



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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N-Channel Power MOSFET

60V, 70A, 12mΩ

FEATURES

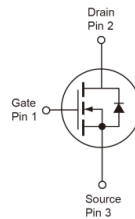
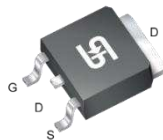
- Low $R_{DS(on)}$ to minimize conductive losses
- Logic level
- Low gate charge for fast power switching
- 100% UIS and R_g tested
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

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		18	nC

APPLICATIONS

- BLDC Motor Control
- Battery Power Management
- Secondary Synchronous Rectification


TO-252(DPAK)

Notes: MSL 3 (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	70	A
	$T_A = 25^\circ\text{C}$		10	
Pulsed Drain Current (Note 1)		I_{DM}	280	A
Single Pulse Avalanche Current (Note 2)		I_{AS}	20	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	60	mJ
Total Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	125	W
	$T_C = 125^\circ\text{C}$		25	
Total Power Dissipation	$T_A = 25^\circ\text{C}$	P_D	2.6	W
	$T_A = 125^\circ\text{C}$		0.5	
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	$R_{\theta JC}$	1	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	49	$^\circ\text{C/W}$

Thermal Performance Note: $R_{\theta JA}$ 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						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	60	--	--	V
Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu A$	$V_{GS(TH)}$	1.2	1.7	2.5	V
Gate-Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Drain-Source Leakage Current	$V_{GS} = 0V, V_{DS} = 60V$	I_{DSS}	--	--	1	μA
	$V_{GS} = 0V, V_{DS} = 60V$ $T_J = 125^{\circ}C$		--	--	100	
Drain-Source On-State Resistance (Note 3)	$V_{GS} = 10V, I_D = 10A$	$R_{DS(on)}$	--	9.7	12	m Ω
	$V_{GS} = 4.5V, I_D = 10A$		--	11	15	
Forward Transconductance (Note 3)	$V_{DS} = 5V, I_D = 10A$	g_{fs}	--	40	--	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	--	18	--	
Gate-Source Charge		Q_{gs}	--	6	--	
Gate-Drain Charge		Q_{gd}	--	7.5	--	
Input Capacitance	$V_{GS} = 0V, V_{DS} = 30V$ $f = 1.0MHz$	C_{iss}	--	2118	--	pF
Output Capacitance		C_{oss}	--	136	--	
Reverse Transfer Capacitance		C_{rss}	--	86	--	
Gate Resistance	$f = 1.0MHz$, open drain	R_g	0.5	1.6	3.2	Ω
Switching (Note 4)						
Turn-On Delay Time	$V_{GS} = 10V, V_{DS} = 30V, I_D = 10A, R_G = 2\Omega$	$t_{d(on)}$	--	6.4	--	ns
Turn-On Rise Time		t_r	--	13.4	--	
Turn-Off Delay Time		$t_{d(off)}$	--	25.6	--	
Turn-Off Fall Time		t_f	--	6.6	--	
Source-Drain Diode						
Forward Voltage (Note 3)	$V_{GS} = 0V, I_S = 10A$	V_{SD}	--	--	1	V
Reverse Recovery Time	$I_S = 10A$, $di/dt = 100A/\mu s$	t_{rr}	--	17	--	ns
Reverse Recovery Charge		Q_{rr}	--	13	--	nC

Notes:

- Current limited by package.
- $L = 0.3\text{mH}$, $V_{GS} = 10V$, $V_{DD} = 30V$, $R_G = 25\Omega$, $I_{AS} = 20A$, 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.

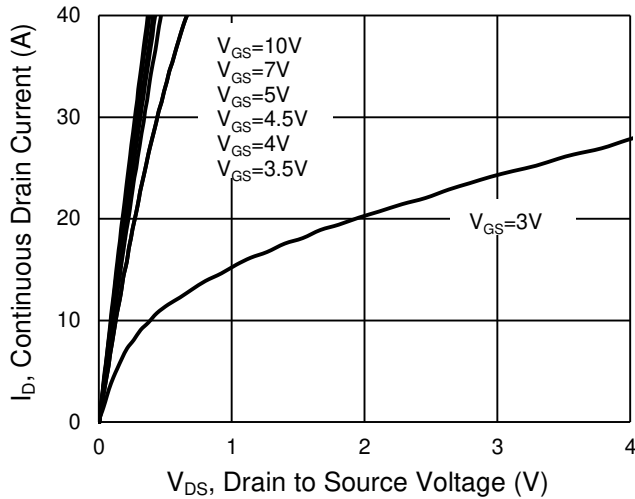
ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM120N06LCP ROG	TO-252(DPAK)	2,500pcs / 13" Reel

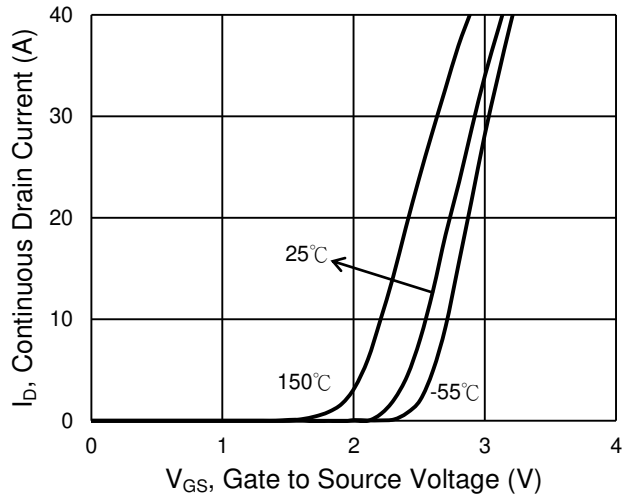
CHARACTERISTICS CURVES

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

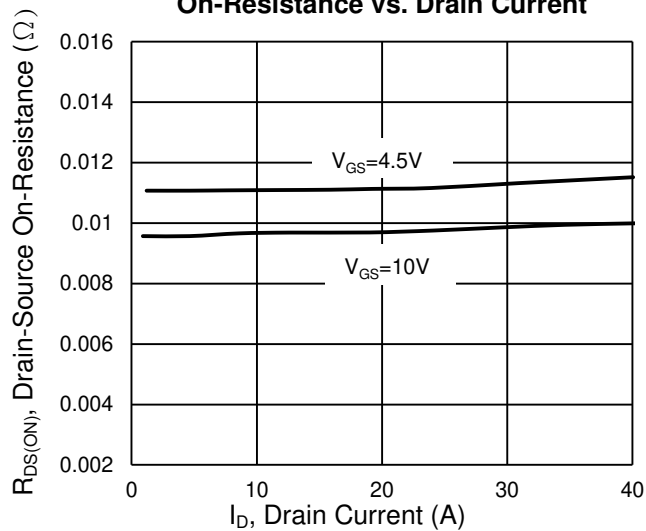
Output Characteristics



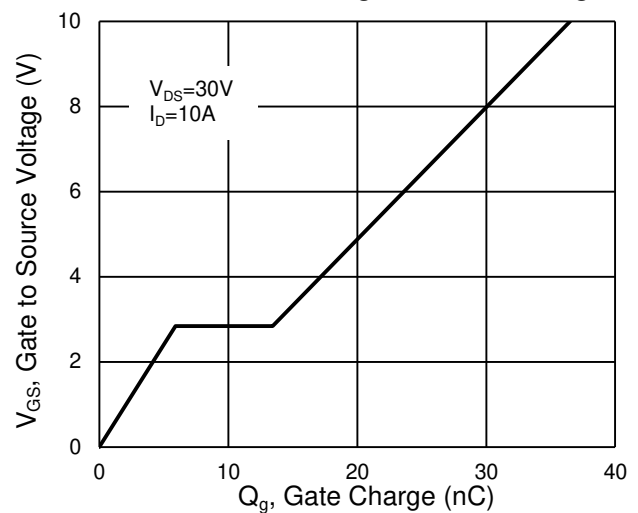
Transfer Characteristics



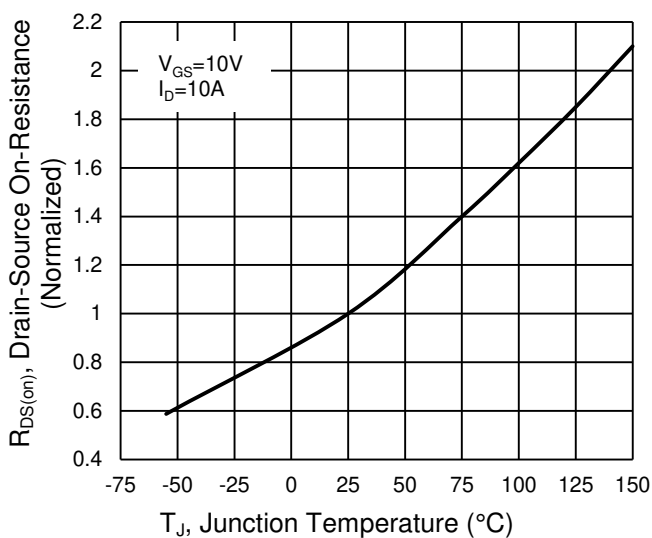
On-Resistance vs. Drain Current



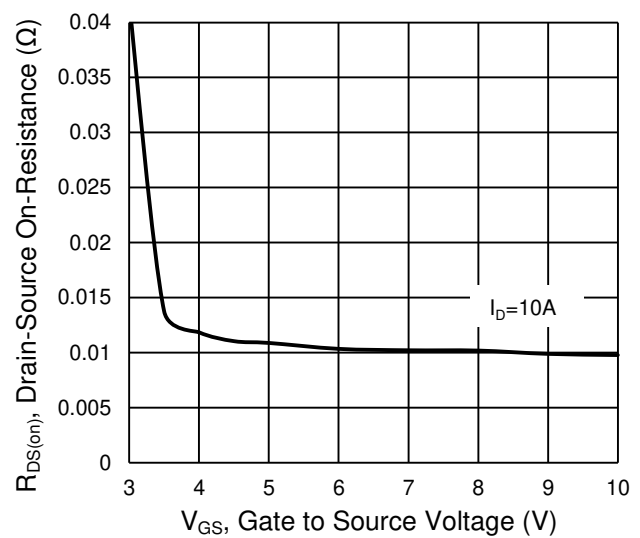
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



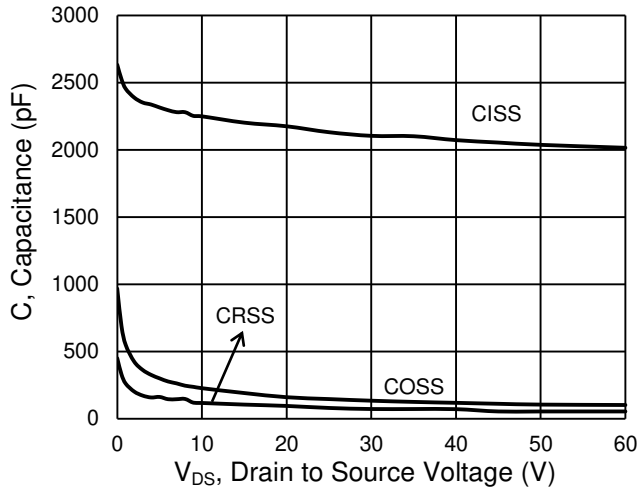
On-Resistance vs. Gate-Source Voltage



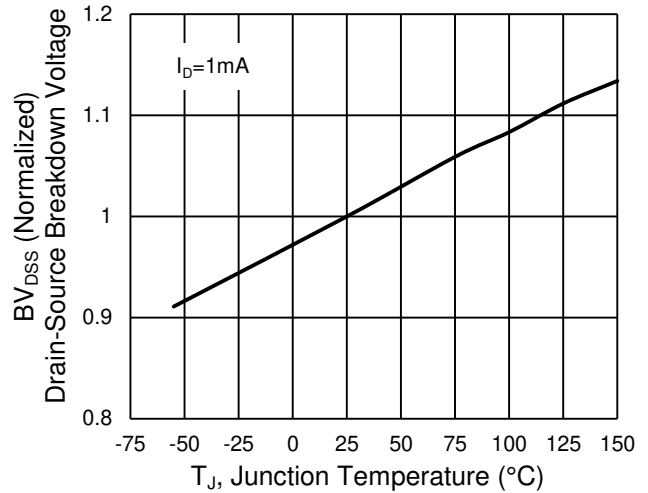
CHARACTERISTICS CURVES

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

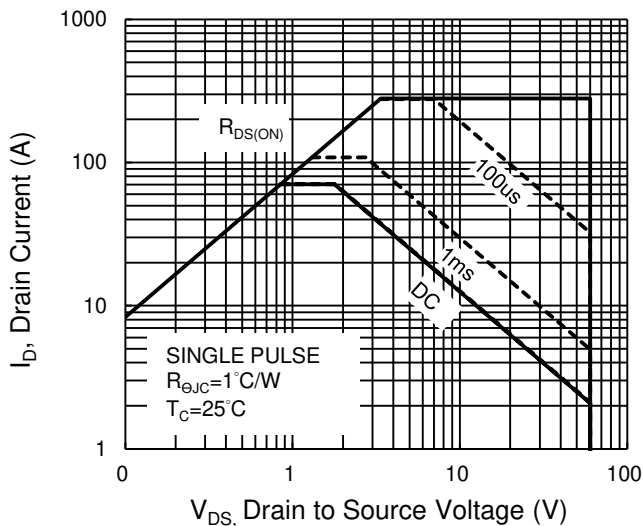
Capacitance vs. Drain-Source Voltage



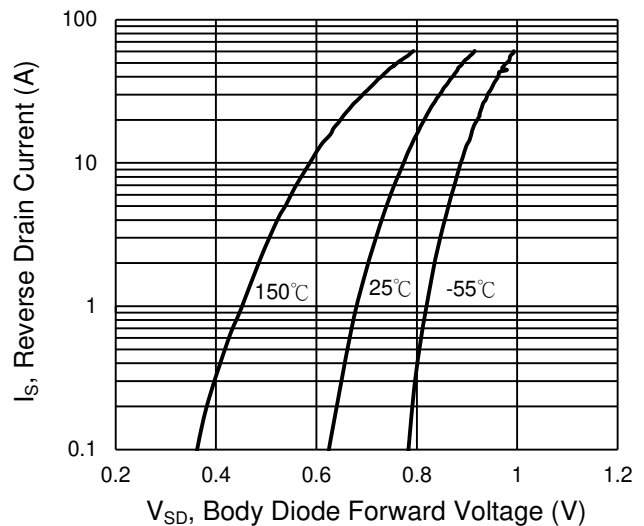
BV_{DSS} vs. Junction Temperature



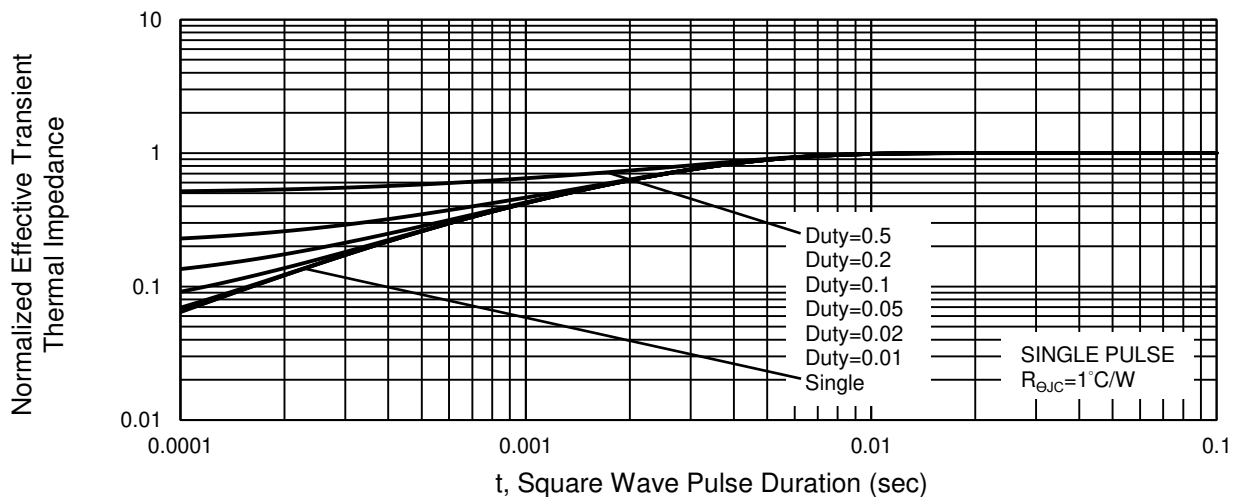
Maximum Safe Operating Area, Junction-to-Case



Source-Drain Diode Forward Current vs. Voltage

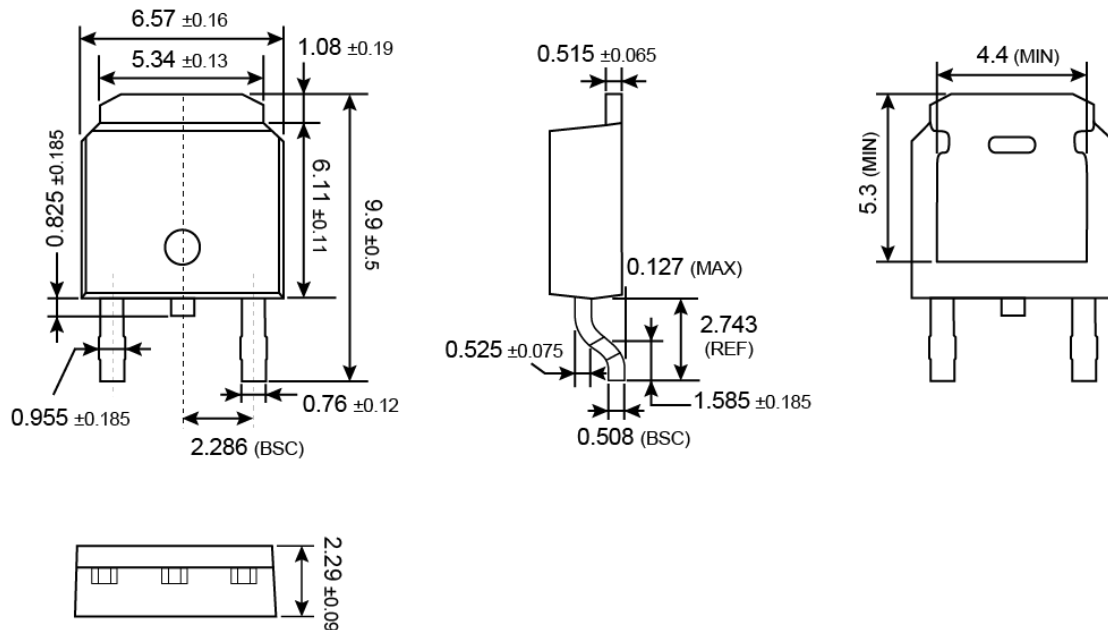


Normalized Thermal Transient Impedance, Junction-to-Case

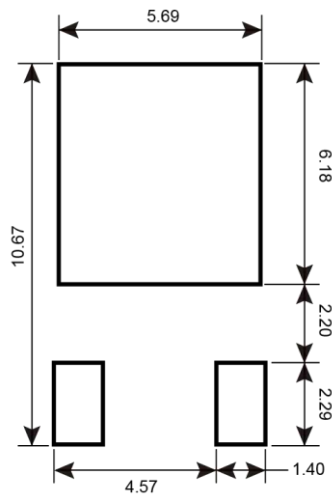


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

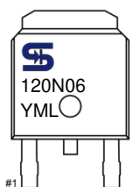
TO-252(DPAK)



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)

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