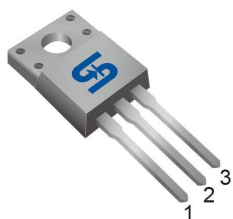
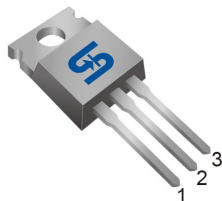


ITO-220



TO-220



Pin Definition:

1. Gate
2. Drain
3. Source

Key Parameter Performance

Parameter	Value	Unit
V_{DS}	500	V
$R_{DS(on)}$ (max)	0.48	
Q_g	31	nC

Features

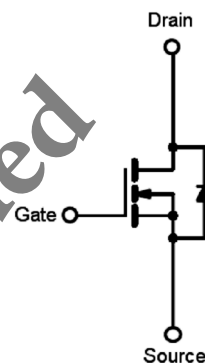
- Improved dv/dt capability
- 100% EAS Guaranteed

Ordering Information

Part No.	Package	Packing
TSM13N50ACI C0G	ITO-220	50pcs / Tube
TSM13N50ACZ C0G	TO-220	50pcs / Tube

Note: %G+denotes for Halogen- and Antimony-free as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds

Block Diagram



N-Channel MOSFET

Absolute Maximum Ratings ($T_C=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	500	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current ^(Note 1)	I_D	$T_C = 25^{\circ}C$	13
		$T_C = 100^{\circ}C$	8
Pulsed Drain Current ^(Note 1,2,3)	I_{DM}	52	A
Total Power Dissipation @ $T_C=25^{\circ}C$	P_{DTOT}	52	W
Single Pulsed Avalanche Energy ^(Note 4)	E_{AS}	542	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150	$^{\circ}C$

Thermal Performance

Parameter	Symbol	Limit		Unit
		ITO220	TO-220	
Junction to Case Thermal Resistance	R_{JC}	2.4	0.6	$^{\circ}C/W$
Junction to Ambient Thermal Resistance	R_{JA}	65	62.5	$^{\circ}C/W$

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

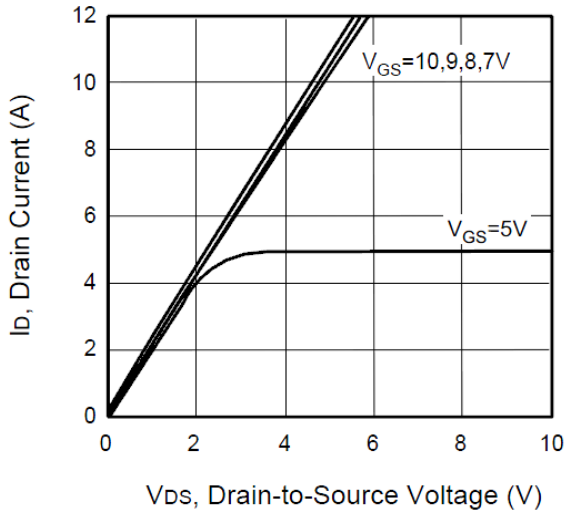
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static (Note 5)						
Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	BV _{DSS}	500	--	--	V
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	V _{GS(TH)}	2	--	4	V
Gate Body Leakage	V _{GS} = ±30V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V _{DS} = 500V, V _{GS} = 0V	I _{DSS}	--	--	1	μA
Drain-Source On-State Resistance	V _{GS} = 10V, I _D = 6.5A	R _{DS(ON)}	--	0.38	0.48	
Dynamic (Note 6)						
Total Gate Charge	V _{DS} = 400V, I _D = 13A, V _{GS} = 10V	Q _g	--	31	40	nC
Gate-Source Charge		Q _{gs}	--	11	--	
Gate-Drain Charge		Q _{gd}	--	7	--	
Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	C _{iss}	--	1965	--	pF
Output Capacitance		C _{oss}	--	185	--	
Reverse Transfer Capacitance		C _{rss}	--	11	--	
Switching (Note 6)						
Turn-On Delay Time	V _{DD} = 200V R _{GEN} = 25 I _D = 13A, V _{GS} = 10V	t _{d(on)}	--	32	--	ns
Turn-On Rise Time		t _r	--	18	--	
Turn-Off Delay Time		t _{d(off)}	--	79	--	
Turn-Off Fall Time		t _f	--	16	--	
Source-Drain Diode						
Forward On Voltage	I _S = 13A, V _{GS} = 0V	V _{SD}	--	--	1.4	V

Notes:

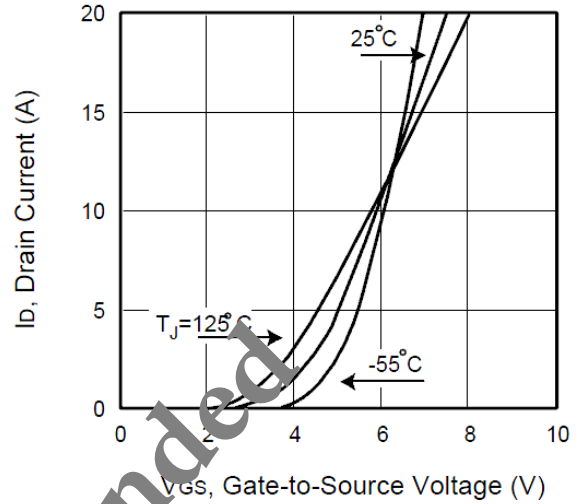
1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. Pulse width limited by safe operating area
4. L=15mH, I_{AS}=8.5A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
5. Pulse test: pulse width ≤ 300μS, duty cycle ≤ 2%
6. Guaranteed by design, not subject to production testing.

Electrical Characteristics Curves

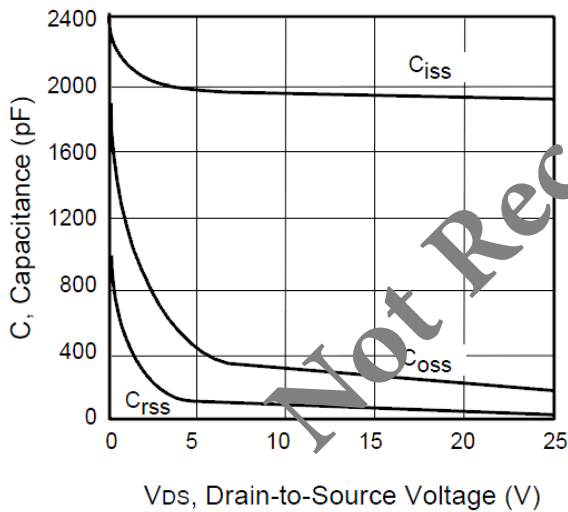
Output Characteristics



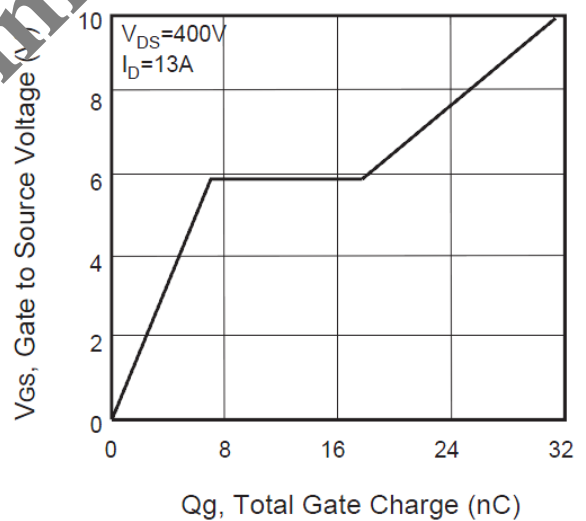
Transfer Characteristics



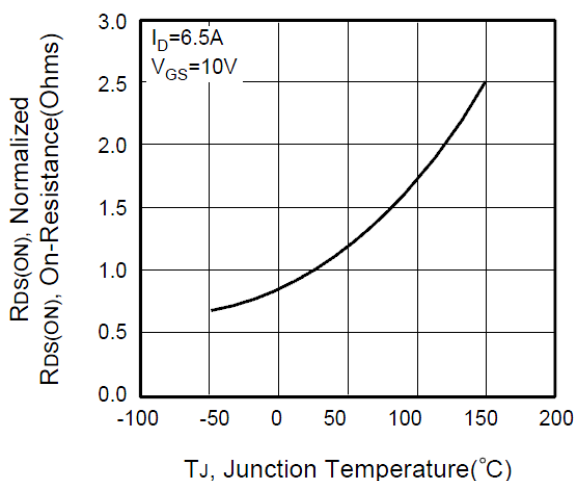
Capacitance



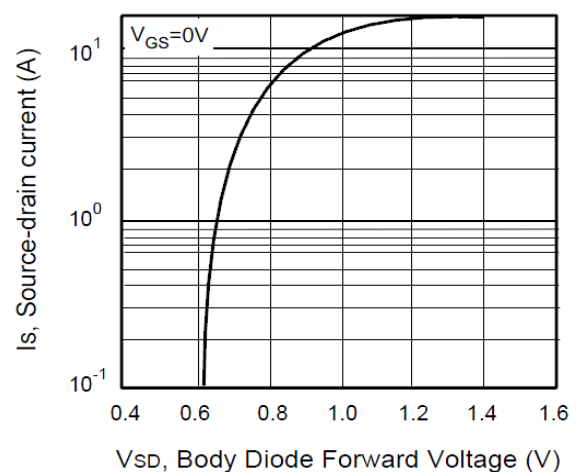
Gate Charge



On-Resistance vs. Junction Temperature

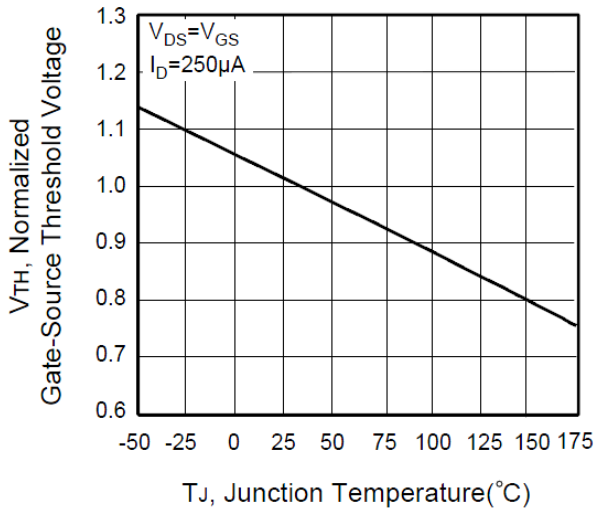


Source-Drain Diode Forward Voltage

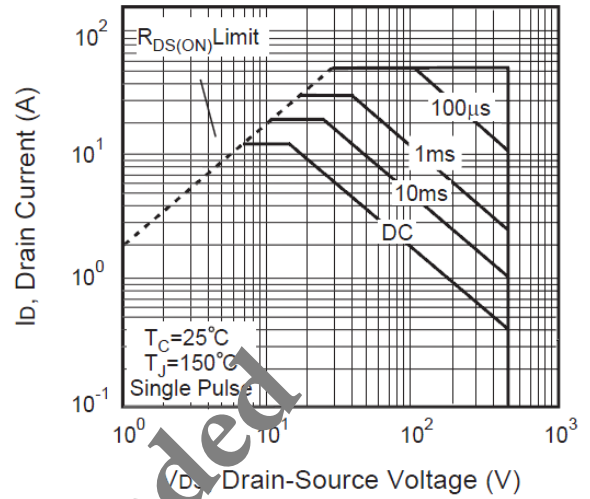


Electrical Characteristics Curves

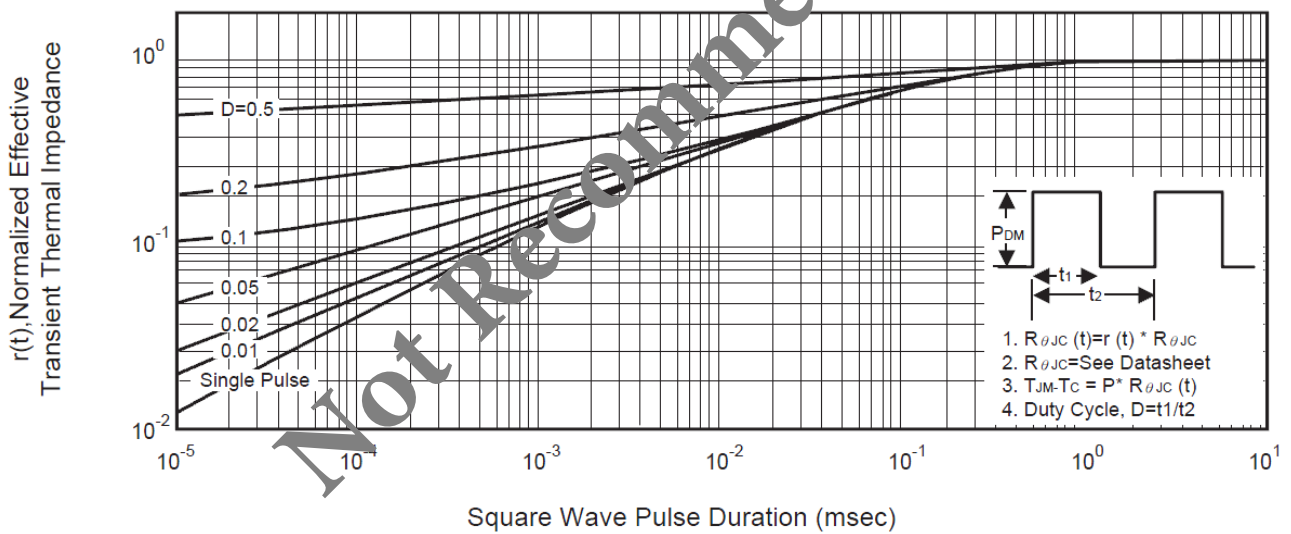
Threshold Voltage vs. Junction Temperature



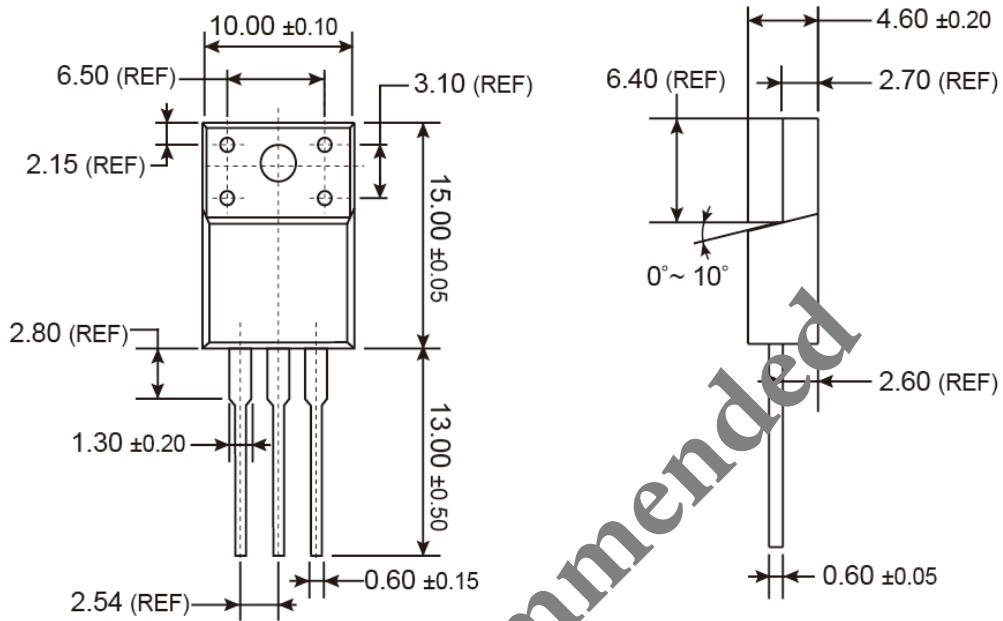
Maximum Safe Operating Area



Normalized Thermal Transient Impedance Curve

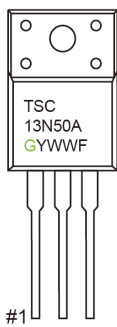


ITO-220 Mechanical Drawing



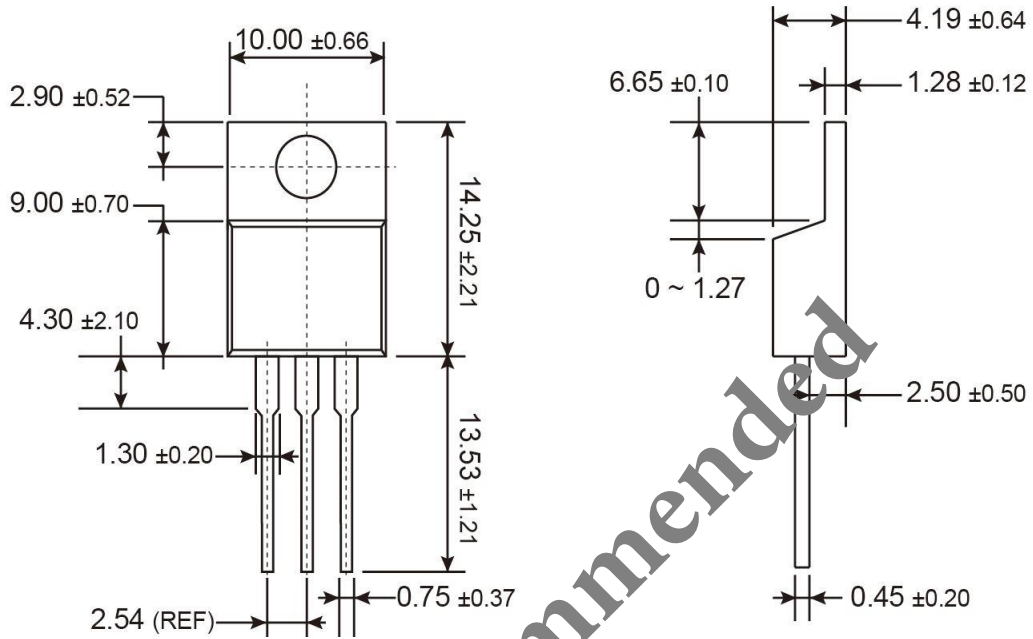
Unit: Millimeters

Marking Diagram



- G** = Halogen Free
- YY** = Year Code
- WW** = Week Code (01~52)
- F** = Factory Code

TO-220 Mechanical Drawing



Unit: Millimeters

Marking Diagram



- G** = Halogen Free
- Y** = Year Code
- W** = Week Code (01~52)
- F** = Factory Code

Not Recommended

Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.