

N-Channel Power MOSFET

60V, 23A, 12mΩ

FEATURES

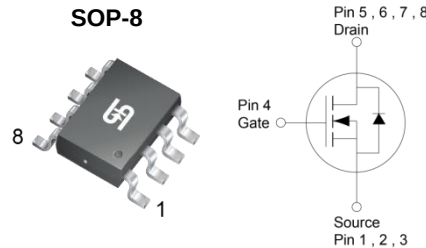
- Low $R_{DS(on)}$ to minimize conductive losses
- Logic level
- Low gate charge for fast power switching
- 100% UIS and R_g tested
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

KEY PERFORMANCE PARAMETERS

PARAMETER		VALUE	UNIT
V_{DS}		60	V
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	12	mΩ
	$V_{GS} = 4.5V$	15	
Q_g		19	nC

APPLICATIONS

- Motor Control for BLDC
- Battery Power Management



Note: MSL 1 (Moisture Sensitivity Level) per J-STD-020

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	I_D	23	A
	$T_A = 25^\circ\text{C}$		10	
Pulsed Drain Current (Note 1)		I_{DM}	92	A
Single Pulse Avalanche Current (Note 2)		I_{AS}	19	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	54	mJ
Total Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	12.5	W
	$T_C = 125^\circ\text{C}$		2.5	
Total Power Dissipation	$T_A = 25^\circ\text{C}$	P_D	2.2	W
	$T_A = 125^\circ\text{C}$		0.4	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	$^\circ\text{C}$

THERMAL PERFORMANCE

PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Case Thermal Resistance	$R_{\theta JC}$	10	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	57	$^\circ\text{C/W}$

Thermal Performance Notes: $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistances. The case-thermal reference is defined at the solder mounting surface of the drain pins. $R_{\theta JA}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.

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

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static ^(Note 3)						
Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	BV _{DSS}	60	--	--	V
Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 250μA	V _{GS(TH)}	1.2	1.7	2.5	V
Gate-Source Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Drain-Source Leakage Current	V _{GS} = 0V, V _{DS} = 60V	I _{DSS}	--	--	1	μA
	V _{GS} = 0V, V _{DS} = 60V T _J = 125°C		--	--	100	
Drain-Source On-State Resistance	V _{GS} = 10V, I _D = 10A	R _{DS(on)}	--	10.4	12	mΩ
	V _{GS} = 4.5V, I _D = 10A		--	11.9	15	
Forward Transconductance	V _{DS} = 5V, I _D = 10A	g _{fs}	--	38	--	S
Dynamic ^(Note 4)						
Total Gate Charge	V _{GS} = 10V, V _{DS} = 30V, I _D = 10A	Q _g	--	37	--	nC
Total Gate Charge	V _{GS} = 4.5V, V _{DS} = 30V, I _D = 10A	Q _g	--	19	--	
Gate-Source Charge		Q _{gs}	--	6	--	
Gate-Drain Charge		Q _{gd}	--	8	--	
Input Capacitance	V _{GS} = 0V, V _{DS} = 30V f = 1.0MHz	C _{iss}	--	2193	--	pF
Output Capacitance		C _{oss}	--	208	--	
Reverse Transfer Capacitance		C _{rss}	--	88	--	
Gate Resistance	f = 1.0MHz, open drain	R _g	0.4	1.5	3	Ω
Switching ^(Note 4)						
Turn-On Delay Time	V _{GS} = 10V, V _{DS} = 30V, I _D = 11A, R _G = 2Ω,	t _{d(on)}	--	6.4	--	ns
Turn-On Rise Time		t _r	--	3.6	--	
Turn-Off Delay Time		t _{d(off)}	--	23	--	
Turn-Off Fall Time		t _f	--	5	--	
Source-Drain Diode ^(Note 3)						
Forward Voltage	V _{GS} = 0V, I _S = 10A	V _{SD}	--	--	1	V
Reverse Recovery Time	I _S = 10A , di/dt = 100A/μs	t _{rr}	--	17	--	ns
Reverse Recovery Charge		Q _{rr}	--	13	--	nC

Notes:

- Current limited by package.
- $L = 0.3\text{mH}, V_{GS} = 10V, V_{DD} = 30V, R_G = 25\Omega, I_{AS} = 19A$, Starting $T_J = 25^\circ\text{C}$
- Pulse test: Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- Switching time is essentially independent of operating temperature.

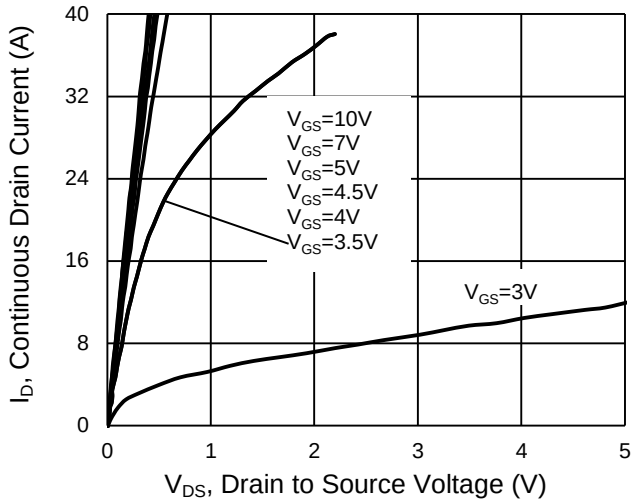
ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM120N06LCS RLG	SOP-8	2,500pcs / 13" Reel

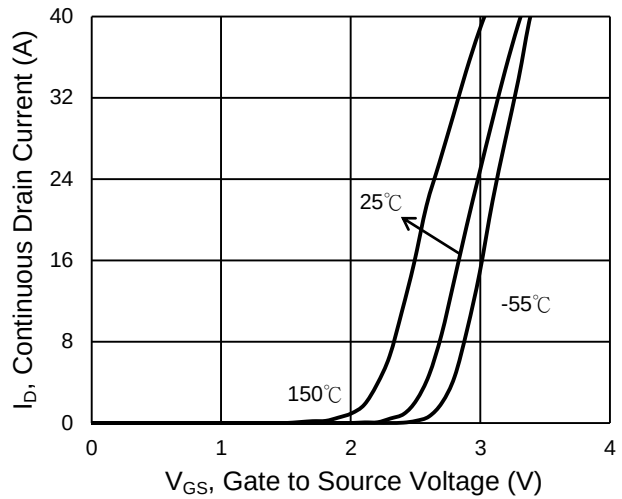
CHARACTERISTICS CURVES

($T_A = 25^\circ\text{C}$ unless otherwise noted)

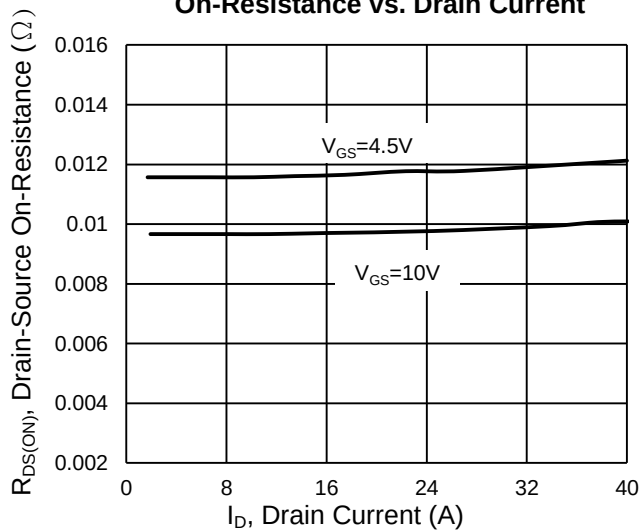
Output Characteristics



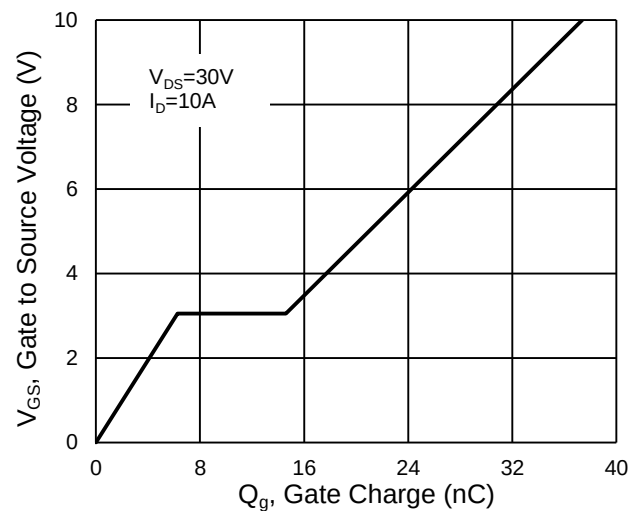
Transfer Characteristics



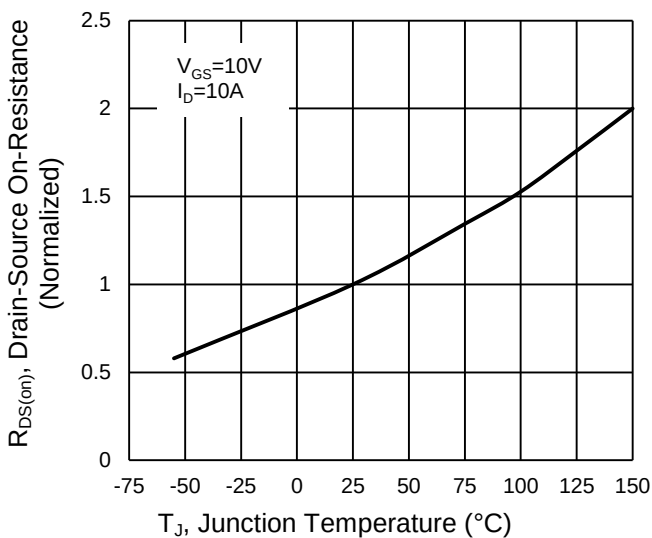
On-Resistance vs. Drain Current



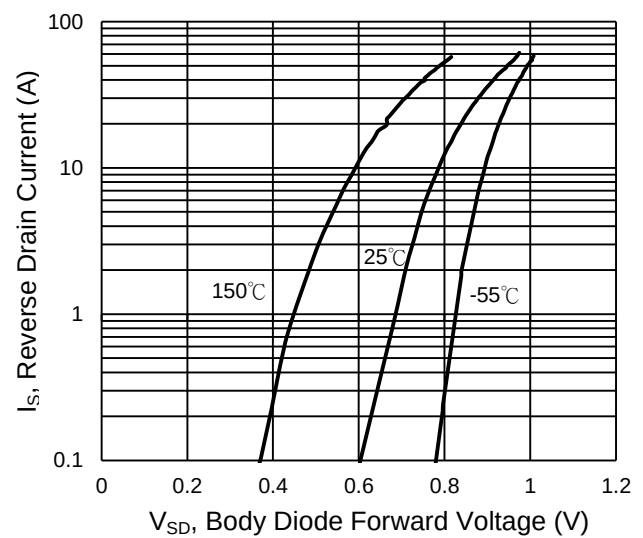
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



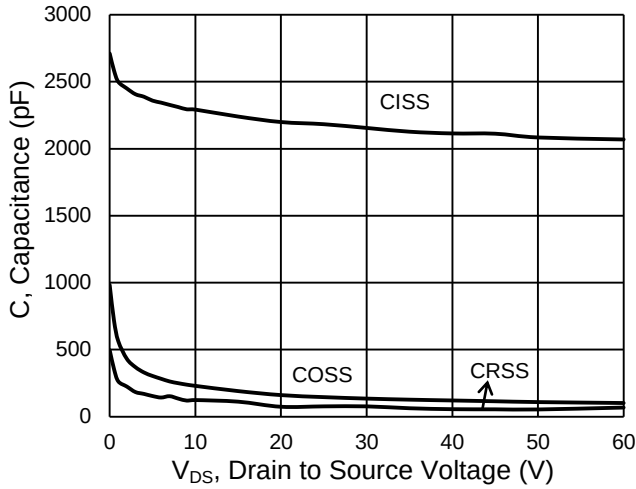
Source-Drain Diode Forward Current vs. Voltage



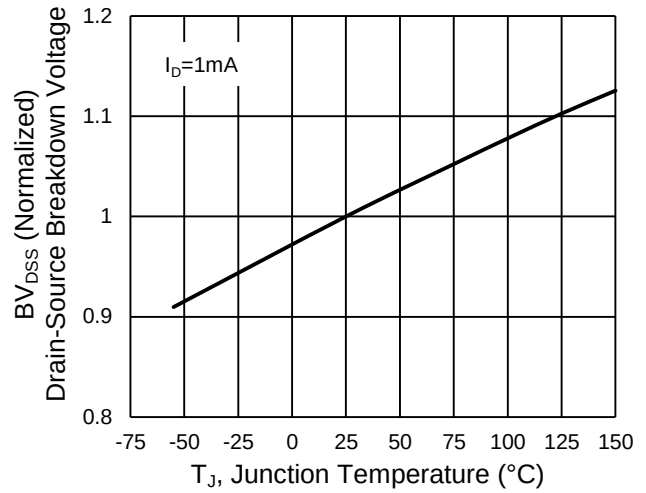
CHARACTERISTICS CURVES

($T_A = 25^\circ\text{C}$ unless otherwise noted)

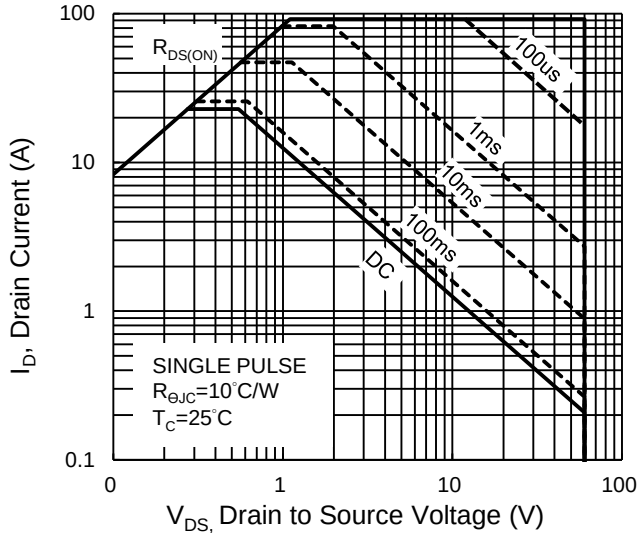
Capacitance vs. Drain-Source Voltage



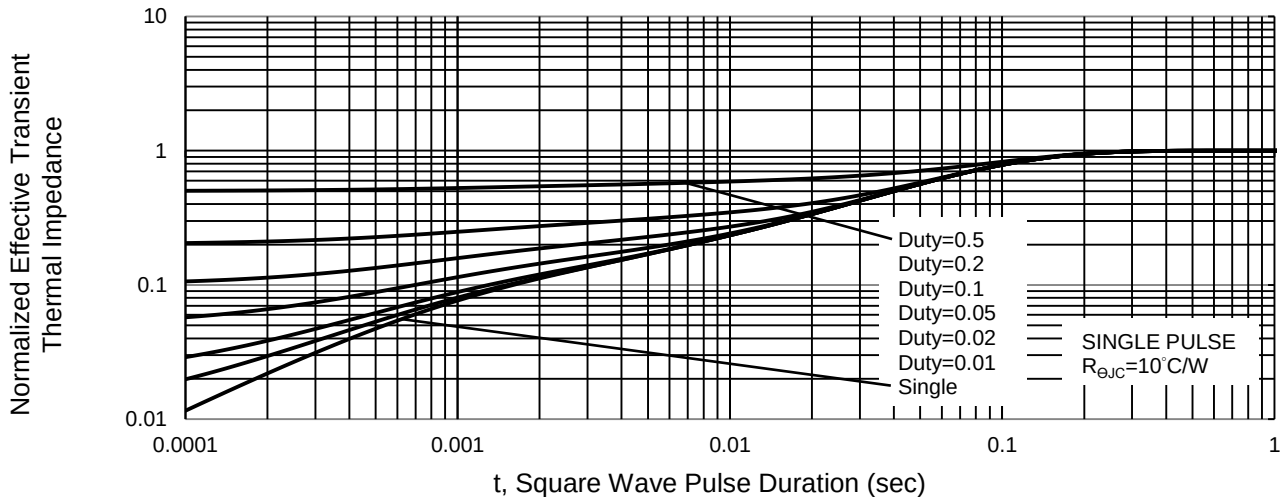
BV_{DSS} vs. Junction Temperature



Maximum Safe Operating Area, Junction-to-Case

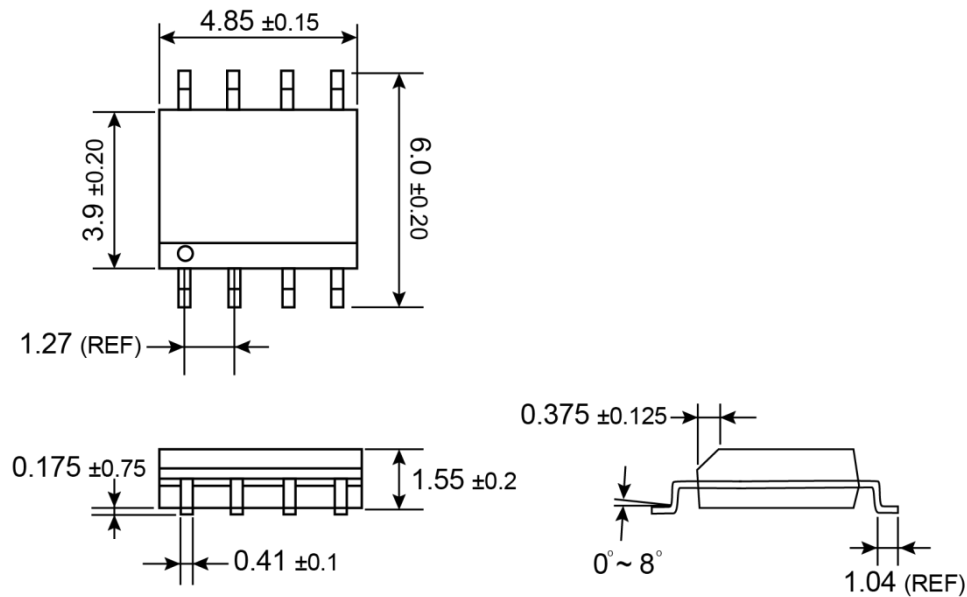


Normalized Thermal Transient Impedance, Junction-to-Case

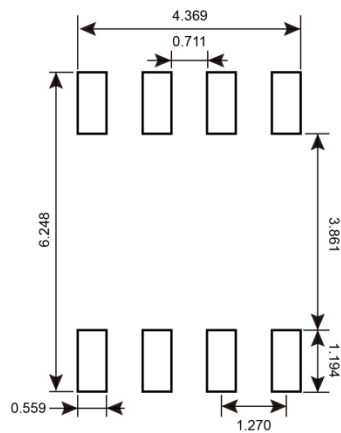


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

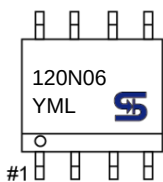
SOP-8



SUGGESTED PAD LAYOUT (Unit: Millimeters)



MARKING DIAGRAM



Y = Year Code

M = Month Code for Halogen Free Product

O =Jan **P** =Feb **Q** =Mar **R** =Apr

S =May **T** =Jun **U** =Jul **V** =Aug

W =Sep **X** =Oct **Y** =Nov **Z** =Dec

L = Lot Code (1~9, A~Z)

Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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