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.

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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

N-Channel Power MOSFET

450V, 0.5A, 4.25Ω

FEATURES

- Low gate charge @typical 6.5nC
- Low Crss @ typical 6.5pF
- Avalanche energy specified
- Improved dV/dt capability
- Pb-free plating
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition

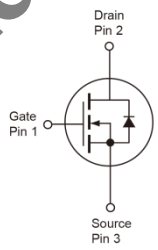
KEY PERFORMANCE PARAMETERS		
PARAMETER	**VALUE**	**UNIT**
V_{DS}	450	V
$R_{DS(on)}$ (max)	4.25	Ω
Q_g	6.5	nC

Pb-Free RoHS COMPLIANT HALOGEN FREE

APPLICATION

- Power Supply
- Lighting

SOT-223 **TO-92**



Notes: MSL 3 (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}	450	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current (Note 1)	T_C = 25°C	I_D	0.5	A
Pulsed Drain Current (Note 2)		I_{DM}	4	A
Total Power Dissipation @ T_C = 25°C	TO-92	P_{DTOT}	2	W
	SOT-223		15	
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	108	mJ
Single Pulsed Avalanche Current (Note 3)		I_{AS}	1.6	A
Repetitive Avalanche Energy (Note 3)		E_{AR}	0.25	mJ
Repetitive Avalanche Current (Note 3)		I_{AR}	0.5	A
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	°C

THERMAL PERFORMANCE				
PARAMETER		**SYMBOL**	**Limit**	**UNIT**
Junction to Lead Thermal Resistance	TO-92	$R_{\Theta JL}$	50	°C/W
Junction to Case Thermal Resistance	SOT-223	$R_{\Theta JC}$	8.5	
Junction to Ambient Thermal Resistance	TO-92	$R_{\Theta JA}$	140	
	SOT-223		60	

Notes: $R_{\Theta JA}$ 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. $R_{\Theta JA}$ shown below for single device operation on FR-4 PCB with minimum recommended footprint in still air.

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)						
PARAMETER	**CONDITIONS**	**SYMBOL**	**MIN**	**TYP**	**MAX**	**UNIT**
Static (Note 4)						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	BV_{DSS}	450	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	$V_{GS(TH)}$	2.3	--	4.25	V
Gate Body Leakage	V_{GS} = ±30V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = 450V, V_{GS} = 0V	I_{DSS}	--	--	10	μA
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 0.25A	$R_{DS(on)}$	--	3.7	4.25	Ω
Dynamic (Note 5)						
Total Gate Charge	V_{DS} = 360V, I_D = 0.5A, V_{GS} = 10V	Q_g	--	6.5	10	nC
Gate-Source Charge		Q_{gs}	--	1.3	--	
Gate-Drain Charge		Q_{gd}	--	3.2	--	
Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	235	--	pF
Output Capacitance		C_{oss}	--	29	--	
Reverse Transfer Capacitance		C_{rss}		6.5		
Switching (Note 6)						
Turn-On Delay Time	V_{DD} = 225V, R_{GEN} = 25Ω, I_D = 0.5A, V_{GS} = 10V,	$t_{d(on)}$	--	14.7	--	ns
Turn-On Rise Time		t_r	--	32.8	--	
Turn-Off Delay Time		$t_{d(off)}$	--	25.2	--	
Turn-Off Fall Time		t_f	--	23.7	--	
Source-Drain Diode (Note 4)						
Maximum Continuous Drain-Source Diode Forward Current		I_S	--	--	0.5	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}	--	--	4	A
Forward On Voltage	I_S = 0.5A, V_{GS} = 0V	V_{SD}	--	--	1.4	V
Reverse Recovery Time	V_{GS} = 0V, I_S = 1A dI_F/dt = 100A/μs	t_{rr}	--	110	--	ns
Reverse Recovery Charge		Q_{rr}	--	0.35	--	μC

Notes:

1. Current limited by package.
2. Pulse width limited by the maximum junction temperature.
3. L = 75mH, I_{AS} = 1.6A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
4. Pulse test: PW ≤ 300μs, duty cycle ≤ 2%.
5. For DESIGN AID ONLY, not subject to production testing.
6. Switching time is essentially independent of operating temperature.

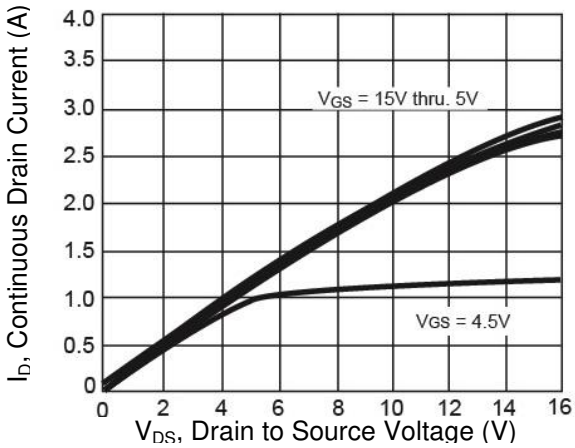
ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM1N45CT B0G	TO-92	1,000pcs / Bulk
TSM1N45CT A3G	TO-92	2,000pcs / Ammo
TSM1N45CW RPG	SOT-223	2,500pcs / 13” Reel

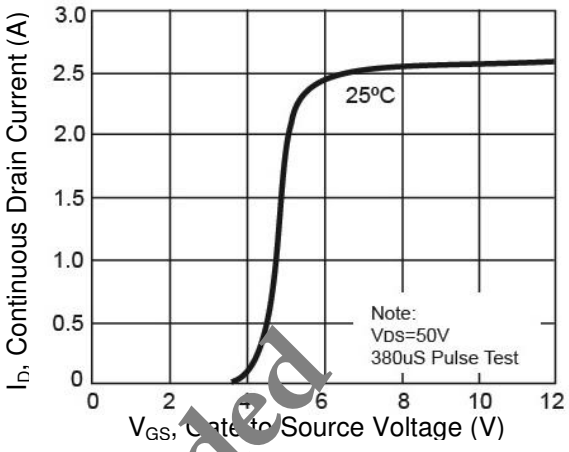
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

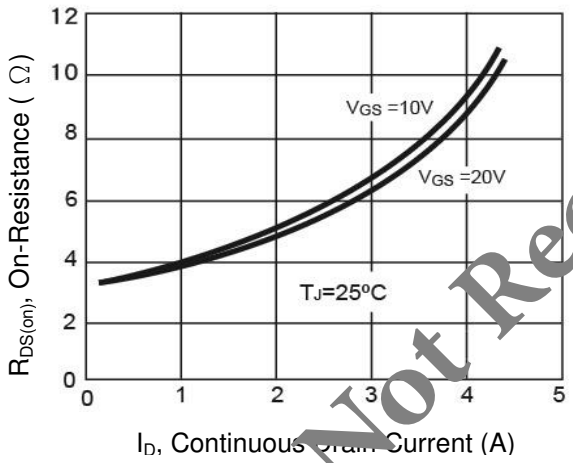
Output Characteristics



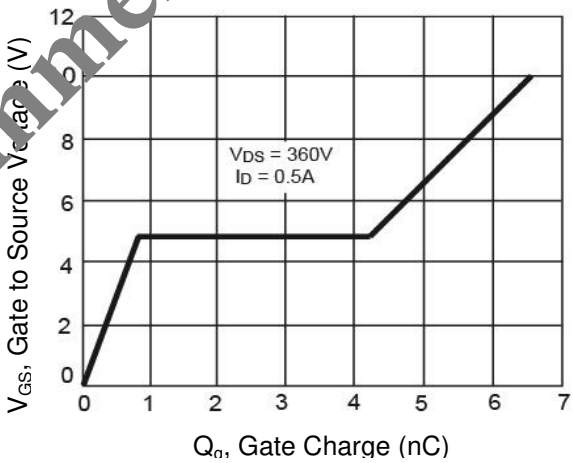
Transfer Characteristics



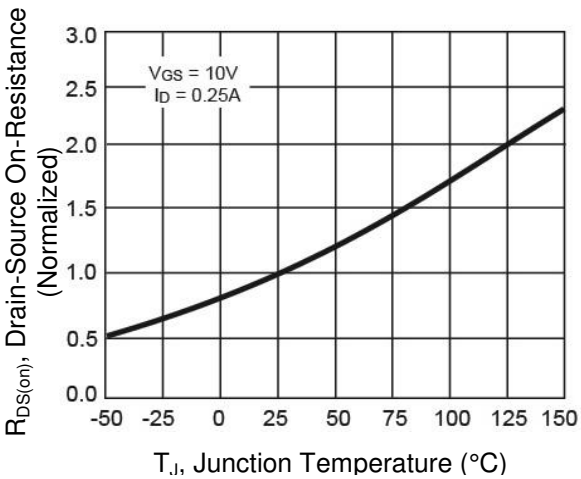
On-Resistance vs. Drain Current



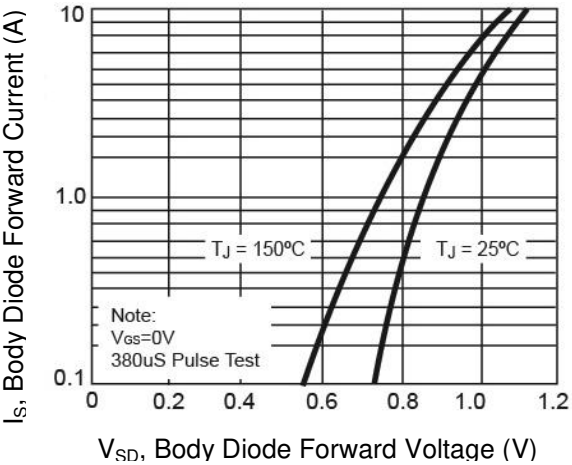
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



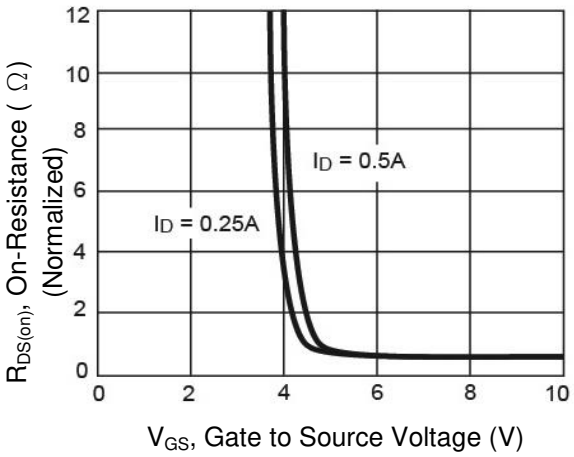
Source-Drain Diode Forward Current vs. Voltage



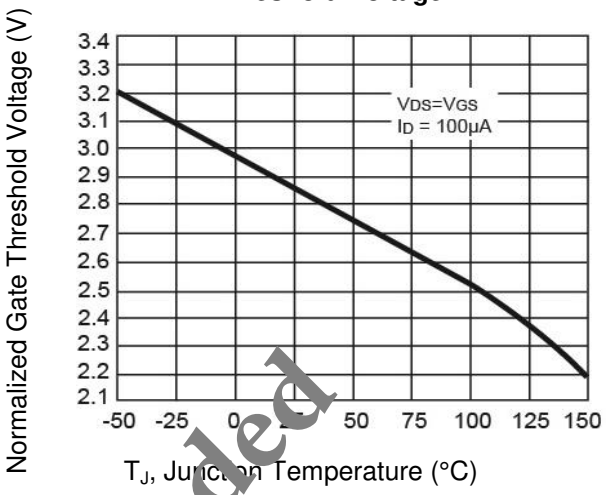
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

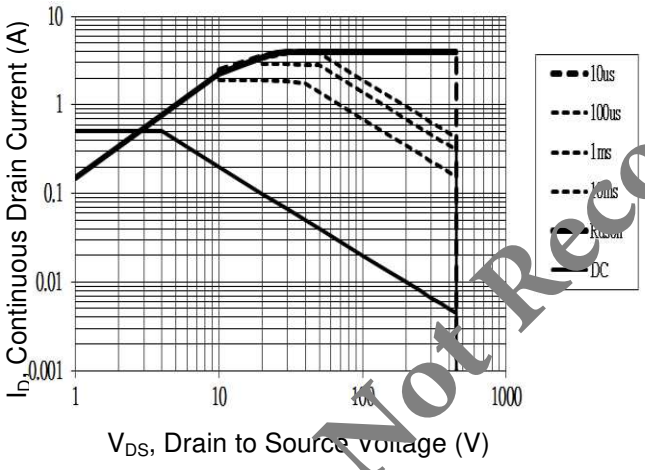
On-Resistance vs. Gate-Source Voltage



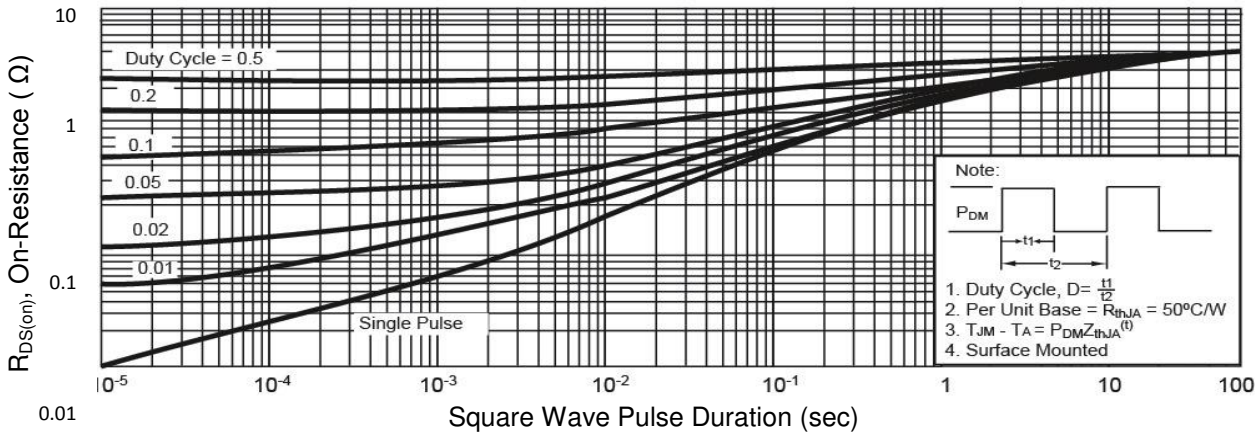
Threshold Voltage



Maximum Safe Operating Area

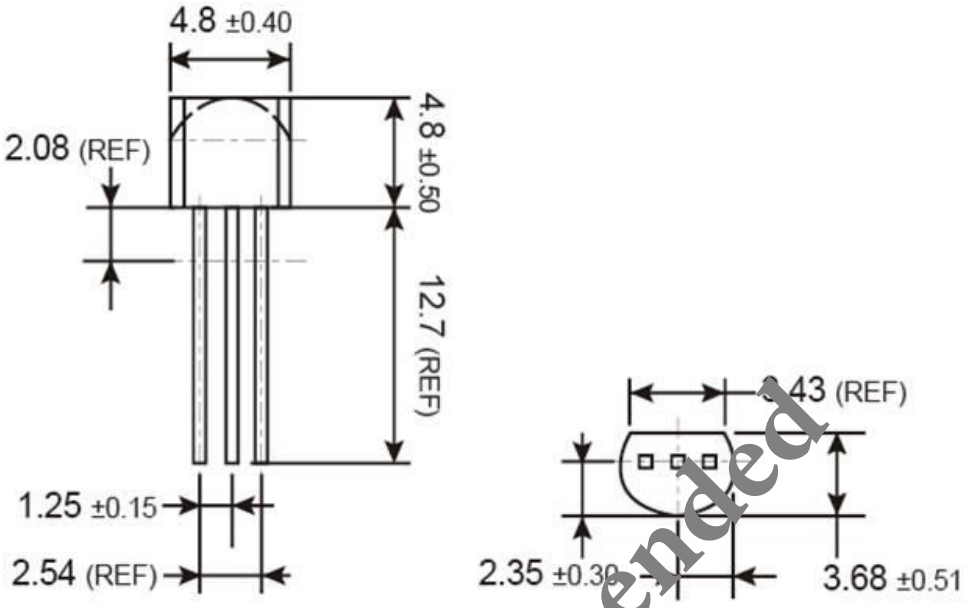


Thermal Transient Impedance, Junction-to-Ambient



PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-92



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

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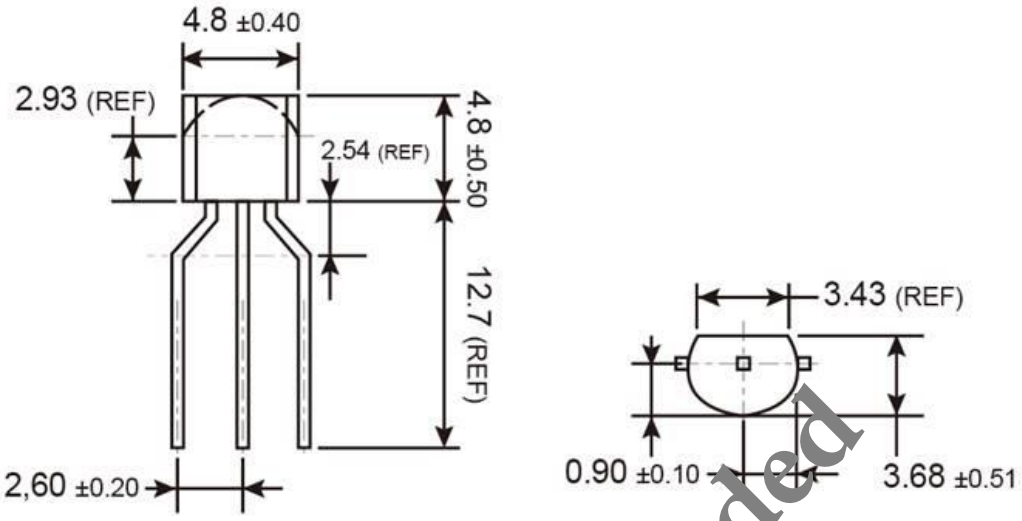
TO-92



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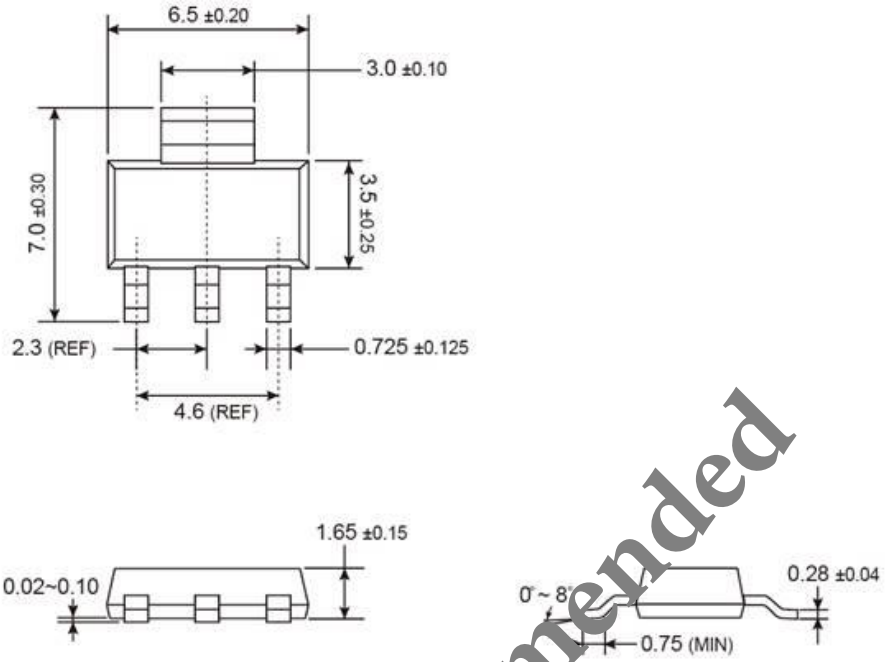
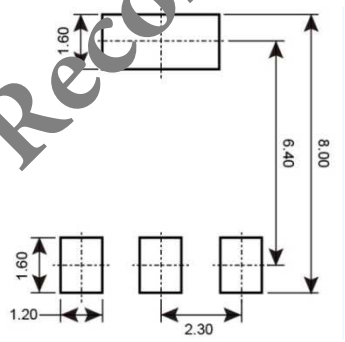
PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

SOT-223



SUGGESTED PAD LAYOUT



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