

P-Channel 1.8-V (G-S) MOSFET

PRODUCT SUMMARY

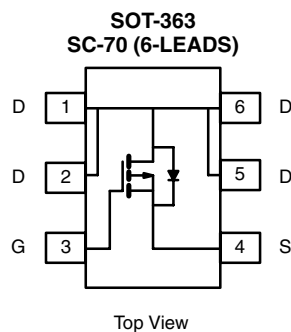
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
- 12	0.130 at $V_{GS} = - 4.5$ V	- 1.8
	0.170 at $V_{GS} = - 2.5$ V	- 1.5
	0.225 at $V_{GS} = - 1.8$ V	- 1.3

FEATURES

- TrenchFET® Power MOSFETs
- 1.8 V Rated



RoHS*
COMPLIANT



Marking Code



Ordering Information: Si1407DL-T1
Si1407DL-T1-E3 (Lead (Pb)-free)

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted

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Parameter		Symbol	5 sec	Steady State	Unit
Drain-Source Voltage		V _{DS}	- 12		V
Gate-Source Voltage		V _{GS}	± 8		
Continuous Drain Current (T _J = 150 °C) ^a	T _A = 25 °C	I _D	- 1.8	- 1.6	A
	T _A = 85 °C		- 1.4	- 1.2	
Pulsed Drain Current		I _{DM}	- 5		
Continuous Diode Current (Diode Conduction) ^a		I _S	- 0.8	- 0.8	
Maximum Power Dissipation ^a	T _A = 25 °C	P _D	0.625	0.568	W
	T _A = 85 °C		0.400	0.295	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	165	200	°C/W
		180	220	
Maximum Junction-to-Foot (Drain)	R_{thJF}	105	130	

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

* Pb containing terminations are not RoHS compliant, exemptions may apply.

SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted

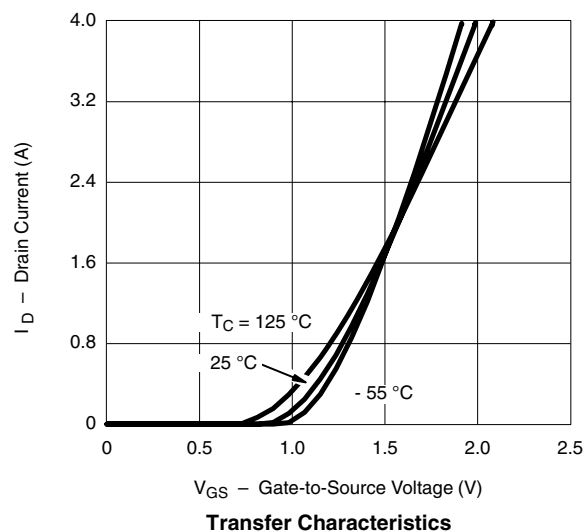
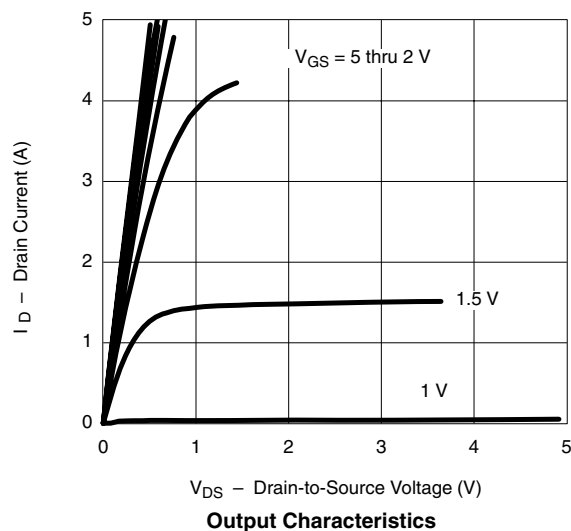
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\text{ }\mu\text{A}$	- 0.45		- 1	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 8\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -12\text{ V}$, $V_{GS} = 0\text{ V}$			- 1	μA
		$V_{DS} = -12\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 85\text{ }^{\circ}\text{C}$			- 5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = -5\text{ V}$, $V_{GS} = -4.5\text{ V}$	- 2			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = -4.5\text{ V}$, $I_D = -1.8\text{ A}$		0.105	0.130	Ω
		$V_{GS} = -2.5\text{ V}$, $I_D = -1.5\text{ A}$		0.140	0.170	
		$V_{GS} = -1.8\text{ V}$, $I_D = -0.8\text{ A}$		0.185	0.225	
Forward Transconductance ^a	g_{fs}	$V_{GS} = -10\text{ V}$, $I_D = -1.8\text{ A}$		4.3		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -0.8\text{ A}$, $V_{GS} = 0\text{ V}$		- 0.77	- 1.1	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -6\text{ V}$, $V_{GS} = -4.5\text{ V}$, $I_D = -1.8\text{ A}$		5.5	7.0	nC
Gate-Source Charge	Q_{gs}			0.95		
Gate-Drain Charge	Q_{gd}			1.10		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -6\text{ V}$, $R_L = 10\text{ }\Omega$ $I_D \cong -1\text{ A}$, $V_{GEN} = -4.5\text{ V}$, $R_G = 6\text{ }\Omega$		8	12	ns
Rise Time	t_r			33	50	
Turn-Off Delay Time	$t_{d(off)}$			32	50	
Fall Time	t_f			29	45	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = -0.8\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$		20	40	

Notes:

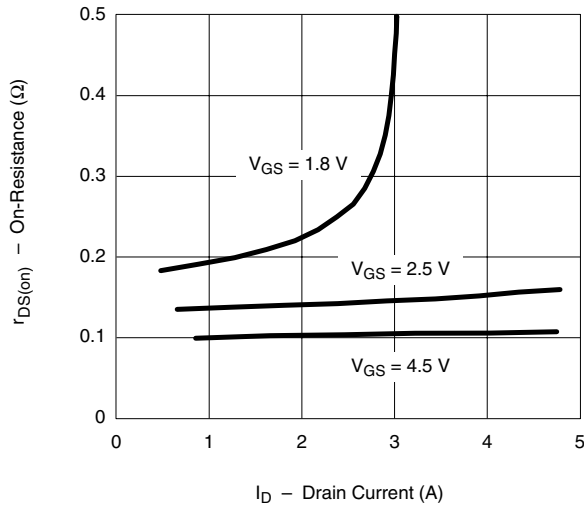
a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

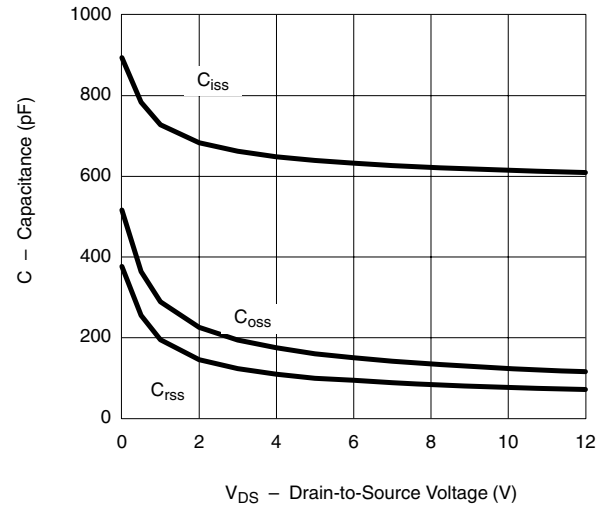
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS $25\text{ }^{\circ}\text{C}$, unless noted

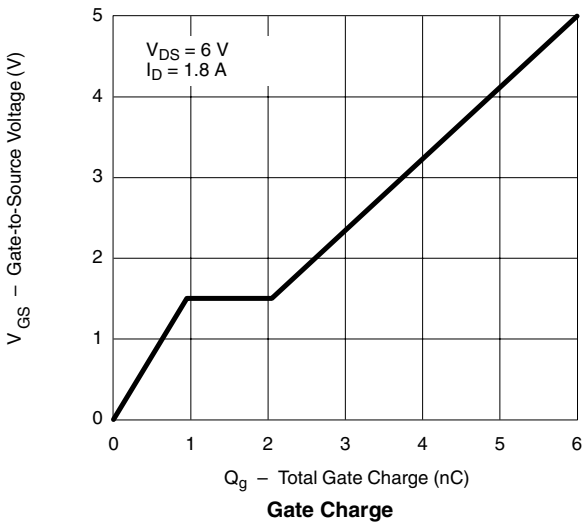
TYPICAL CHARACTERISTICS 25 °C, unless noted



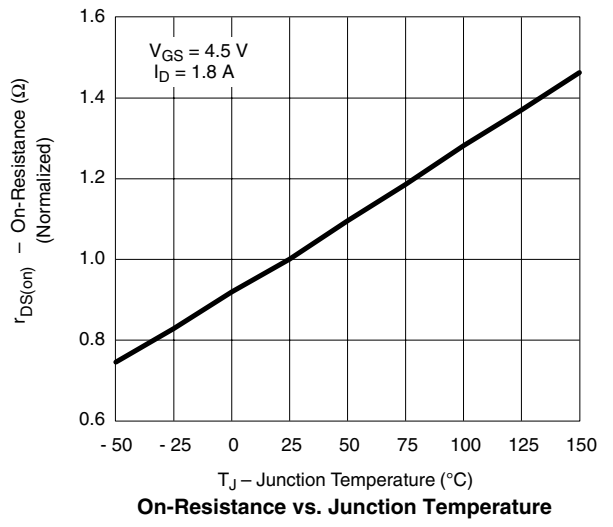
On-Resistance vs. Drain Current



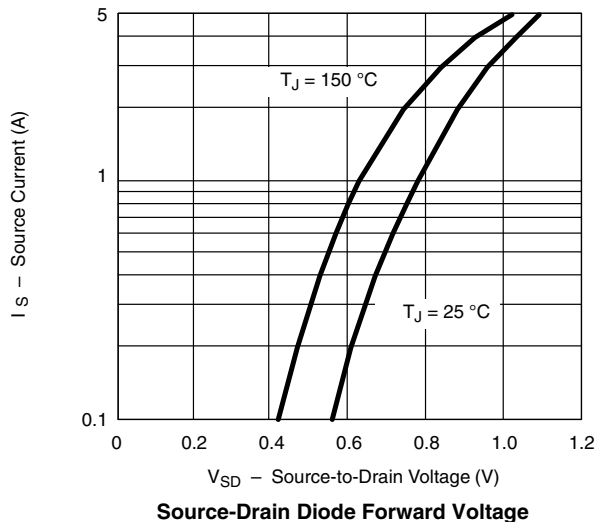
Capacitance



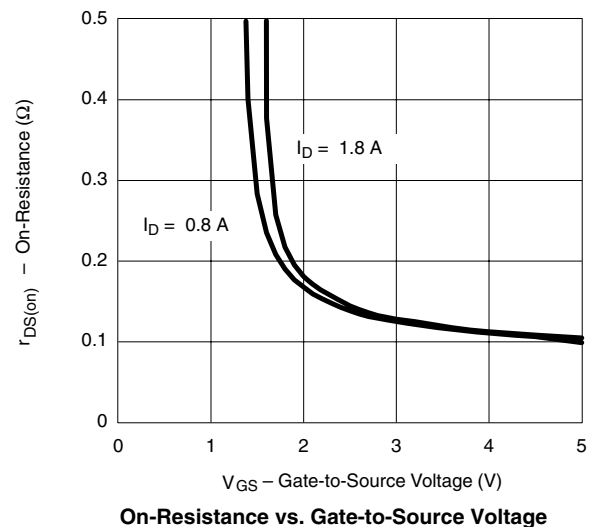
Gate Charge



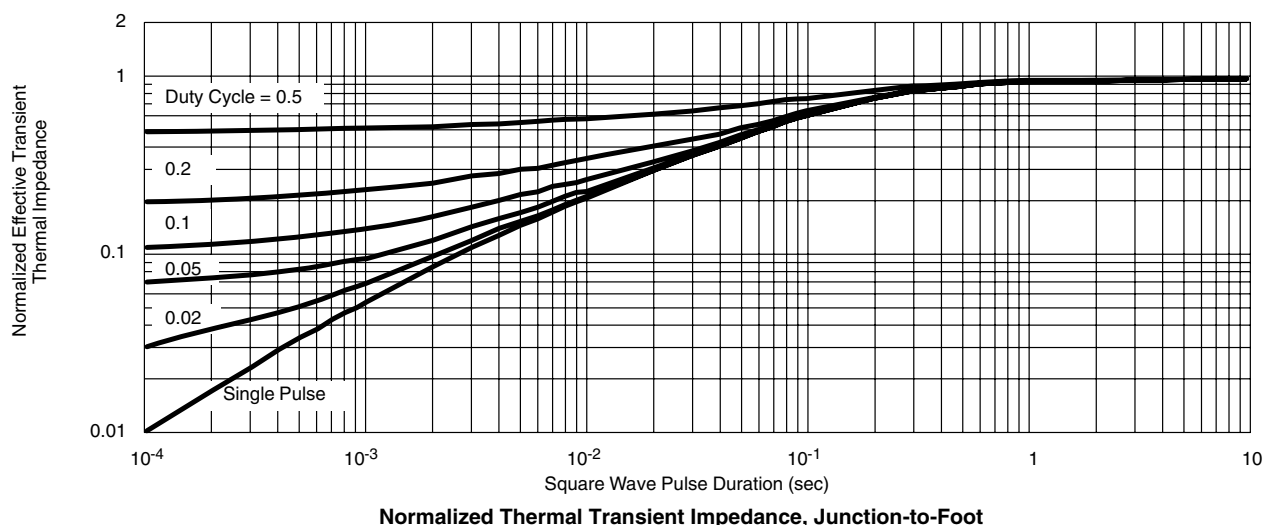
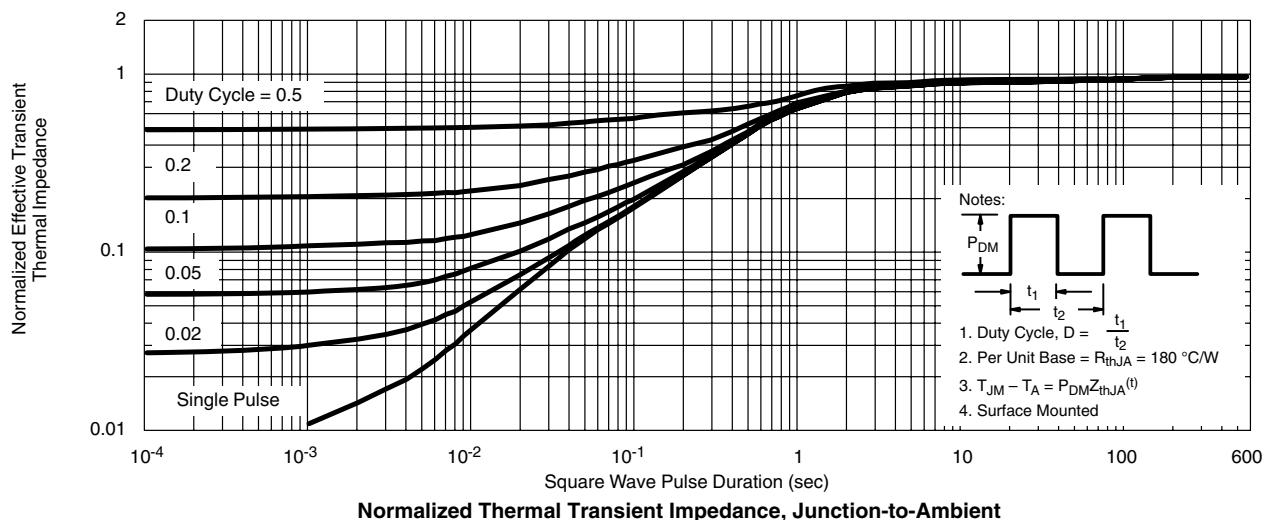
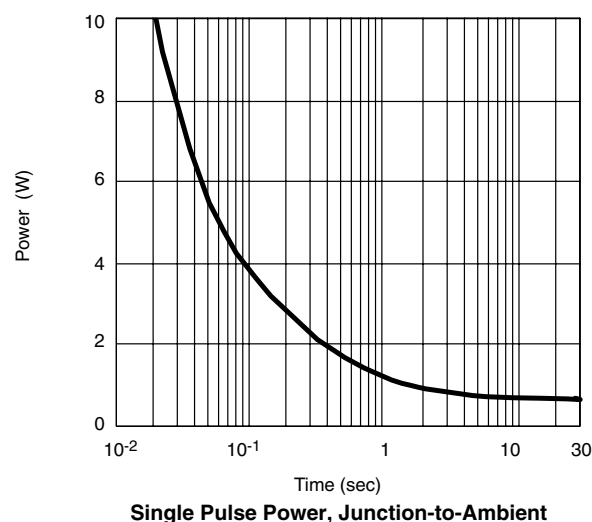
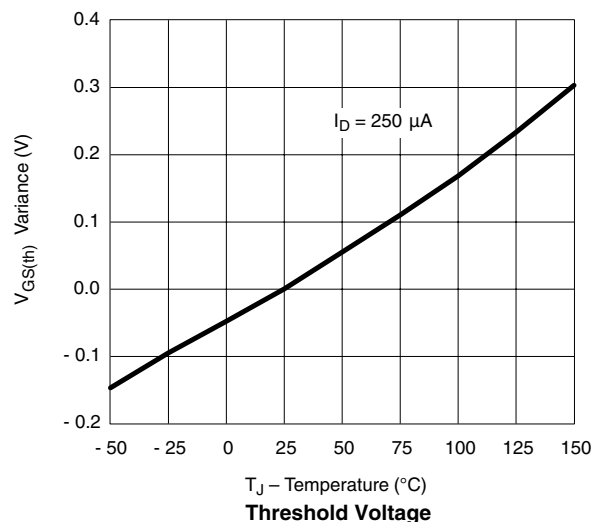
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless noted

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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9