

N-Channel Power MOSFET

150V, 9A, 65mΩ

FEATURES

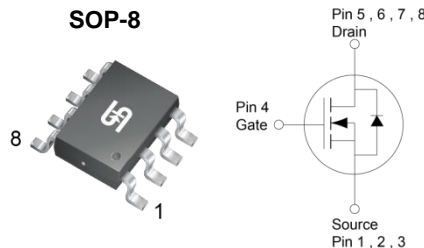
- Low $R_{DS(on)}$ to minimize conductive losses
- Low gate charge for fast power switching
- 100% UIS and R_g tested
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

KEY PERFORMANCE PARAMETERS

PARAMETER	VALUE	UNIT
V_{DS}	150	V
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	65
	$V_{GS} = 6V$	80
Q_g	37	nC

APPLICATIONS

- PoE
- LED Lighting
- Telecom Power



Note: 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}	150	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^(Note 1)	I_D	$T_C = 25^\circ\text{C}$	9
		$T_A = 25^\circ\text{C}$	4
Pulsed Drain Current	I_{DM}	36	A
Single Pulse Avalanche Current ^(Note 2)	I_{AS}	20	A
Single Pulse Avalanche Energy ^(Note 2)	E_{AS}	60	mJ
Total Power Dissipation	P_D	$T_C = 25^\circ\text{C}$	12.5
		$T_C = 125^\circ\text{C}$	2.5
Total Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	2.2
		$T_A = 125^\circ\text{C}$	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 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}	150	--	--	V
Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu A$	$V_{GS(TH)}$	2	2.7	4	V
Gate-Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Drain-Source Leakage Current	$V_{GS} = 0V, V_{DS} = 150V$	I_{DSS}	--	--	1	μA
	$V_{GS} = 0V, V_{DS} = 150V$ $T_J = 125^\circ\text{C}$		--	--	100	
Drain-Source On-State Resistance (Note 3)	$V_{GS} = 10V, I_D = 4A$	$R_{DS(on)}$	--	51	65	m Ω
	$V_{GS} = 6V, I_D = 4A$		--	59	80	
Forward Transconductance (Note 3)	$V_{DS} = 5V, I_D = 4A$	g_{fs}	--	11	--	S
Dynamic (Note 4)						
Total Gate Charge	$V_{GS} = 10V, V_{DS} = 75V,$ $I_D = 4A$	Q_g	--	37	--	nC
Total Gate Charge	$V_{GS} = 6V, V_{DS} = 75V,$ $I_D = 4A$	Q_g	--	24	--	
Gate-Source Charge		Q_{gs}	--	9	--	
Gate-Drain Charge		Q_{gd}	--	12	--	
Input Capacitance	$V_{GS} = 0V, V_{DS} = 75V$ $f = 1.0\text{MHz}$	C_{iss}	--	1783	--	pF
Output Capacitance		C_{oss}	--	94	--	
Reverse Transfer Capacitance		C_{rss}	--	18	--	
Gate Resistance	$f = 1.0\text{MHz}, \text{open drain}$	R_g	0.4	1.3	2.6	Ω
Switching (Note 4)						
Turn-On Delay Time	$V_{GS} = 10V, V_{DS} = 75V,$ $I_D = 4A, R_G = 2\Omega,$	$t_{d(on)}$	--	7	--	ns
Turn-On Rise Time		t_r	--	5	--	
Turn-Off Delay Time		$t_{d(off)}$	--	17	--	
Turn-Off Fall Time		t_f	--	11	--	
Source-Drain Diode						
Forward Voltage (Note 3)	$V_{GS} = 0V, I_S = 4A$	V_{SD}	--	--	1	V
Reverse Recovery Time	$I_S = 4A,$ $di/dt = 100A/\mu s$	t_{rr}	--	50	--	ns
Reverse Recovery Charge		Q_{rr}	--	97	--	nC

Notes:

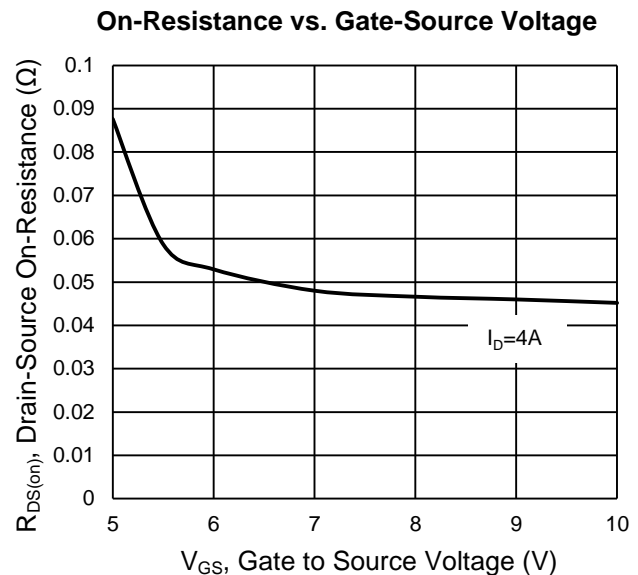
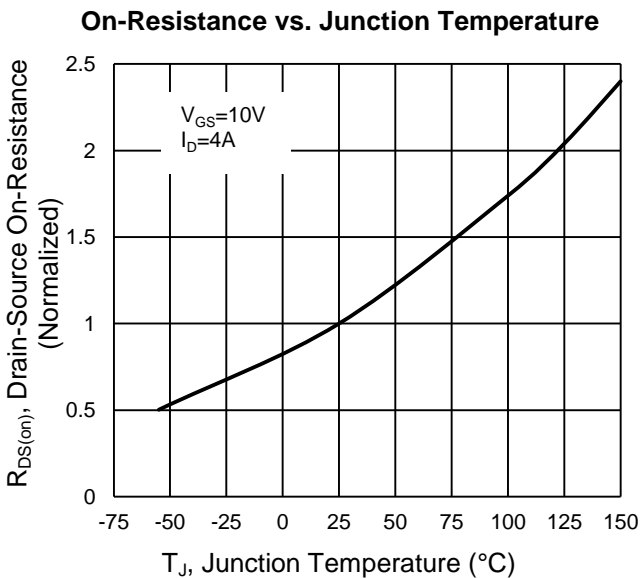
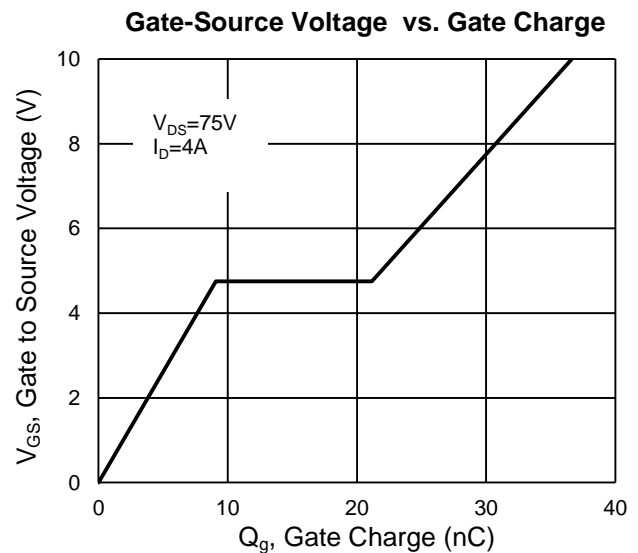
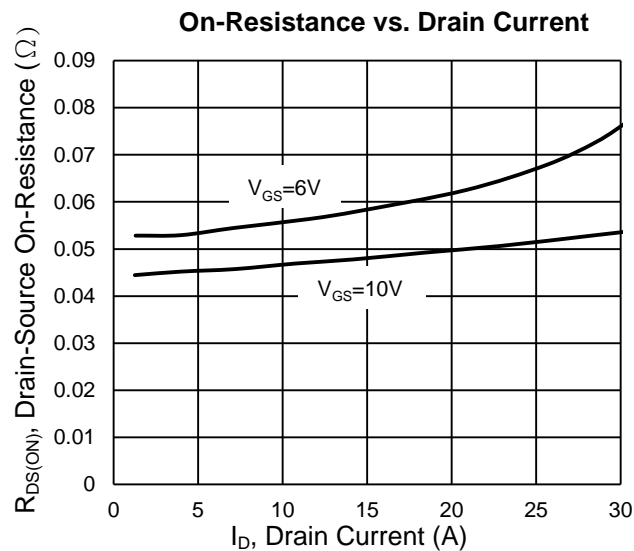
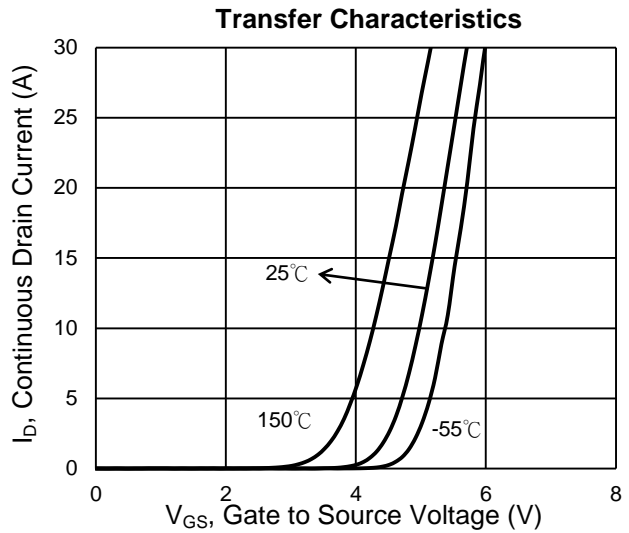
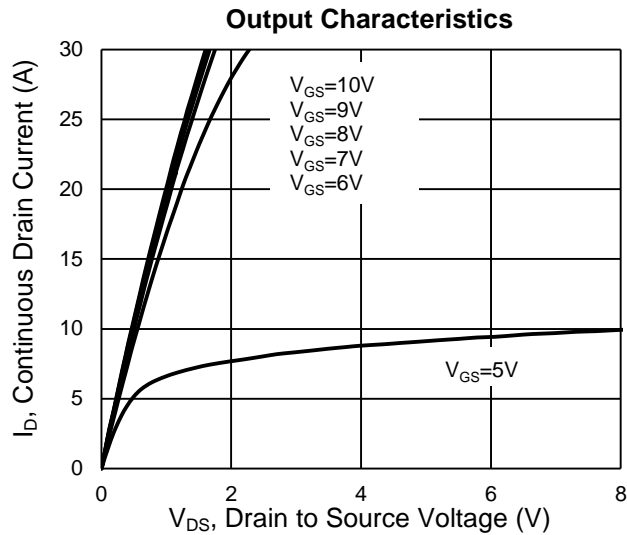
1. Silicon limited current only.
2. $L = 0.3\text{mH}, V_{GS} = 10V, V_{DD} = 50V, R_G = 25\Omega, I_{AS} = 18A,$ Starting $T_J = 25^\circ\text{C}$
3. Pulse test: Pulse Width $\leq 300\mu s,$ duty cycle $\leq 2\%$.
4. Switching time is essentially independent of operating temperature.

ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM650N15CS RLG	SOP-8	2,500pcs / 13" Reel

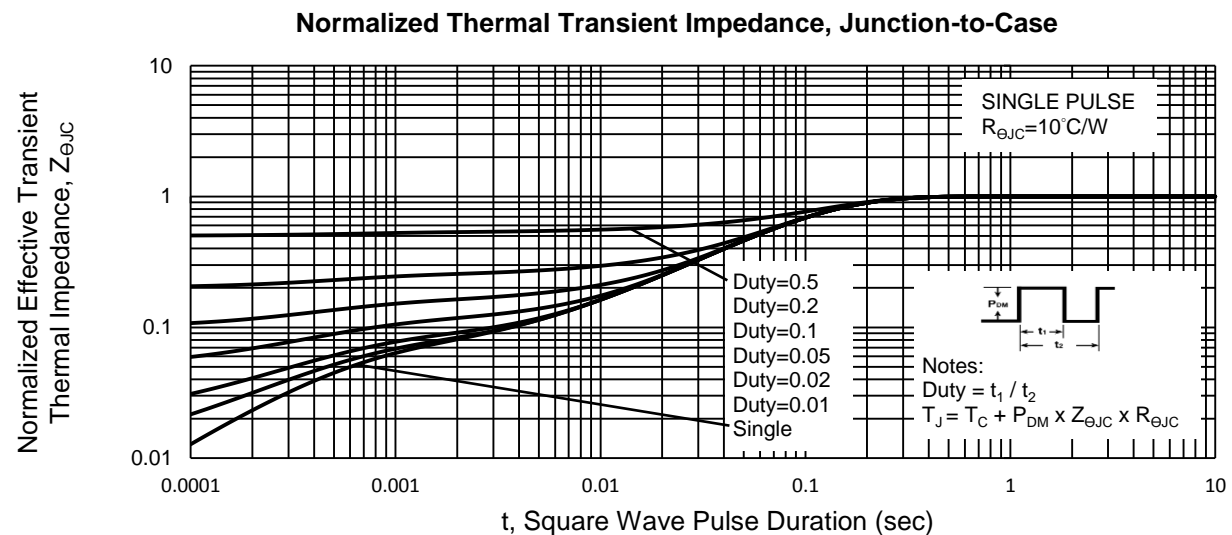
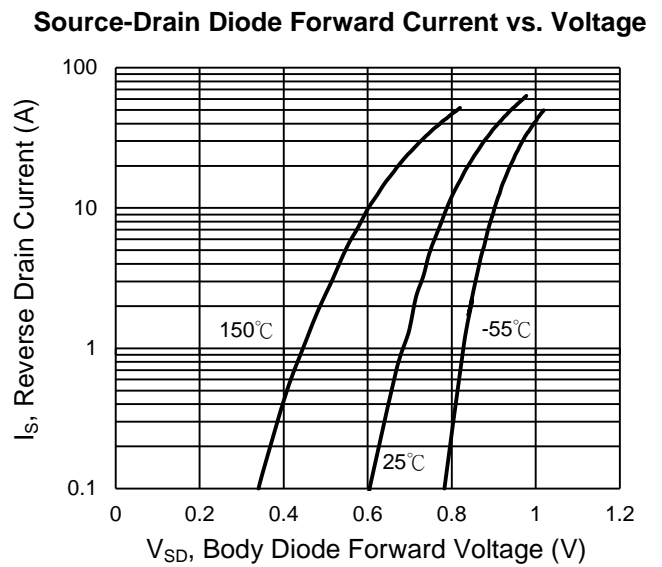
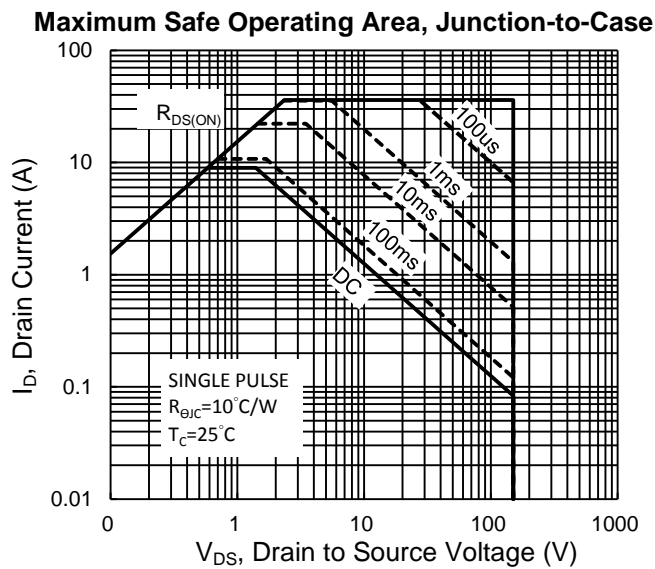
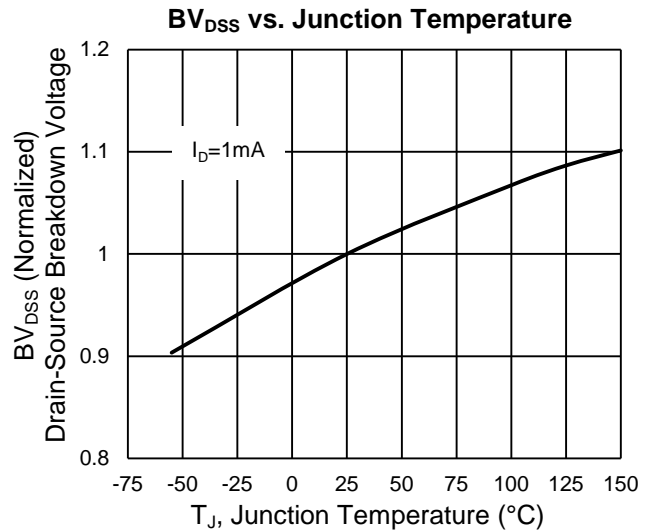
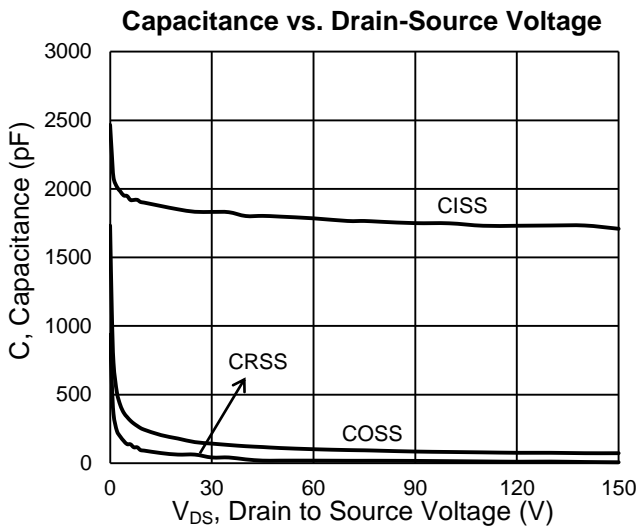
CHARACTERISTICS CURVES

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



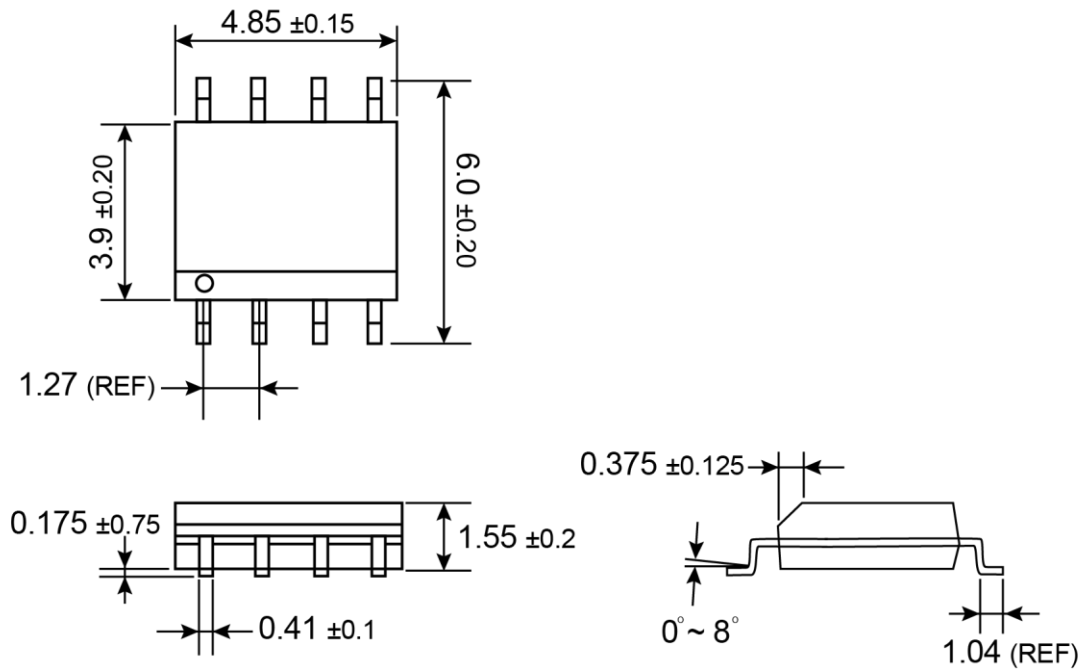
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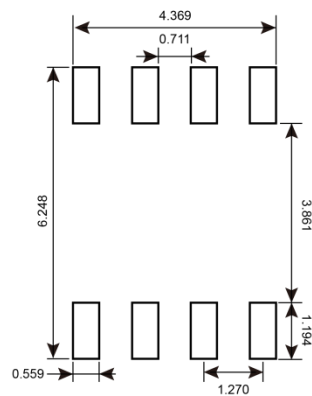


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

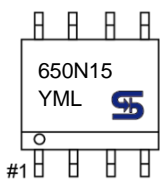
SOP-8



SUGGESTED PAD LAYOUT (Unit: Millimeters)



MARKING DIAGRAM



- Y = Year Code
- M = Month Code
- 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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