rated
- Lead (Pb)-Free Version is RoHS Compliant

1206-8 ChipFET™



Marking Code
CB XX
Lot Traceability
and Date Code
Part # Code



Ordering Information: Si5904DC-T1
Si5904DC-T1—E3 (Lead (Pb)-Free)

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

Parameter		Symbol	5 secs	Steady State	Unit
Drain-Source Voltage		V _{DS}	20		V
Gate-Source Voltage		V _{GS}	± 12		
Continuous Drain Current (T _J = 150°C) ^a	T _A = 25°C	I _D	± 4.2	± 3.1	A
	T _A = 85°C		± 3.0	± 2.2	
Pulsed Drain Current		I _{DM}	± 10		
Continuous Source Current (Diode Conduction) ^a		I _S	1.8	0.9	
Maximum Power Dissipation ^a	T _A = 25°C	P _D	2.1	1.1	W
	T _A = 85°C		1.1	0.6	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 150		°C
Soldering Recommendations (Peak Temperature) ^{b, c}			260		

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	50	60	$^\circ\text{C/W}$
		90	110	
Maximum Junction-to-Foot (Drain)	R_{thJF}	30	40	

Notes

- Surface Mounted on 1" x 1" FR4 Board.
- See Reliability Manual for profile. The ChipFET is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
- Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.

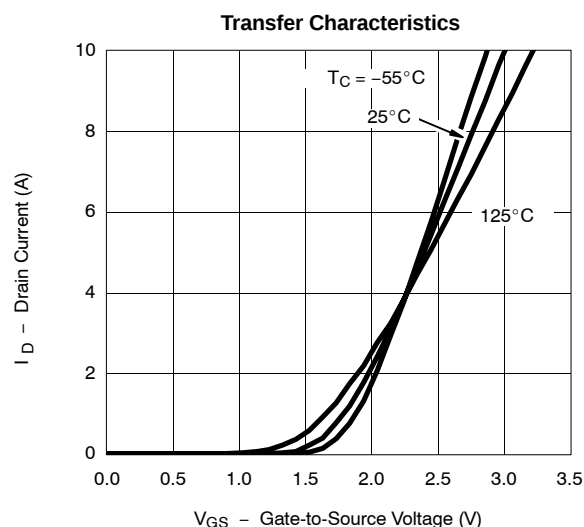
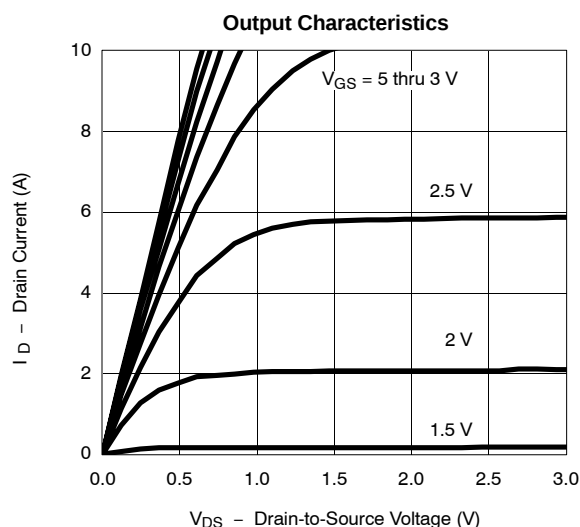
SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	0.6		1.5	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}$, $V_{GS} = \pm 12\ \text{V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20\ \text{V}$, $V_{GS} = 0\ \text{V}$			1	μA
		$V_{DS} = 20\ \text{V}$, $V_{GS} = 0\ \text{V}$, $T_J = 85^\circ\text{C}$			5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\ \text{V}$, $V_{GS} = 4.5\ \text{V}$	10			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 4.5\ \text{V}$, $I_D = 3.1\ \text{A}$		0.065	0.075	Ω
		$V_{GS} = 2.5\ \text{V}$, $I_D = 2.3\ \text{A}$		0.115	0.143	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 10\ \text{V}$, $I_D = 3.1\ \text{A}$		8		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 0.9\ \text{A}$, $V_{GS} = 0\ \text{V}$		0.8	1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 10\ \text{V}$, $V_{GS} = 4.5\ \text{V}$, $I_D = 3.1\ \text{A}$		4	6	nC
Gate-Source Charge	Q_{gs}			0.6		
Gate-Drain Charge	Q_{gd}			1.3		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 10\ \text{V}$, $R_L = 10\ \Omega$ $I_D \cong 1\ \text{A}$, $V_{GEN} = 4.5\ \text{V}$, $R_G = 6\ \Omega$		12	18	ns
Rise Time	t_r			35	55	
Turn-Off Delay Time	$t_{d(off)}$			19	30	
Fall Time	t_f			9	15	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 0.9\ \text{A}$, $di/dt = 100\ \text{A}/\mu\text{s}$		40	80	

Notes

- a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

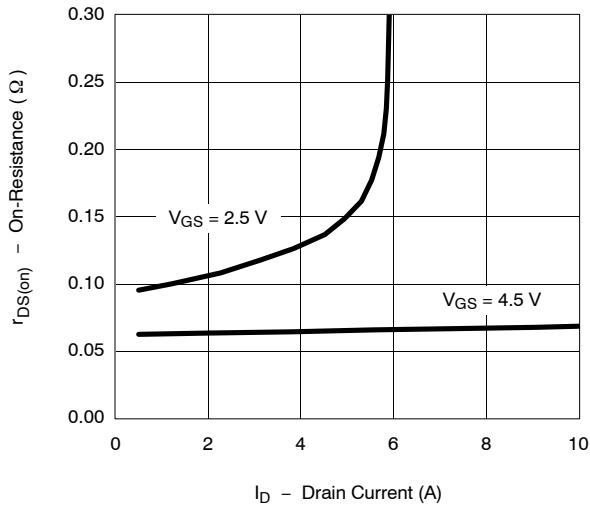
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

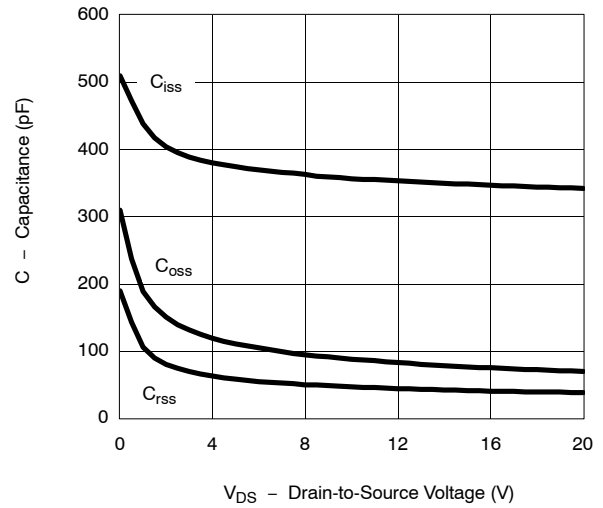


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

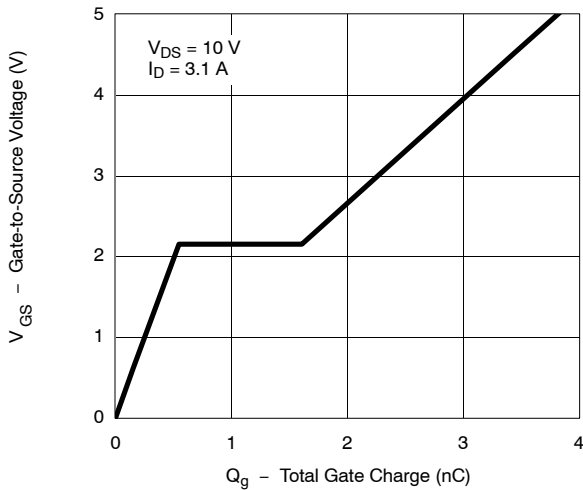
On-Resistance vs. Drain Current



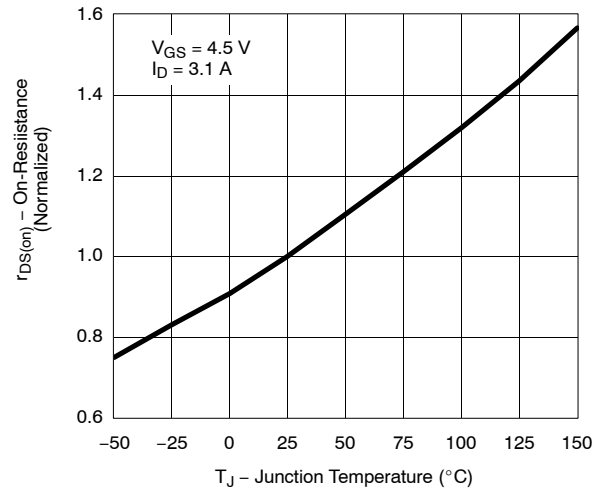
Capacitance



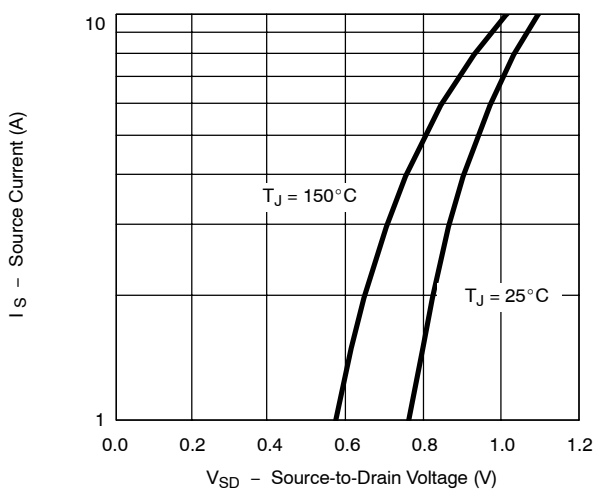
Gate Charge



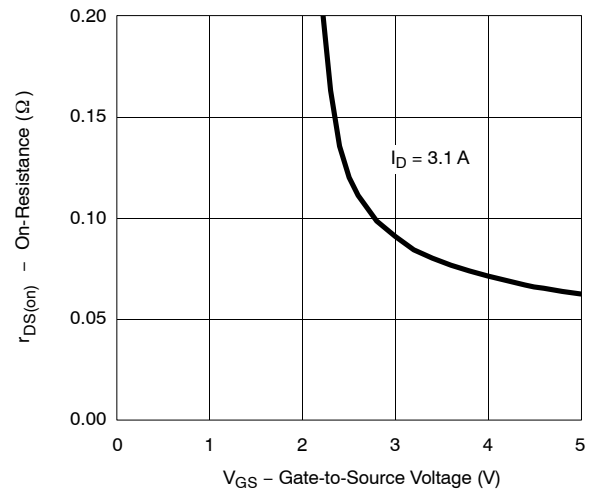
On-Resistance vs. Junction Temperature

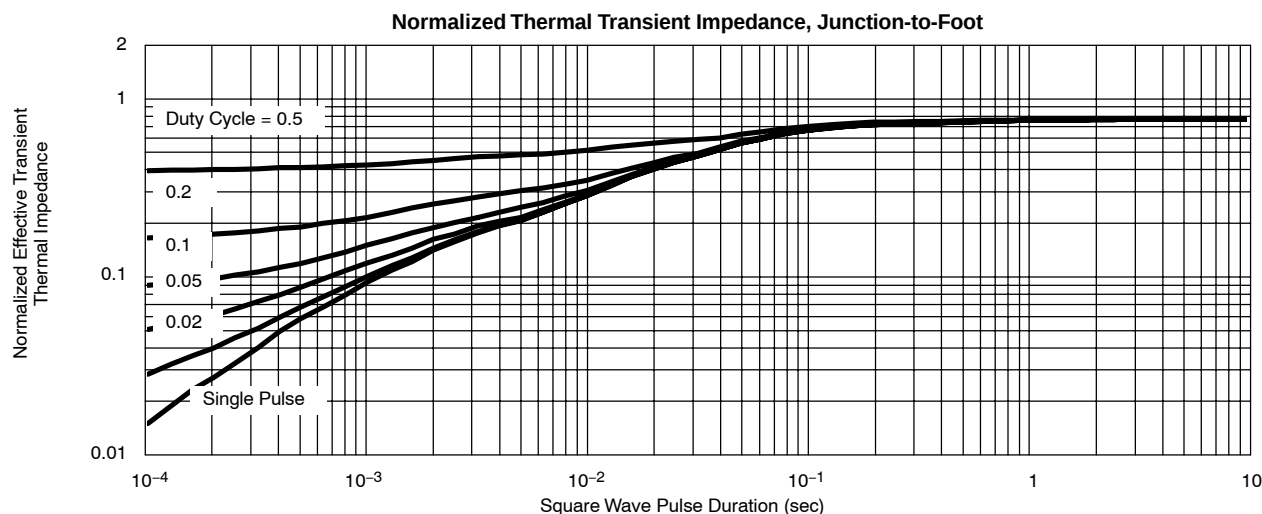
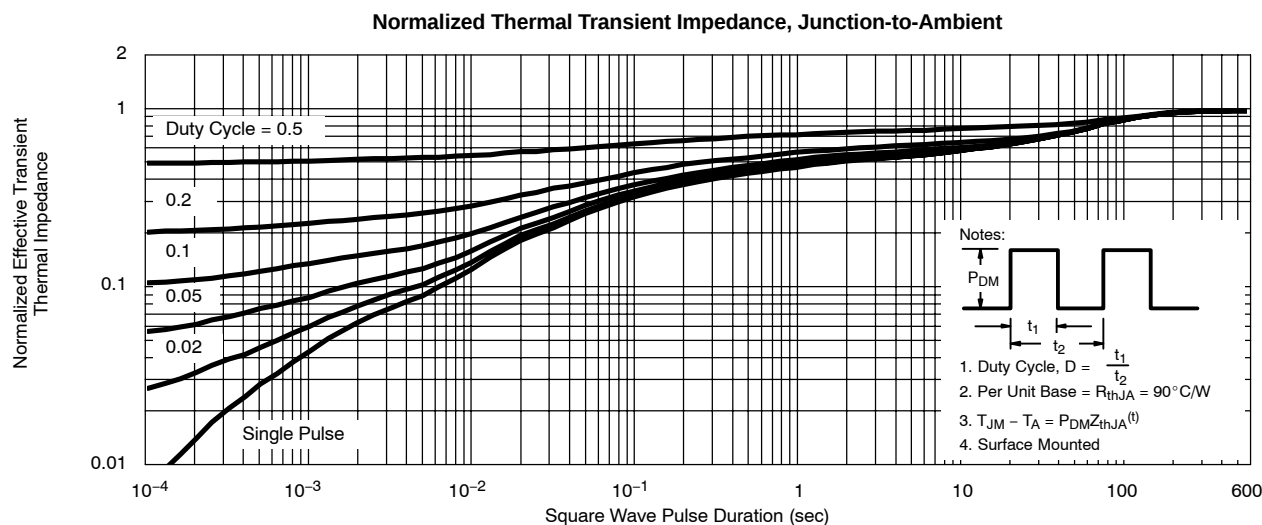
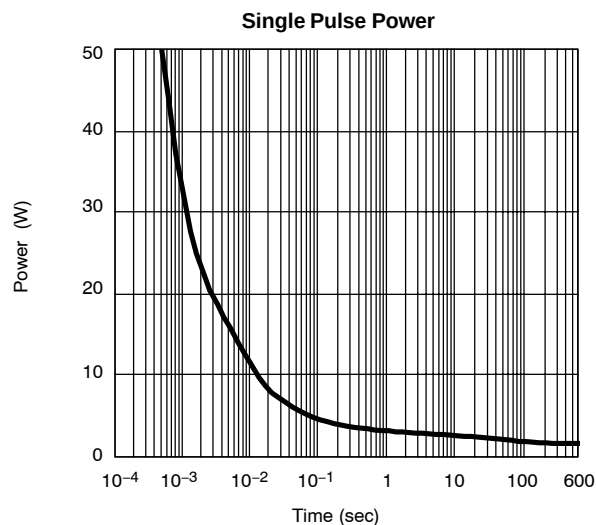
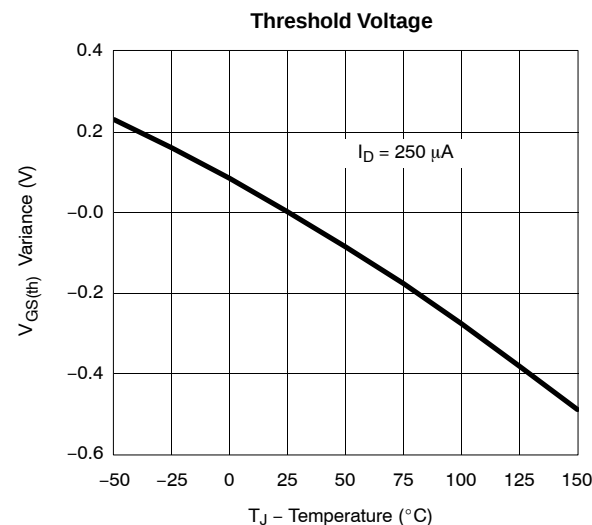


Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg771065>.