N-Channel 150V Power MOSFET

FEATURES

- Low $R_{DS(ON)}$ to minimize conductive losses
- Low gate charge for fast power switching
- RoHS Compliant
- Halogen-Free according to IEC 61249-2-21

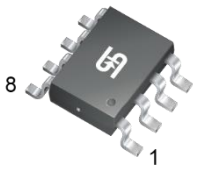
KEY PERFORMANCE PARAMETERS			
PARAMETER		**VALUE**	**UNIT**
V_{DS}		150	V
$R_{DS(on)}$ (max)	V_{GS} = 10V	50	mΩ

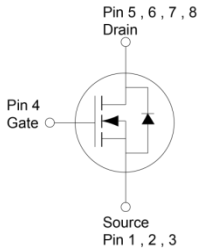
APPLICATIONS

- DC-DC Converters
- Power Routing
- Motor Drives

Pb-Free RoHS COMPLIANT HALOGEN FREE

SOP-8





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

ABSOLUTE MAXIMUM RATINGS (T_A = 25°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	T_C = 25°C	I_D	11	A
	T_A = 25°C		4	
Pulsed Drain Current		I_{DM}	44	A
Single Pulse Avalanche Current		I_{AS}	8.9	A
Single Pulse Avalanche Energy		E_{AS}	12	mJ
Total Power Dissipation	T_A = 25°C	P_D	12.7	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	°C

THERMAL PERFORMANCE			
PARAMETER	**SYMBOL**	**LIMIT**	**UNIT**
Thermal Resistance – Junction to Case	$R_{\Theta JC}$	9.85	°C/W
Thermal Resistance – Junction to Ambient	$R_{\Theta JA}$	75	°C/W

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)						
PARAMETER	**CONDITIONS**	**SYMBOL**	**MIN**	**TYP**	**MAX**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	BV_{DSS}	150	--	--	V
Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	$V_{GS(TH)}$	2	3	4	V
Gate-Source Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Drain-Source Leakage Current	V_{GS} = 0V, V_{DS} = 120V	I_{DSS}	--	--	1	μA
	V_{GS} = 0V, V_{DS} = 120V T_J = 125°C		--	--	10	
Drain-Source On-State Resistance (Note 3)	V_{GS} = 10V, I_D = 4A	$R_{DS(on)}$	--	40.6	50	mΩ
Forward Transconductance (Note 3)	V_{DS} = 10V, I_D = 4A	g_{fs}	--	22	--	S
Dynamic (Note 4)						
Total Gate Charge	V_{GS} = 10V, V_{DS} = 80V, I_D = 4A	Q_g	--	20.5	--	nC
Gate-Source Charge		Q_{gs}	--	4.6	--	
Gate-Drain Charge		Q_{gd}	--	6	--	
Total Gate Charge	V_{GS} = 7V, V_{DS} = 80V, I_D = 4A	Q_g	--	15.6	--	nC
Gate-Source Charge		Q_{gs}	--	4.5	--	
Gate-Drain Charge		Q_{gd}	--	6	--	
Input Capacitance	V_{GS} = 0V, V_{DS} = 80V, f = 1.0MHz	C_{iss}	--	1123	--	pF
Output Capacitance		C_{oss}	--	80	--	
Reverse Transfer Capacitance		C_{rss}	--	4.9	--	
Gate Resistance	f = 1.0MHz	R_g	--	0.7	--	Ω
Switching (Note 4)						
Turn-On Delay Time	V_{GS} = 10V, V_{DS} = 80V, I_D = 4A, R_G = 2Ω	$t_{d(on)}$	--	14	--	ns
Turn-On Rise Time		t_r	--	21.4	--	
Turn-Off Delay Time		$t_{d(off)}$	--	29.5	--	
Turn-Off Fall Time		t_f	--	10.6	--	
Source-Drain Diode						
Forward Voltage (Note 3)	V_{GS} = 0V, I_S = 11A	V_{SD}	--	0.8	1	V
Reverse Recovery Time	I_S = 2A, dI/dt = 100A/μs	t_{rr}	--	51	--	ns
Reverse Recovery Charge		Q_{rr}	--	3.2	--	nC

Notes:

1. Current limited by package.
2. L = 0.3mH, V_{GS} = 10V, V_{DD} = 80V, R_G = 25Ω, Starting T_J = 25°C
3. Pulse test: Pulse Width ≤ 300μs, duty cycle ≤ 2%.
4. Switching time is essentially independent of operating temperature.

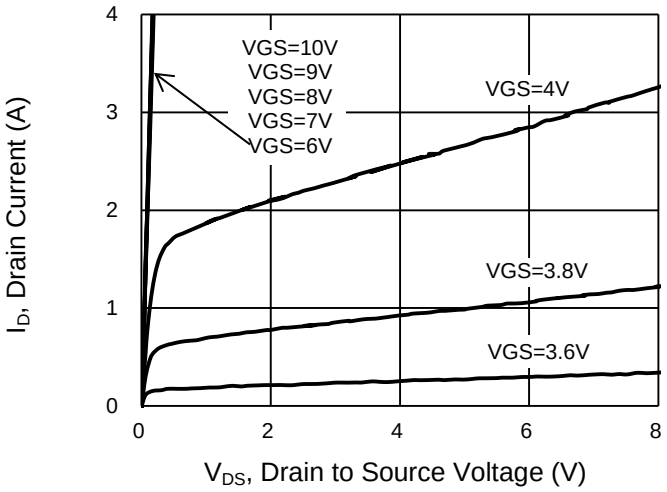
ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TSM500N15CS RLG	SOP-8	2,500pcs / 13” Reel

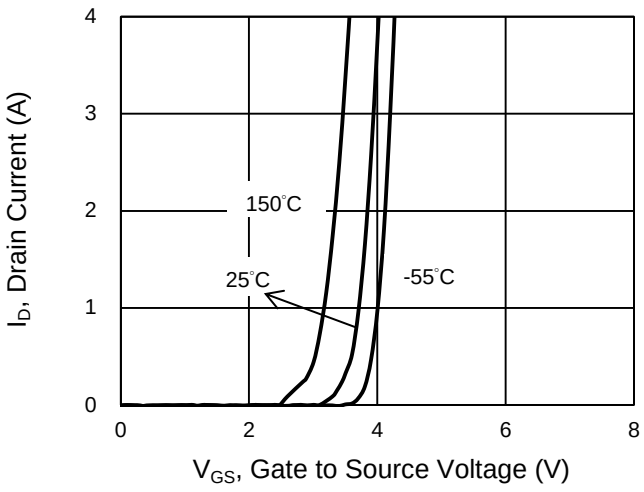
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

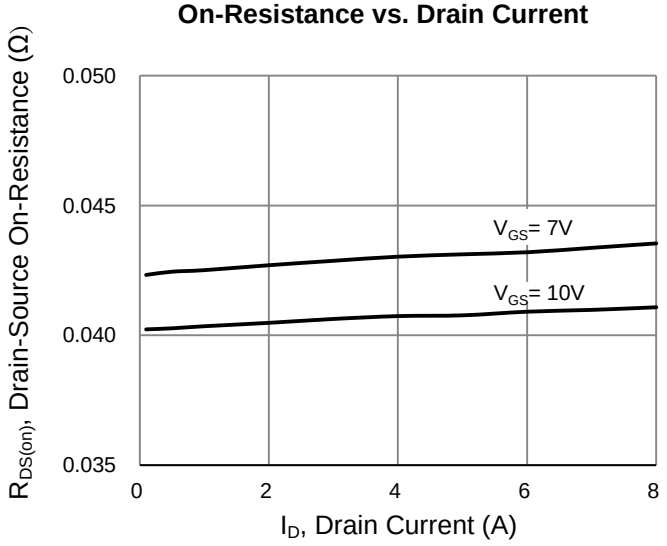
Output Characteristics



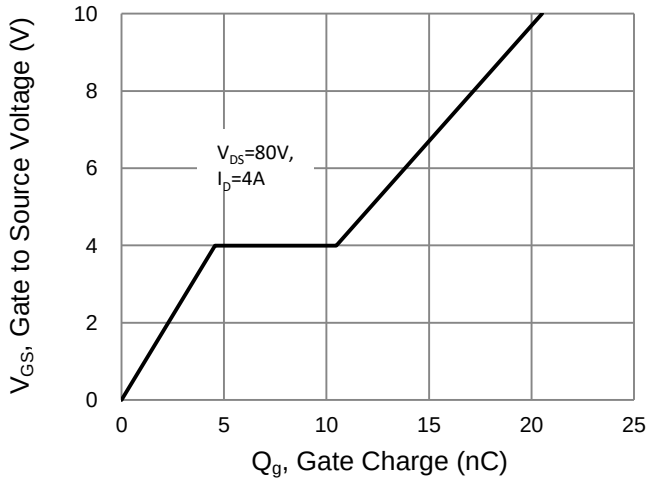
Transfer Characteristics



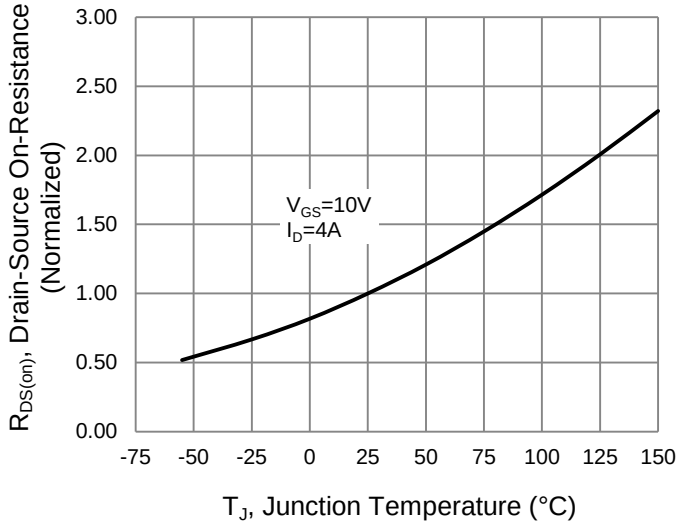
On-Resistance vs. Drain Current



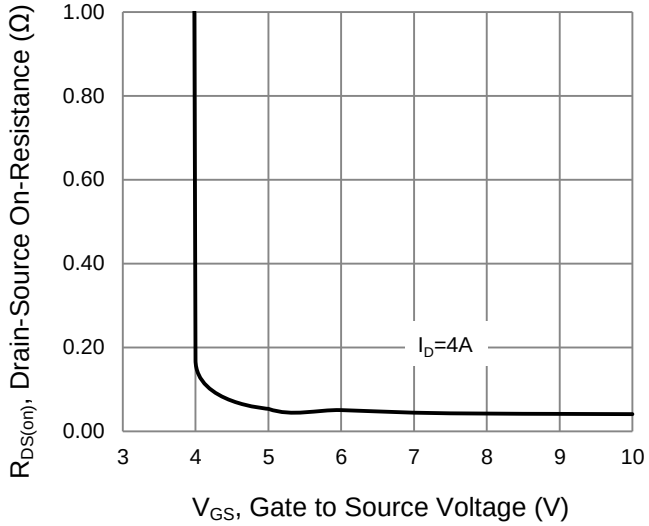
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



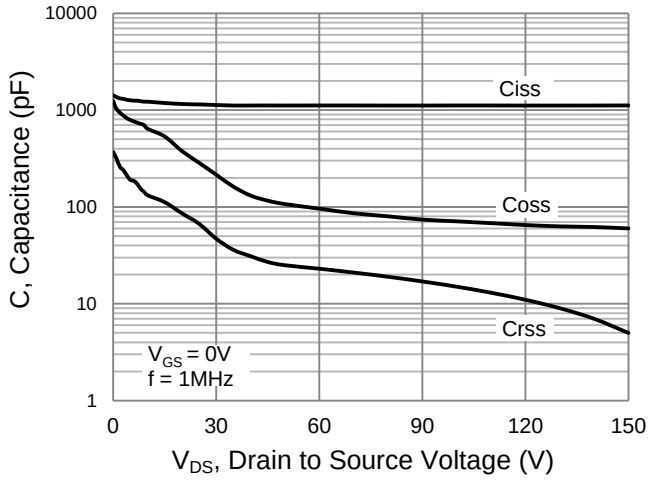
On-Resistance vs. Gate-Source Voltage



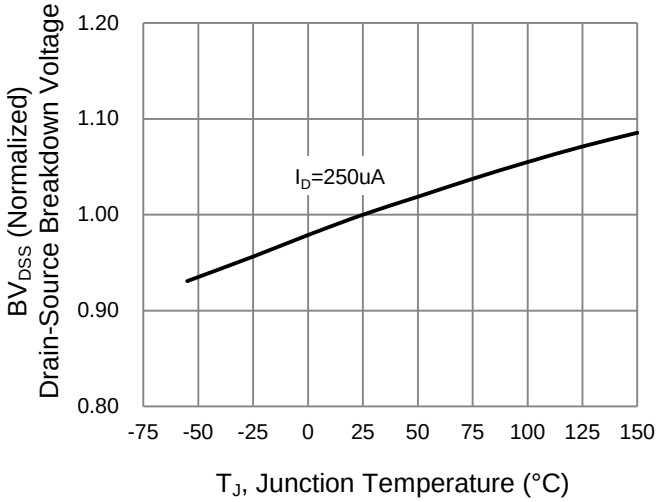
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

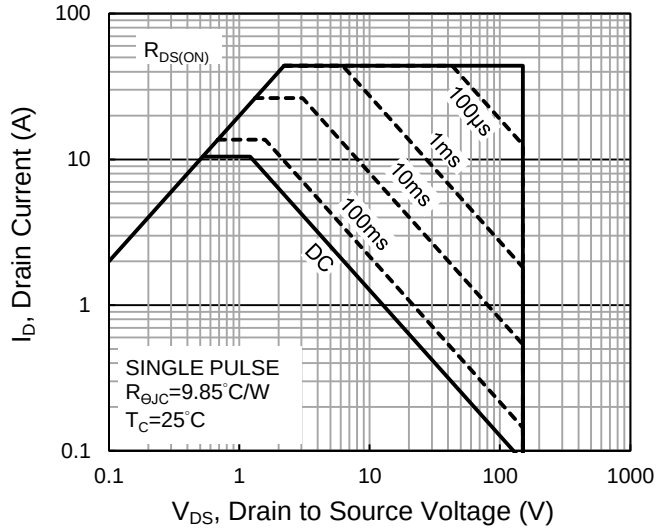
Capacitance vs. Drain-Source Voltage



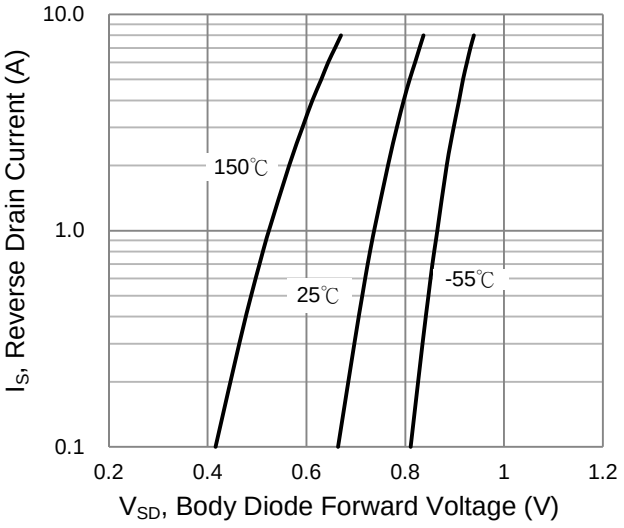
BV_{DSS} vs. Junction Temperature



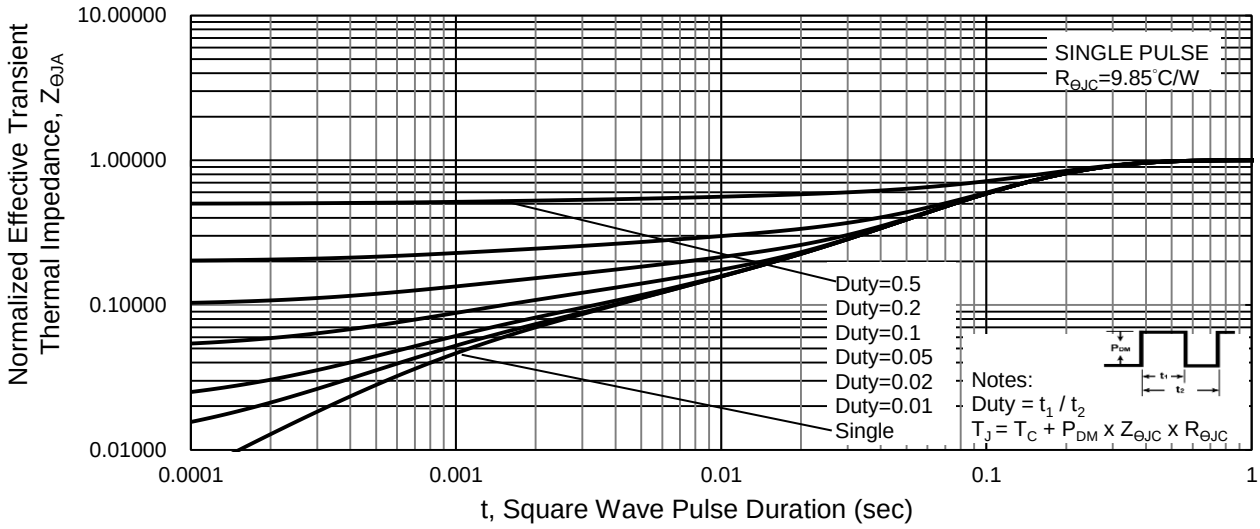
Maximum Safe Operating Area, Junction-to-Ambient



Source-Drain Diode Forward Current vs. Voltage

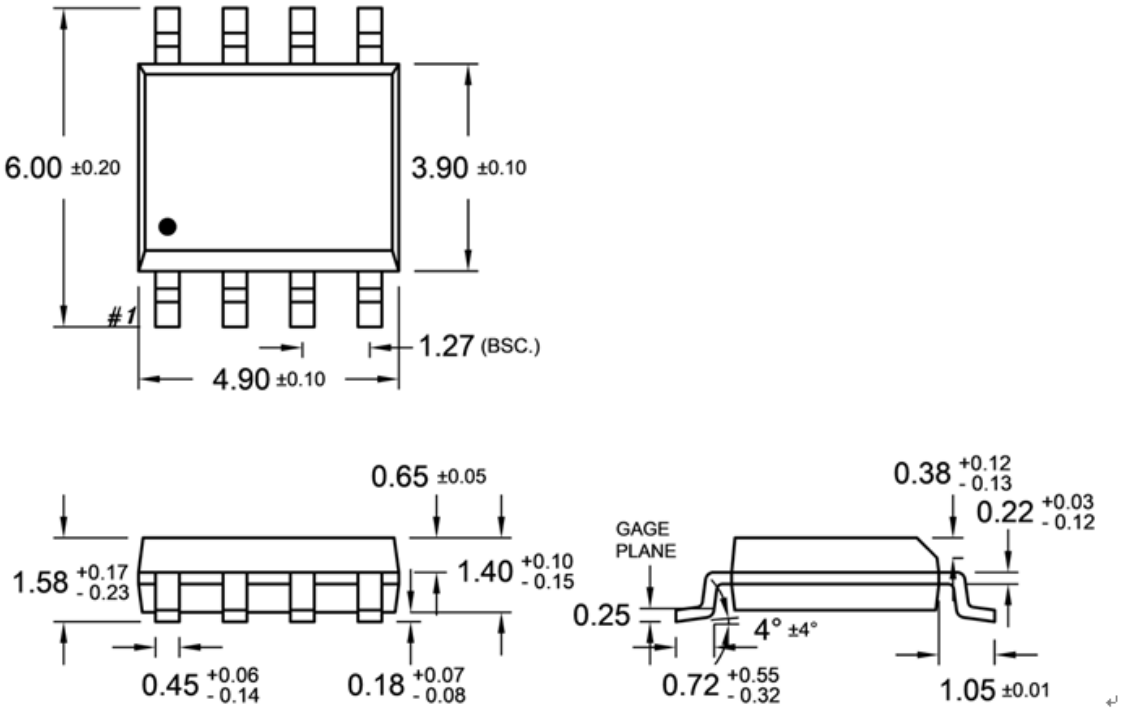


Normalized Thermal Transient Impedance, Junction-to-Ambient

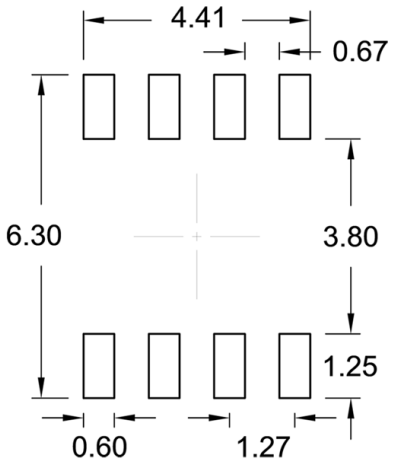


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

SOP-8



SUGGESTED PAD LAYOUT (Unit: Millimeters)



MARKING DIAGRAM



Y = Year Code
WW = Week Code (01~52)
L = Lot Code (1~9,A~Z)
F = Factory Code

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