

N-Channel 150V Power MOSFET

FEATURES

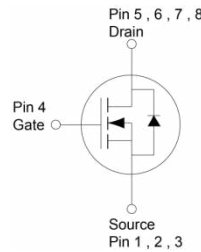
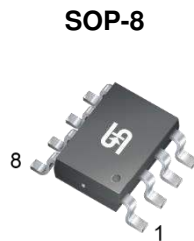
- Low $R_{DS(ON)}$ to minimize conductive losses
- Low gate charge for fast power switching
- RoHS Compliant
- Halogen-Free according to IEC 61249-2-21

KEY PERFORMANCE PARAMETERS

PARAMETER		VALUE	UNIT
V_{DS}		150	V
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	50	m Ω

APPLICATIONS

- DC-DC Converters
- Power Routing
- Motor Drives



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}	150	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	$T_C = 25^\circ\text{C}$	11
		$T_A = 25^\circ\text{C}$	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	P_D	12.7	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150	$^\circ\text{C}$

THERMAL PERFORMANCE

PARAMETER	SYMBOL	LIMIT	UNIT
Thermal Resistance – Junction to Case	$R_{\theta JC}$	9.85	$^\circ\text{C/W}$
Thermal Resistance – Junction to Ambient	$R_{\theta JA}$	75	$^\circ\text{C/W}$

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	3	4	V
Gate-Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Drain-Source Leakage Current	$V_{GS} = 0V, V_{DS} = 120V$	I_{DSS}	--	--	1	μA
	$V_{GS} = 0V, V_{DS} = 120V$ $T_J = 125^\circ\text{C}$		--	--	10	
Drain-Source On-State Resistance (Note 3)	$V_{GS} = 10V, I_D = 4A$	$R_{DS(on)}$	--	40.6	50	m Ω
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	$V_{GS} = 0V, V_{DS} = 80V,$ $f = 1.0\text{MHz}$	C_{iss}	--	1123	--	μF
Output Capacitance		C_{oss}	--	80	--	
Reverse Transfer Capacitance		C_{rss}	--	4.9	--	
Gate Resistance	$f = 1.0\text{MHz}$	R_g	--	0.7	--	Ω
Switching (Note 4)						
Turn-On Delay Time	$V_{GS} = 10V, V_{DS} = 80V,$ $I_D = 4A, R_G = 2\Omega$	$t_{d(on)}$	--	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	$I_S = 2A,$ $dI/dt = 100A/\mu s$	t_{rr}	--	51	--	ns
Reverse Recovery Charge		Q_{rr}	--	3.2	--	nC

Notes:

- Current limited by package.
- $L = 0.3\text{mH}, V_{GS} = 10V, V_{DD} = 80V, R_G = 25\Omega,$ 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.

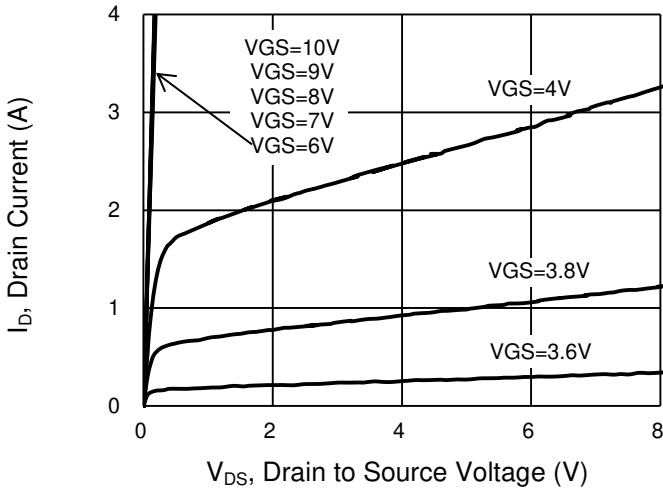
ORDERING INFORMATION

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

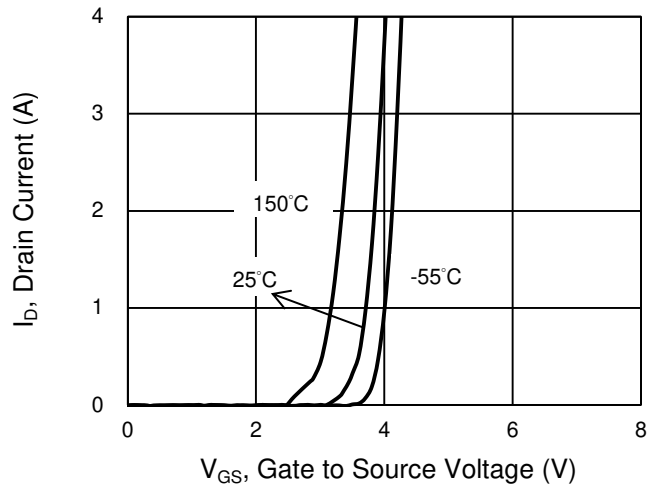
CHARACTERISTICS CURVES

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

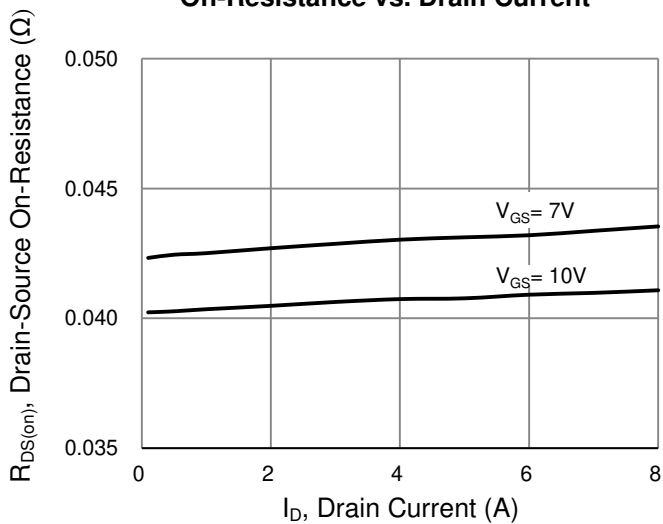
Output Characteristics



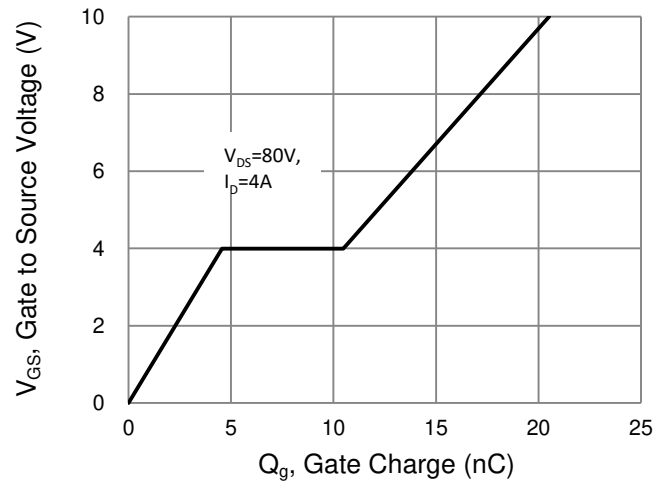
Transfer Characteristics



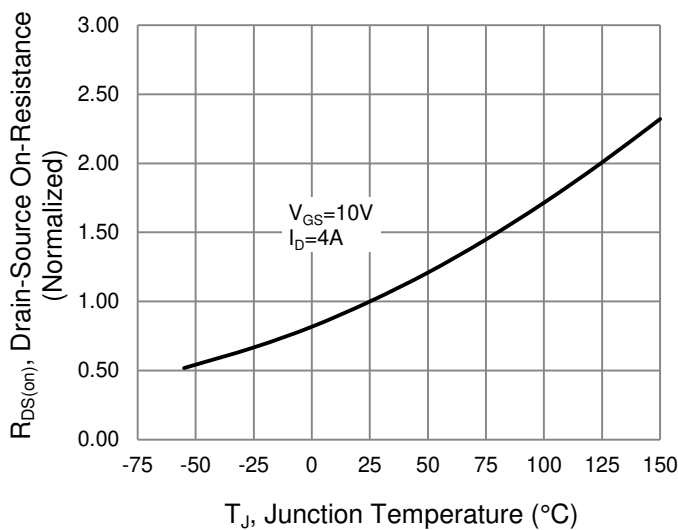
On-Resistance vs. Drain Current



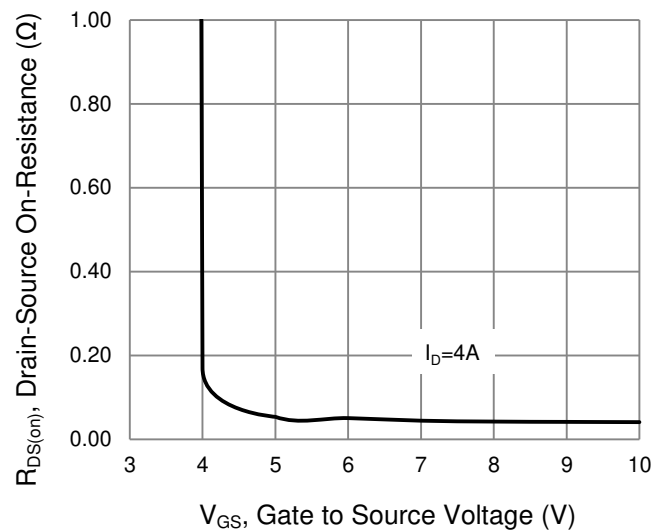
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



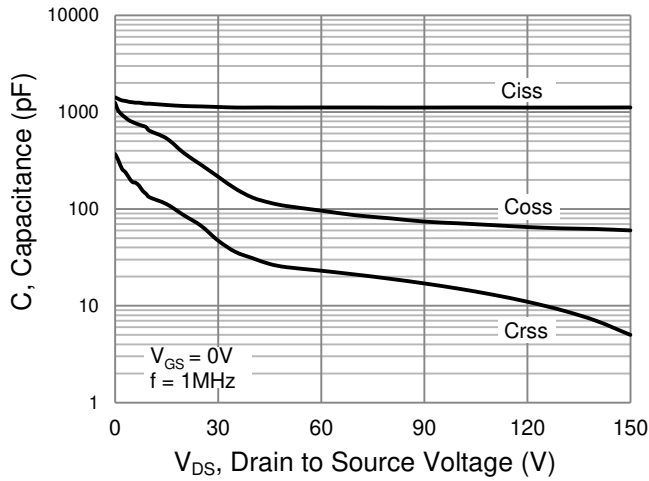
On-Resistance vs. Gate-Source Voltage



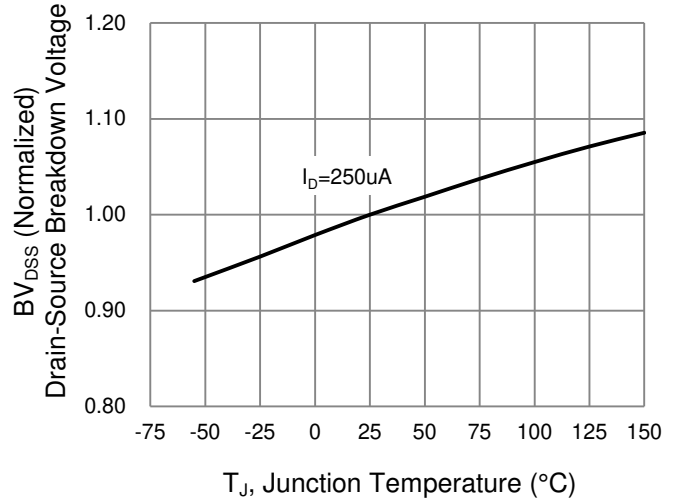
CHARACTERISTICS CURVES

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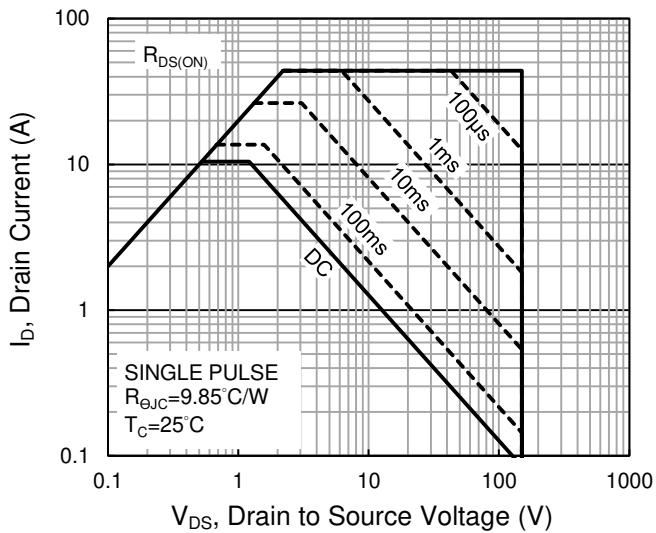
Capacitance vs. Drain-Source Voltage



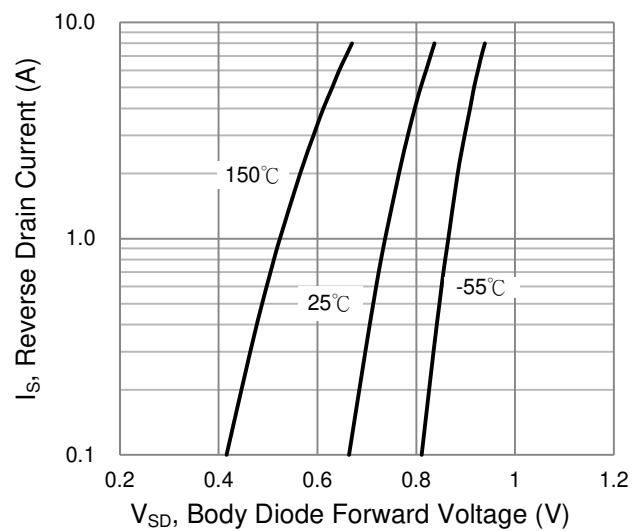
BV_{DSS} vs. Junction Temperature



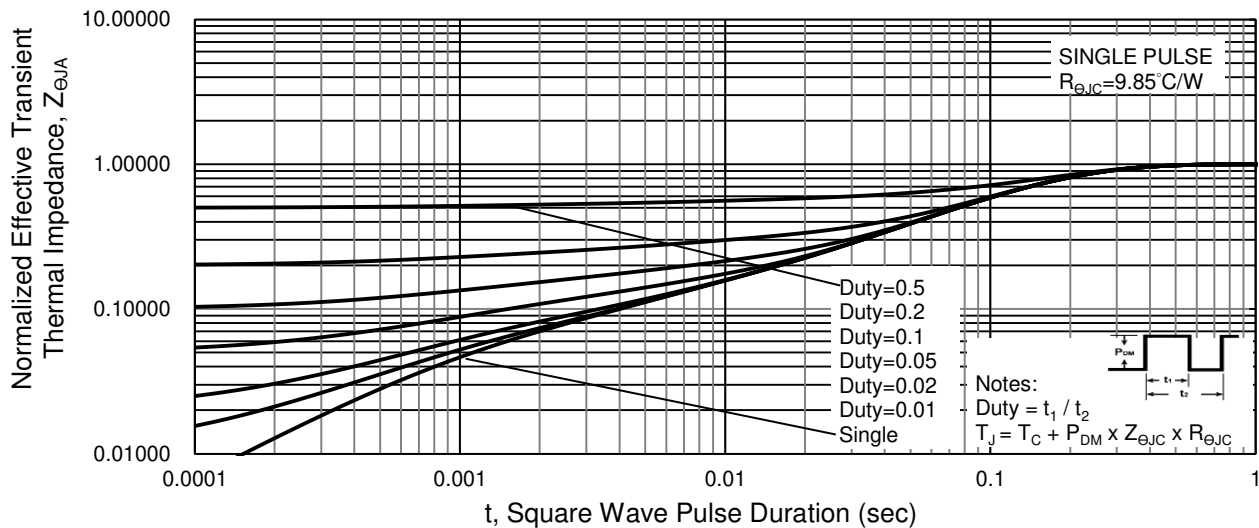
Maximum Safe Operating Area, Junction-to-Ambient



Source-Drain Diode Forward Current vs. Voltage

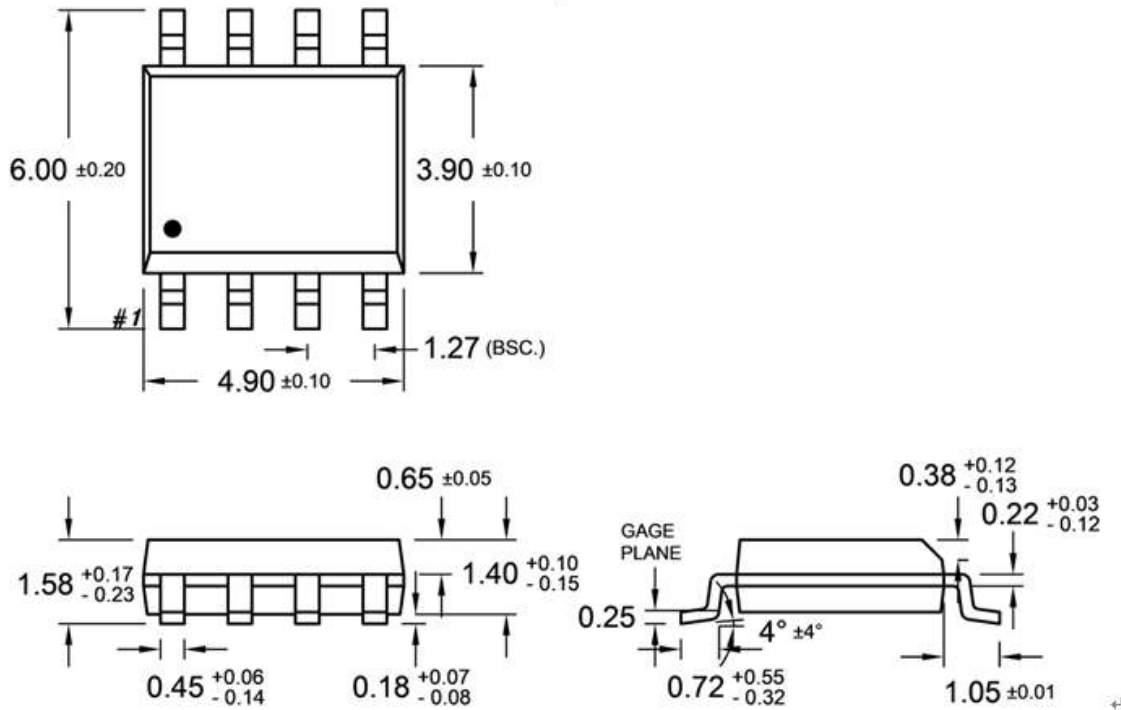


Normalized Thermal Transient Impedance, Junction-to-Ambient

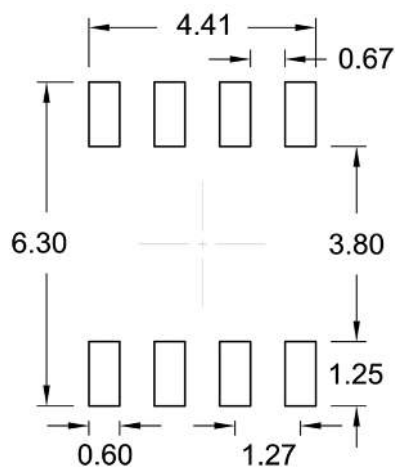


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

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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