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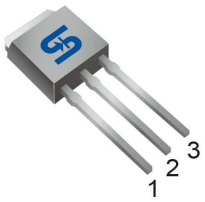
TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

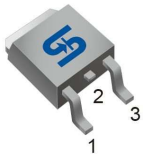
TSM8N50

500V N-Channel MOSFET

TO-251 (IPAK)



TO-252 (DPAK)



Pin Definition:
1. Gate
2. Drain
3. Source

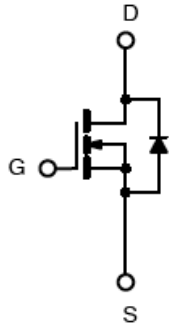
PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$(Ω)	I_D (A)
500	0.85 @ V_{GS} =10V	7.2

Features

- Low On-Resistance.
- High power and current handing capability.

Block Diagram



N-Channel MOSFET

Ordering Information

Part No.	Package	Packing
TSM8N50CH C5G	TO-251	75pcs / Tube
TSM8N50CP ROG	TO-252	2.5Kpcs / 13" Reel

Note: "G" denotes for Halogen Free

Absolute Maximum Rating (Tc = 25°C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	500	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current	Tc = 25°C	I_D	7.2	A
	Tc = 100°C		4.3	A
Pulsed Drain Current (Note 1)		I_{DM}	28.8	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	181	mJ
Total Power Dissipation @ T_C = 25°C		P_{TOT}	89	W
Operating Junction Temperature		T_J	150	°C
Storage Temperature Range		T_{STG}	-55 to +150	°C

Note1: Repetitive Rating : Pulse width limited by maximum junction temperature.
Note2: L = 7mH, I_{AS} = 7.2A, V_{DD} = 50V, Starting T_J = 25°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Case	$R\Theta_{JC}$	1.4	°C/W
Thermal Resistance - Junction to Ambient	$R\Theta_{JA}$	50	

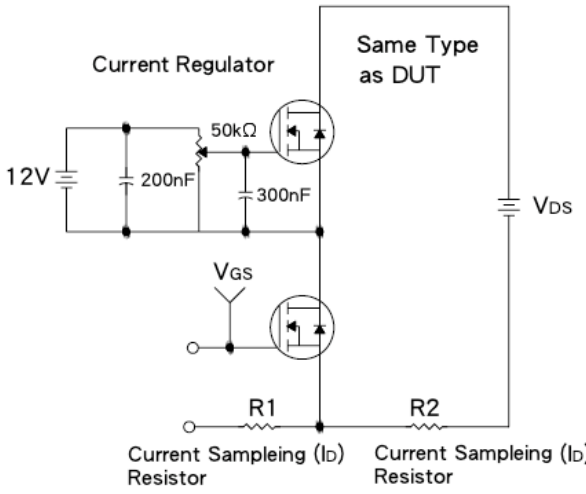
TSM8N50
500V N-Channel MOSFET

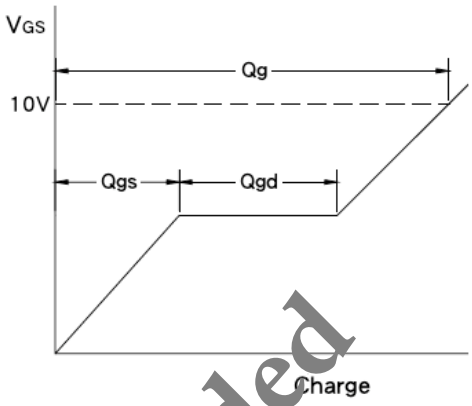
Electrical Specifications (Tc = 25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250uA	BV_{DSS}	500	--	--	V
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 3.6A	$R_{DS(ON)}$	--	0.7	0.85	Ω
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	$V_{GS(TH)}$	2.0	3.0	4.0	V
Zero Gate Voltage Drain Current	V_{DS} = 500V, V_{GS} = 0V	I_{DSS}	--	--	1	uA
Gate Body Leakage	V_{GS} = ±30V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Dynamic (Note a)						
Total Gate Charge	V_{DD} = 400V, I_D = 7A, V_{GS} = 10V	Q_g	--	26.6	--	nC
Gate-Source Charge		Q_{gs}	--	5.4	--	
Gate-Drain Charge		Q_{gd}	--	6.82	--	
Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	1595	--	pF
Output Capacitance		C_{oss}	--	127.4	--	
Reverse Transfer Capacitance		C_{rss}	--	14.5	--	
Switching (Note a)						
Turn-On Delay Time	V_{GS} = 10V, I_D = 7A, V_{DD} = 250V, R_{GEN} = 9.1Ω	$t_{d(on)}$	--	22	--	nS
Turn-On Rise Time		t_r	--	6.8	--	
Turn-Off Delay Time		$t_{d(off)}$	--	42	--	
Turn-Off Fall Time		t_f	--	4.8	--	
Source-Drain Diode Ratings and Characteristic						
Source Current		I_S	--	--	7	A
Diode Forward Voltage	I_S =7A, V_{GS} = 0V	V_{SD}	--	--	1.5	V

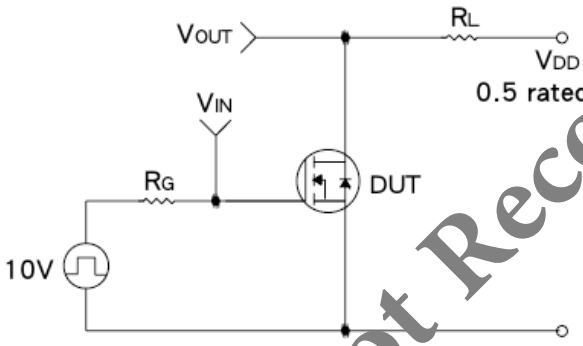
Note a: Pulse Test : Pulse Width < 300μs, Duty Cycle < 2%.

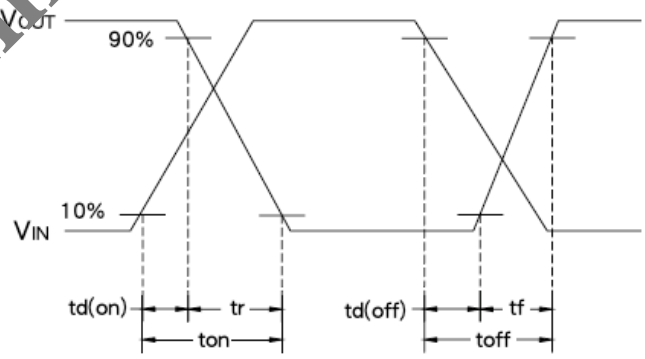
Gate Charge Test Circuit & Waveform



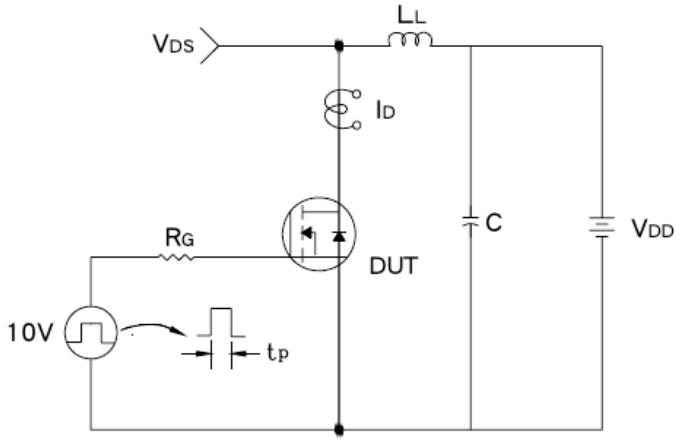


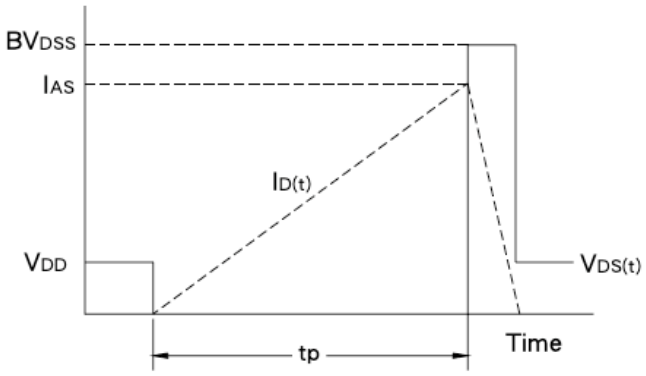
Resistive Switching Test Circuit & Waveform



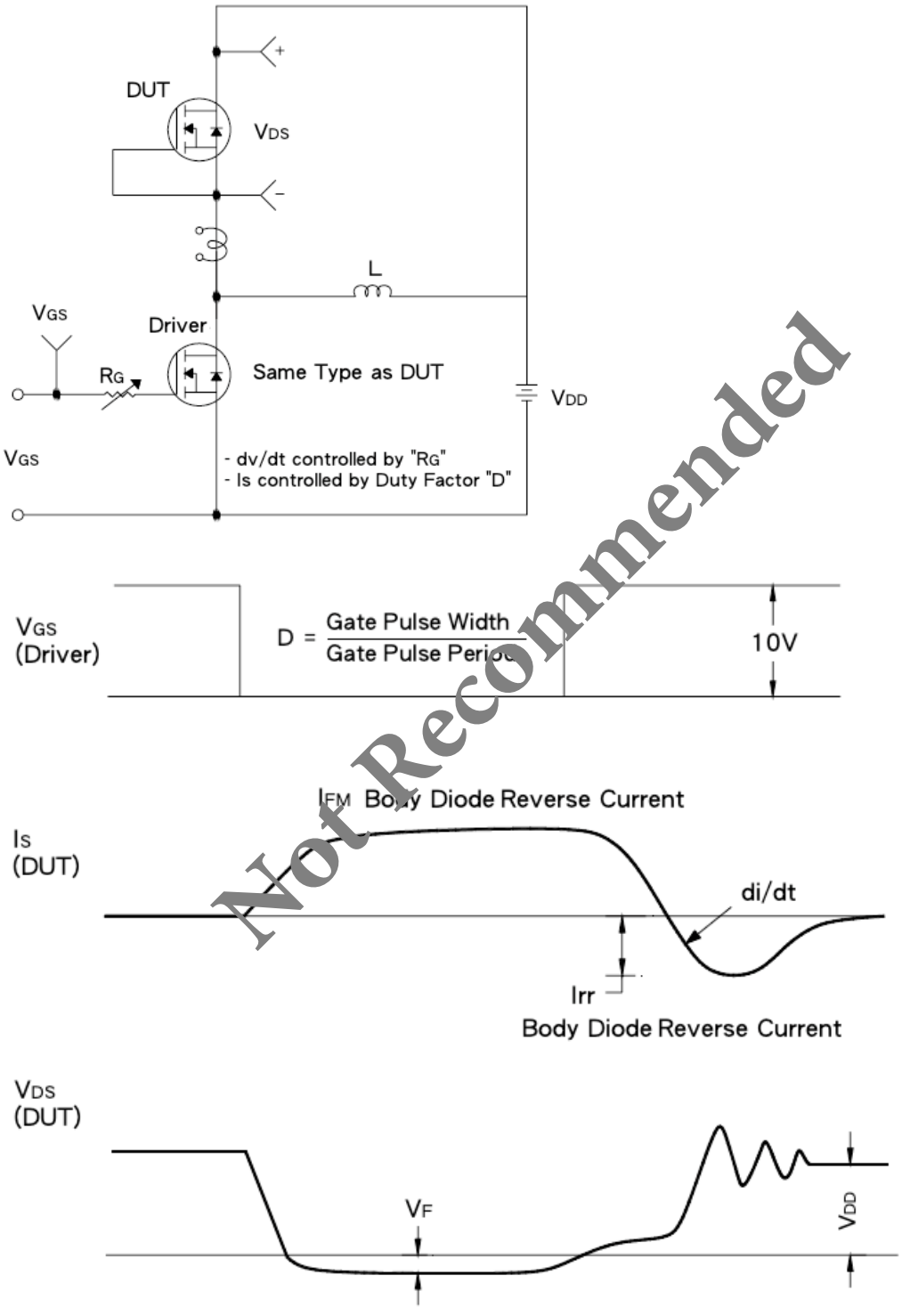


E_{AS} Test Circuit & Waveform



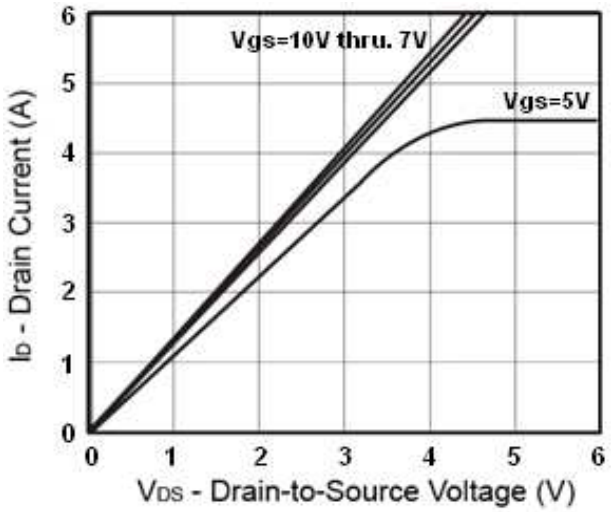


Diode Reverse Recovery Time Test Circuit & Waveform

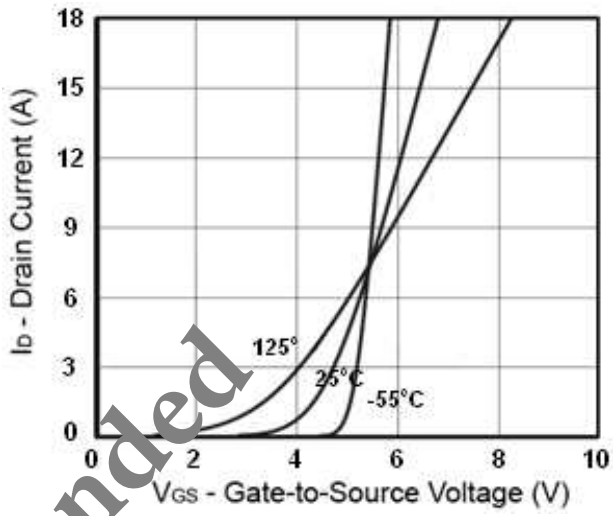


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

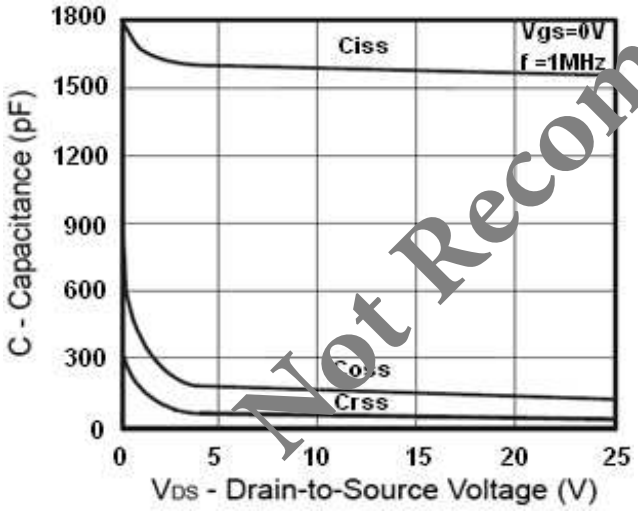
Output Characteristics



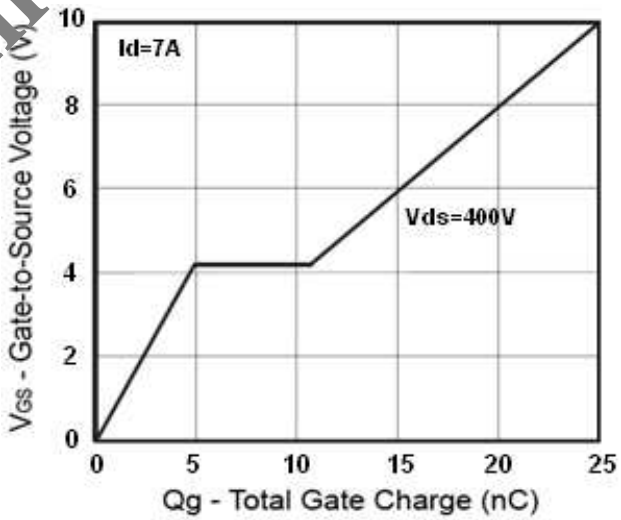
Transfer Characteristics



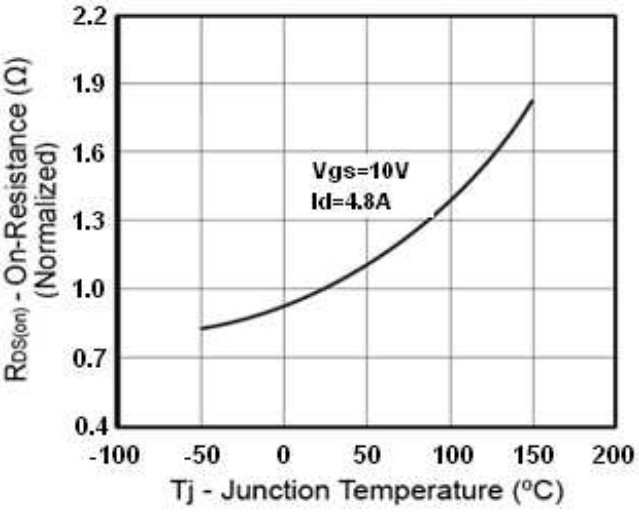
Capacitance



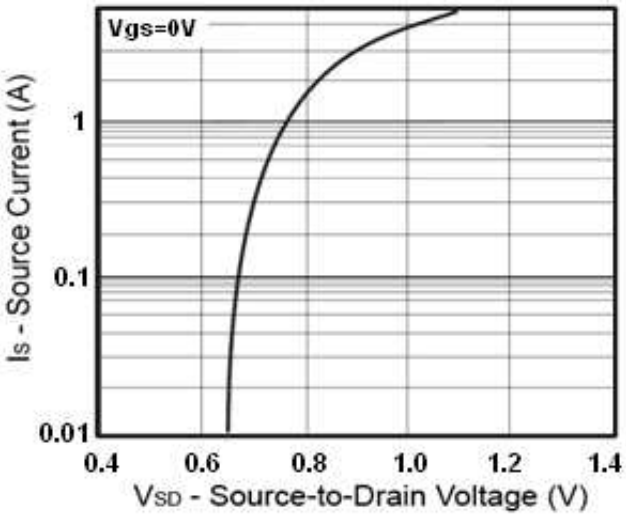
Gate Charge



On-Resistance vs. Junction Temperature

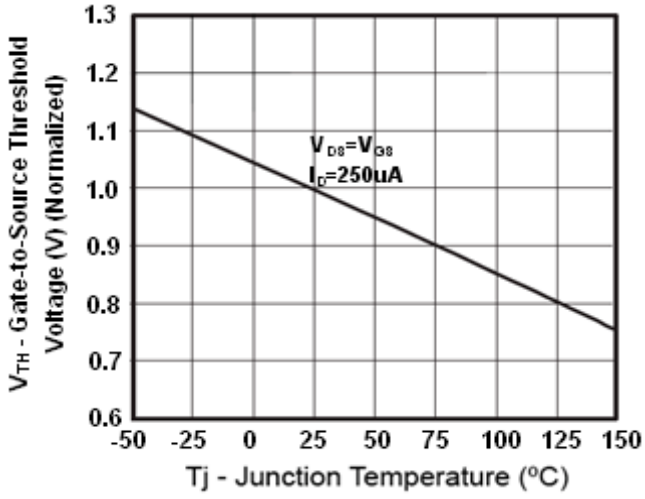


Source-Drain Diode Forward Voltage

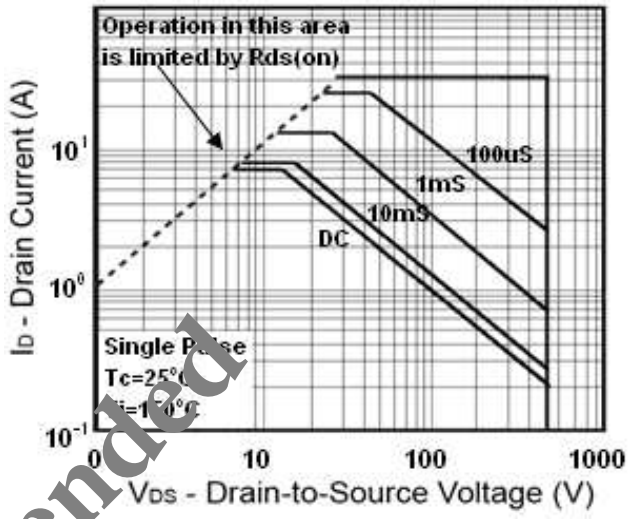


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

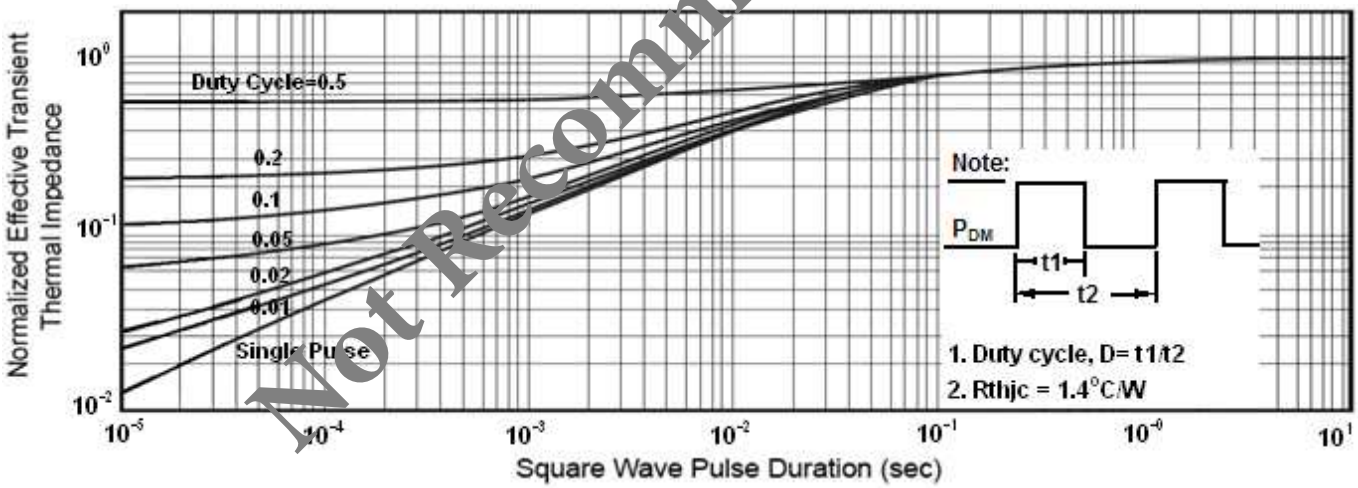
Gate Threshold vs. Junction Temperature



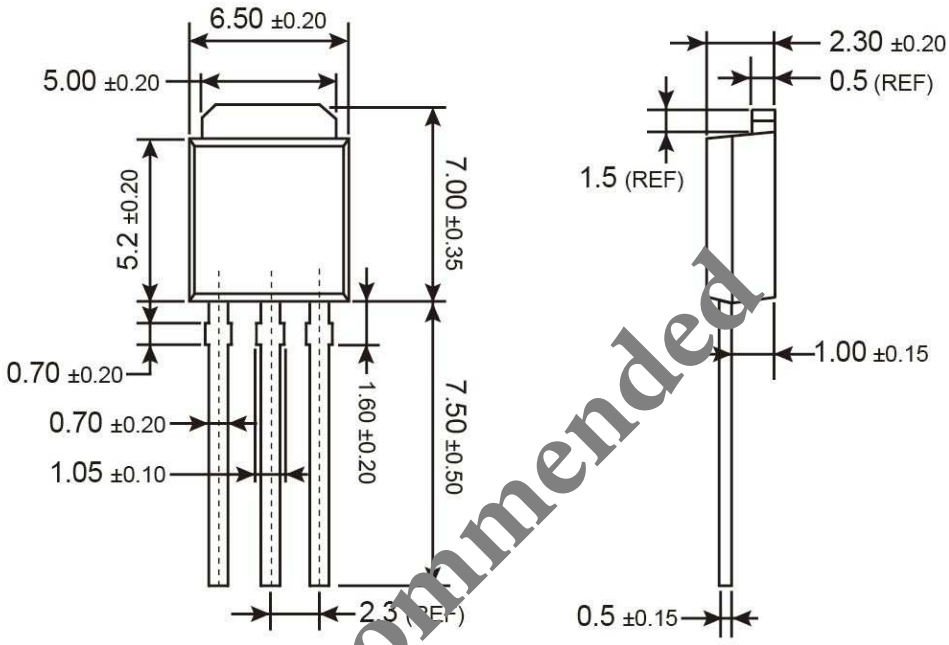
Maximum Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

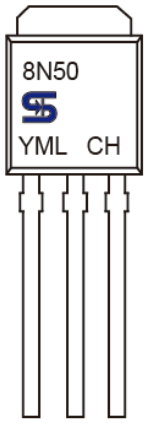


TO-251 Mechanical Drawing



Unit: Millimeters

Marking Diagram

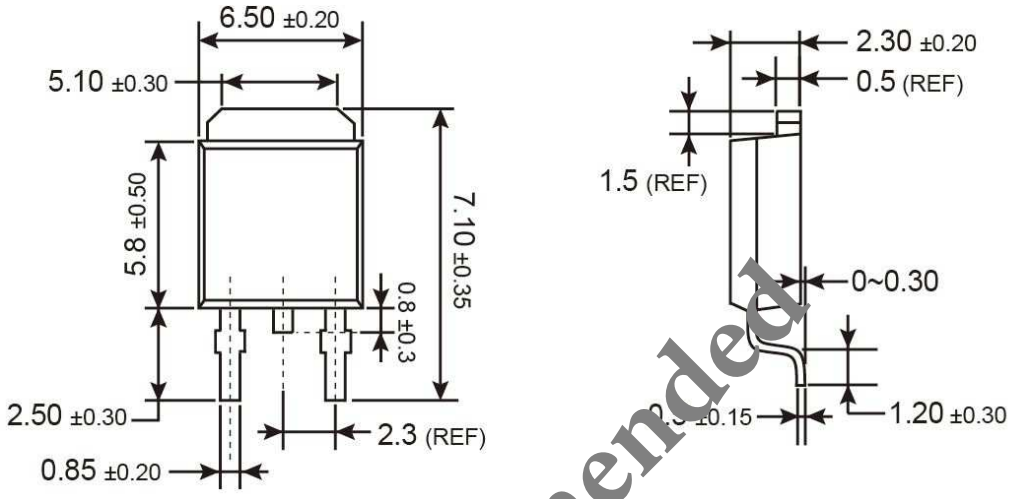


Y = Year Code
M = Month Code for Halogen Free Product

O	=Jan	**P**	=Feb	**Q**	=Mar	**R**	=Apr
S	=May	**T**	=Jun	**U**	=Jul	**V**	=Aug
W	=Sep	**X**	=Oct	**Y**	=Nov	**Z**	=Dec

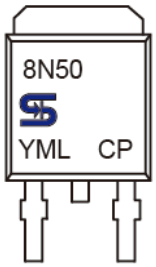
L = Lot Code

TO-252 Mechanical Drawing



Unit: Millimeters

Marking Diagram



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