

**Pin Definition:**

1. Gate
2. Drain
3. Source

**Key Parameter Performance**

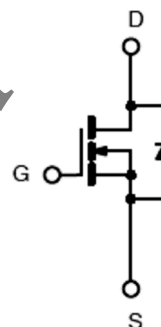
Parameter	Value	Unit
$V_{DS}$	600	V
$R_{DS(on)}$ (max)	1.6	
$Q_g$	18.3	nC

**Ordering Information**

Part No.	Package	Packing
TSM6NB60CZ C0G	TO-220	50pcs / Tube
TSM6NB60CI C0G	ITO-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** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Limit		Unit
		TO-220	ITO-220	
Drain-Source Voltage	$V_{DS}$	600		V
Gate-Source Voltage	$V_{GS}$	±30		V
Continuous Drain Current (Note 1)	$I_D$	$T_C = 25^\circ\text{C}$		A
		$T_C = 100^\circ\text{C}$		
Pulsed Drain Current (Note 2)	$I_{DM}$	24		A
Total Power Dissipation @ $T_C=25^\circ\text{C}$	$P_{DTOT}$	125	40	W
Single Pulsed Avalanche Energy (Note 3)	$E_{AS}$	83		mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	- 55 to +150		$^\circ\text{C}$

**Thermal Performance**

Parameter	Symbol	Limit		Unit
Junction to Case Thermal Resistance	$R_{JC}$	1	3.1	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance	$R_{JA}$	62.5	65	$^\circ\text{C/W}$



### Electrical Specifications (T<sub>C</sub> = 25°C unless otherwise noted)

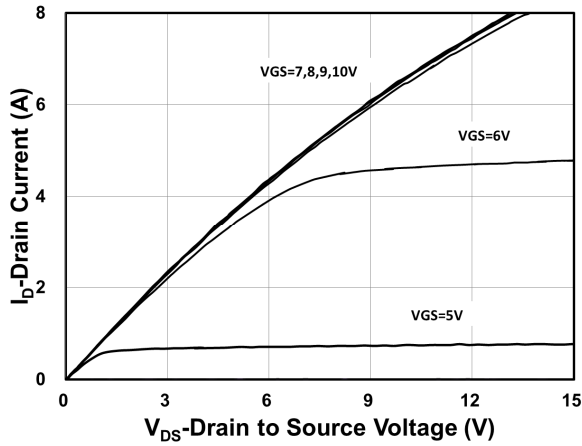
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b> (Note 4)						
Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	BV <sub>DSS</sub>	600	--	--	V
Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	V <sub>GS(TH)</sub>	2.5	3.6	4.5	V
Gate Body Leakage	V <sub>GS</sub> = ±30V, V <sub>DS</sub> = 0V	I <sub>GSS</sub>	--	--	±100	nA
Zero Gate Voltage Drain Current	V <sub>DS</sub> = 600V, V <sub>GS</sub> = 0V	I <sub>DSS</sub>	--	--	10	μA
Drain-Source On-State Resistance	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3A	R <sub>DS(on)</sub>	--	1.12	1.6	
<b>Dynamic</b> (Note 5,6)						
Total Gate Charge	V <sub>DS</sub> = 480V, I <sub>D</sub> = 6A, V <sub>GS</sub> = 10V	Q <sub>g</sub>	--	18.3	--	nC
Gate-Source Charge		Q <sub>gs</sub>	--	5.26	--	
Gate-Drain Charge		Q <sub>gd</sub>	--	6.84	--	
Input Capacitance	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1.0MHz	C <sub>iss</sub>	--	872	--	pF
Output Capacitance		C <sub>oss</sub>	--	104	--	
Reverse Transfer Capacitance		C <sub>rss</sub>	--	15	--	
<b>Switching</b> (Note 5,6)						
Turn-On Delay Time	V <sub>DD</sub> = 30V, R <sub>GEN</sub> = 25Ω, I <sub>D</sub> = 6A, V <sub>GS</sub> = 10V,	t <sub>d(on)</sub>	--	23	--	ns
Turn-On Rise Time		t <sub>r</sub>	--	9.4	--	
Turn-Off Delay Time		t <sub>d(off)</sub>	--	35.6	--	
Turn-Off Fall Time		t <sub>f</sub>	--	6.8	--	
<b>Source-Drain Diode</b>						
Forward On Voltage	I <sub>S</sub> = 6A, V <sub>GS</sub> = 0V	V <sub>SD</sub>	--	--	1.4	V

#### Notes:

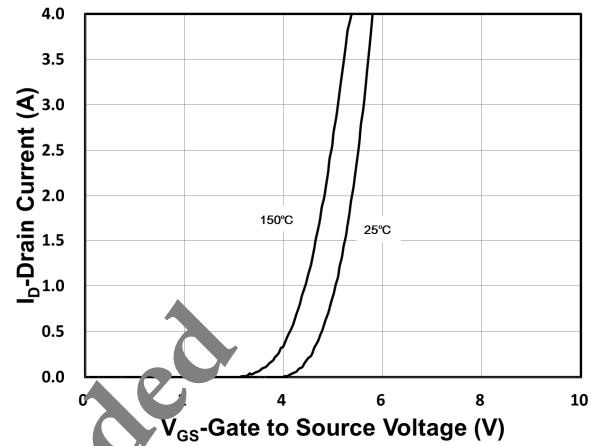
1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. L = 10mH, I<sub>AS</sub> = 3.9A, V<sub>DD</sub> = 50V, R<sub>G</sub> = 25Ω, Starting T<sub>J</sub> = 25°C
4. Pulse test: PW ≤ 300μs, duty cycle ≤ 2%
5. For DESIGN AID ONLY, not subject to production testing.
6. Switching time is essentially independent of operating temperature.

**Electrical Characteristics Curves**

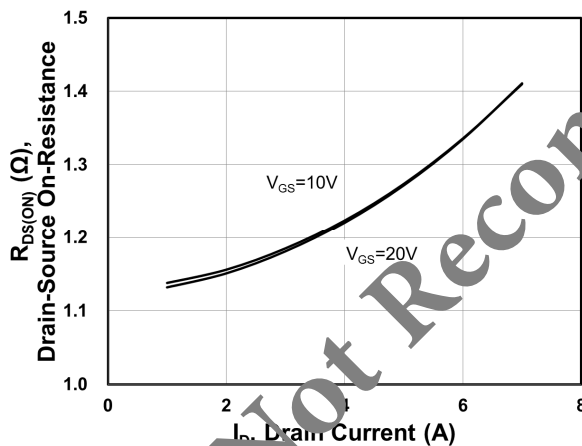
**Output Characteristics**



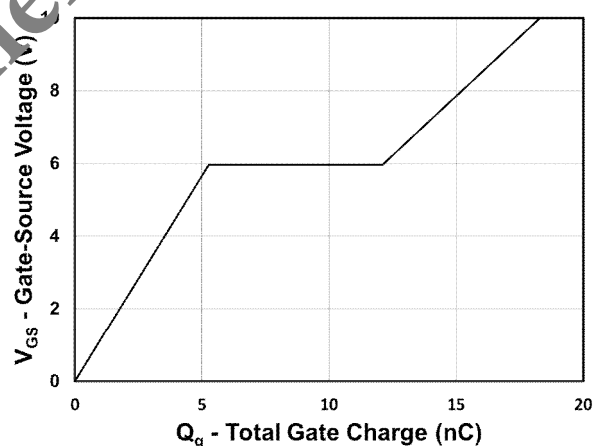
**Transfer Characteristics**



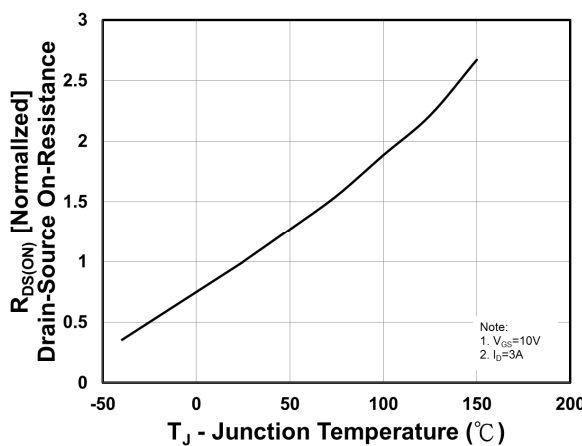
**On-Resistance vs. Drain Current**



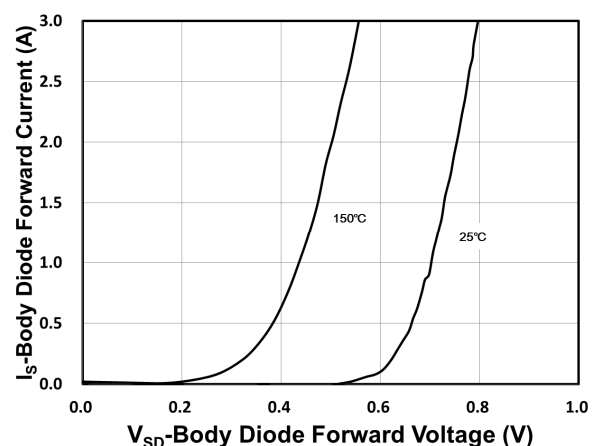
**Gate-Source Voltage vs. Gate Charge**



**On-Resistance vs. Junction Temperature**

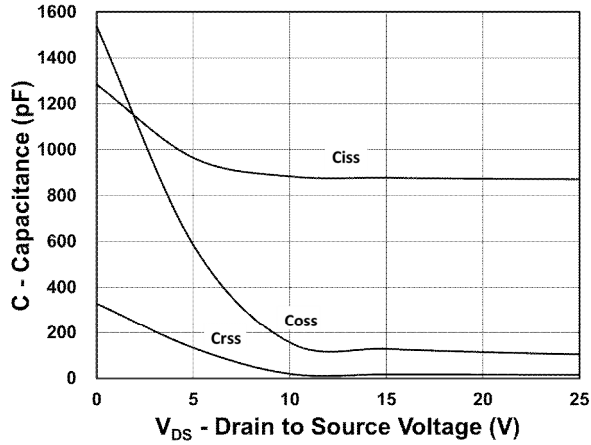


**Source-Drain Diode Forward Current vs. Voltage**

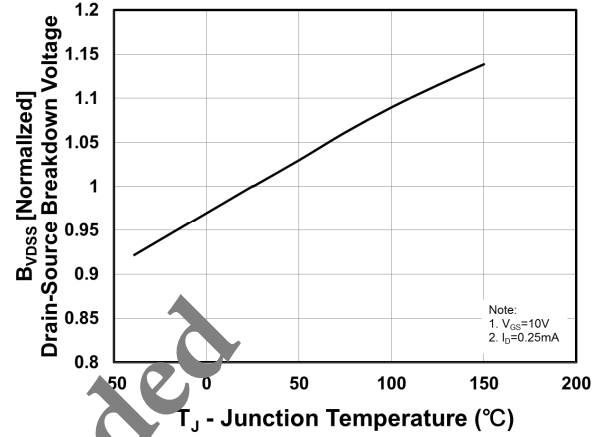


**Electrical Characteristics Curves**

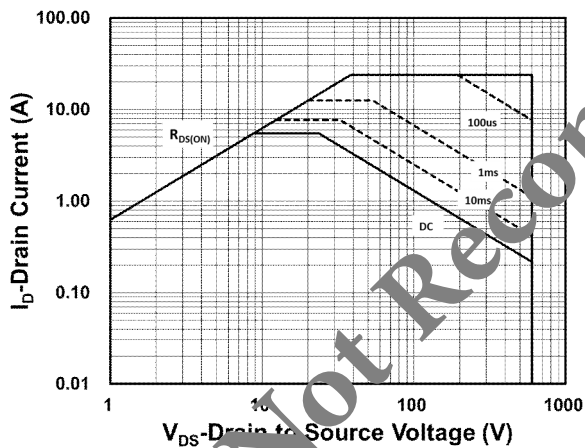
**Capacitance vs. Drain-Source Voltage**



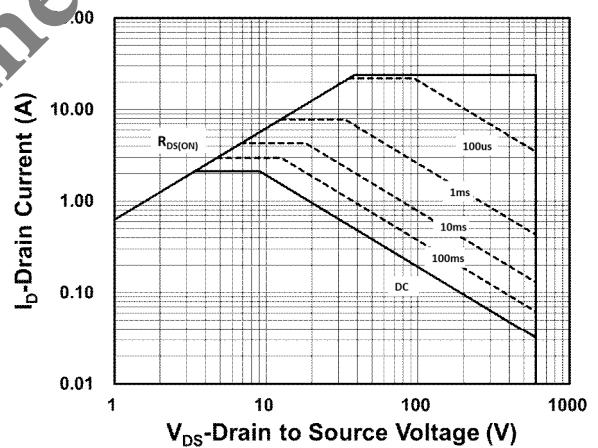
**B<sub>VDS</sub> vs. Junction Temperature**



**Maximum Safe Operating Area (TO-220)**

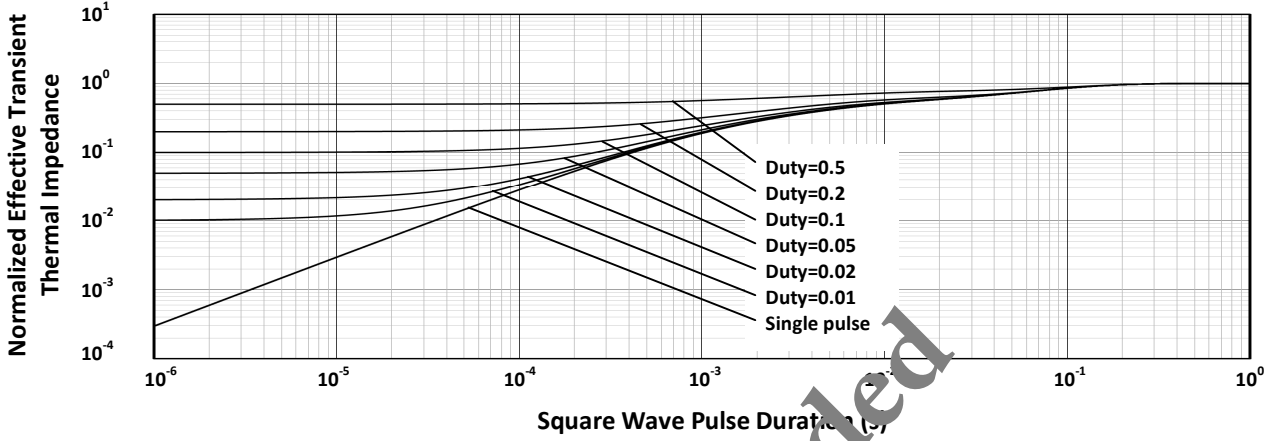


**Maximum Safe Operating Area (ITO-220)**

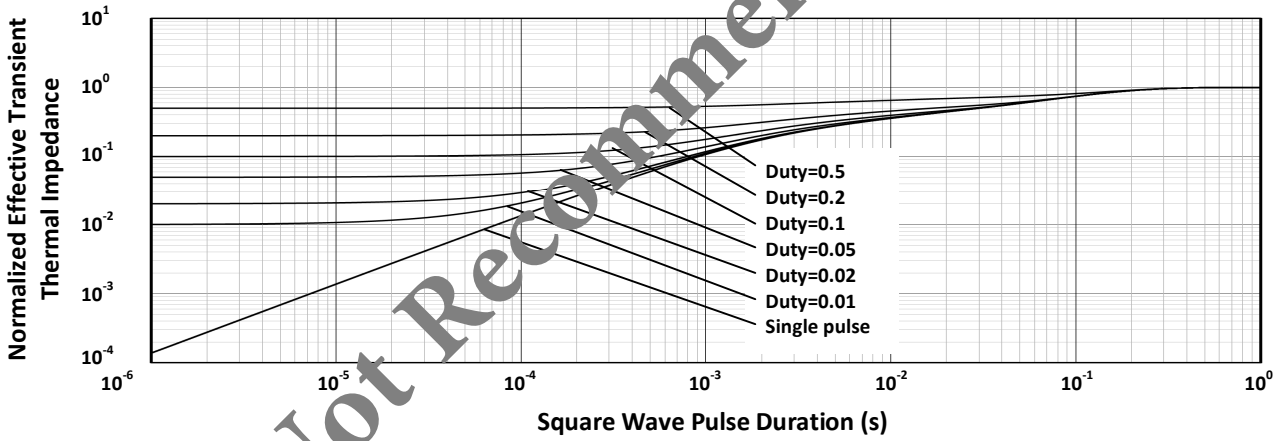


Electrical Characteristics Curves

Normalized Thermal Transient Impedance, Junction-to-Case (TO-220)



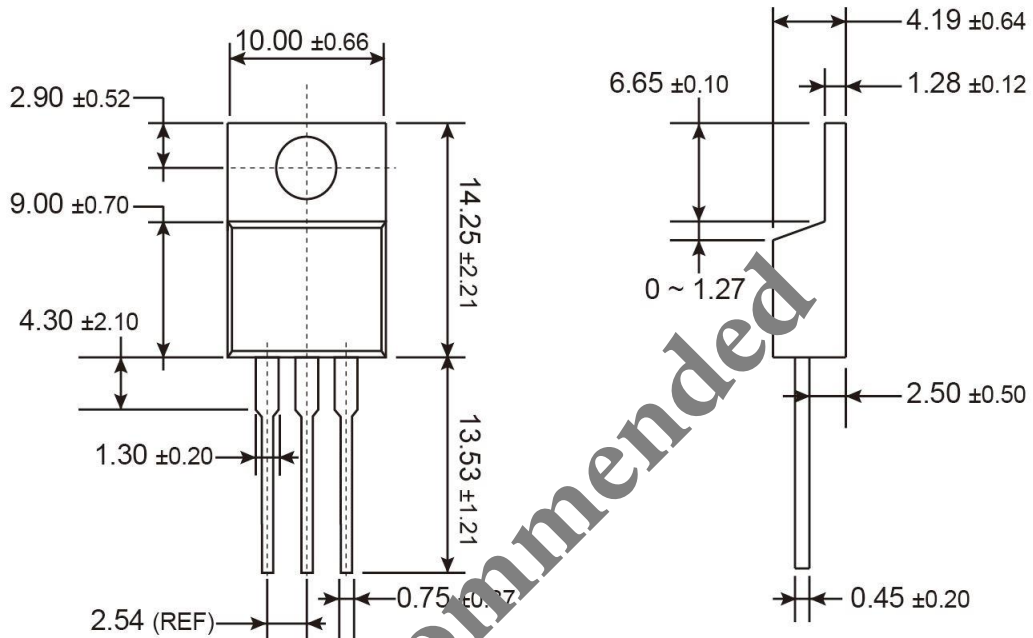
Normalized Thermal Transient Impedance, Junction-to-Case (ITO-220)



Not Recommended

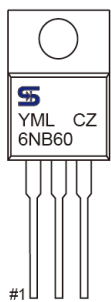


**TO-220 Mechanical Drawing**



Unit: Millimeters

**Marking Diagram**

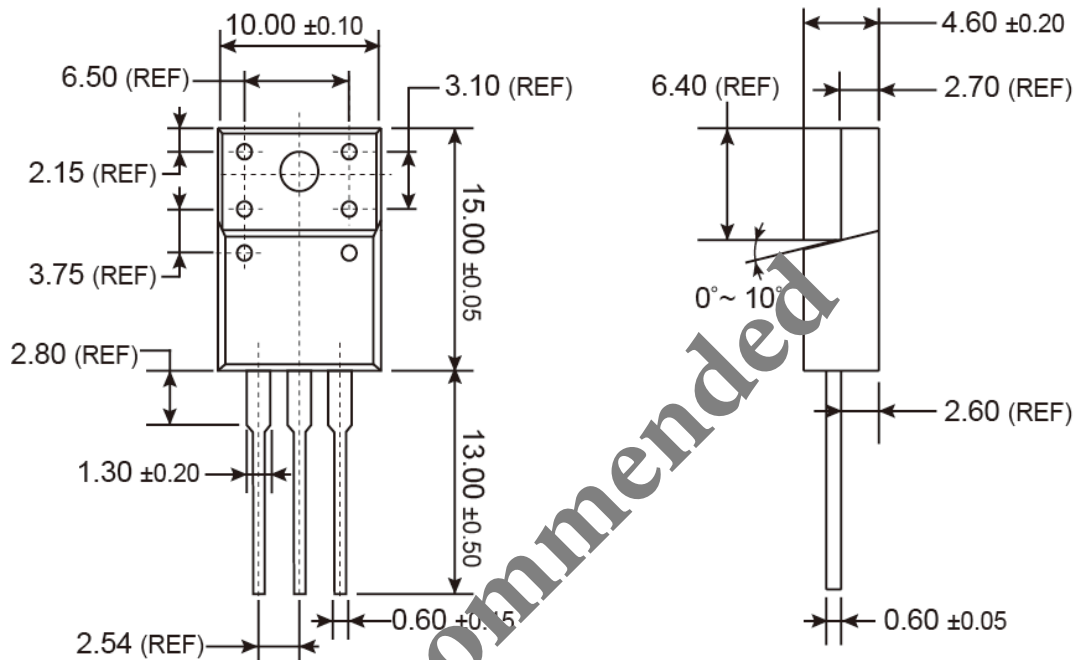


- Y** = Year Code
- M** = Month Code for Halogen Free Product  
(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apr, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)
- L** = Lot Code

Not Recommended

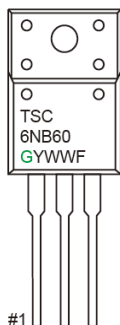


**ITO-220 Mechanical Drawing**



Unit: Millimeters

**Marking Diagram**



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

**Not Recommended**

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