

N-Channel Power MOSFET

600V, 10A, 0.75Ω

FEATURES

- Advanced high dense cell design.
- High power and Current handing capability
- 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

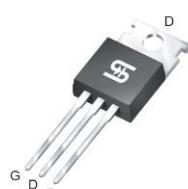
PARAMETER	VALUE	UNIT
V_{DS}	600	V
$R_{DS(on)}$ (max)	0.75	Ω
Q_g	39	nC

APPLICATIONS

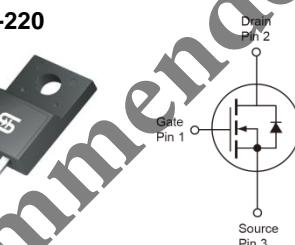
- Power Supply
- Lighting



TO-220



ITO-220



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

PARAMETER	SYMBOL	TO-220	ITO-220	UNIT
Drain-Source Voltage	V_{DS}	600		V
Gate-Source Voltage	V_{GS}		±30	V
Continuous Drain Current ^(Note 1)	I_D	10		A
		6		A
Pulsed Drain Current ^(Note 2)	I_{DM}	40		A
Total Power Dissipation @ T _C = 25°C	P_{DTOT}	166	50	W
Single Pulse Avalanche Energy ^(Note 3)	E_{AS}	41		mJ
Single Pulse Avalanche Current ^(Note 3)	I_{AS}	10		A
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150		°C

THERMAL PERFORMANCE

PARAMETER	SYMBOL	Limit		UNIT
Junction to Case Thermal Resistance	$R_{\theta JC}$	0.75	2.5	°C/W
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	63		°C/W

Thermal Performance Note: $R_{\theta JA}$ 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 ($T_A = 25^\circ\text{C}$ unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{V}$, $I_D = 250\mu\text{A}$	BV_{DSS}	600	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	$V_{GS(\text{TH})}$	2	3.1	4	V
Gate Body Leakage	$V_{GS} = \pm 30\text{V}$, $V_{DS} = 0\text{V}$	I_{GSS}	--	--	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS} = 600\text{V}$, $V_{GS} = 0\text{V}$	I_{DSS}	--	--	20	μA
Drain-Source On-State Resistance (Note 4)	$V_{GS} = 10\text{V}$, $I_D = 5\text{A}$	$R_{DS(\text{on})}$	--	0.61	0.75	Ω
Dynamic ^(Note 5)						
Total Gate Charge	$V_{DS} = 300\text{V}$, $I_D = 10\text{A}$, $V_{GS} = 10\text{V}$	Q_g	--	45.8	--	nC
Gate-Source Charge		Q_{gs}	--	11.5	--	
Gate-Drain Charge		Q_{gd}	--	16	--	
Input Capacitance	$V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$, $f = 1.0\text{MHz}$	C_{iss}	--	1738	--	pF
Output Capacitance		C_{oss}	--	195	--	
Reverse Transfer Capacitance		C_{rss}	--	26.3	--	
Switching ^(Note 6)						
Turn-On Delay Time	$V_{DD} = 300\text{V}$, $R_G = 10\Omega$, $I_D = 10\text{A}$, $V_{GS} = 10\text{V}$,	$t_{d(on)}$	--	33.6	--	ns
Turn-On Rise Time		t_r	--	7.4	--	
Turn-Off Delay Time		$t_{d(off)}$	--	68	--	
Turn-Off Fall Time		t_f	--	15.2	--	
Source-Drain Diode						
Forward Voltage ^(Note 4)	$I_S = 10\text{A}$, $V_{GS} = 0\text{V}$	V_{SD}	--	0.8	1.5	V

Notes:

1. Current limited by package.
2. Pulse width limited by the maximum junction temperature.
3. $L = 0.75\text{mH}$, $I_{AS} = 10\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
4. Pulse test: $PW \leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
5. For DESIGN AID ONLY, not subject to production testing.
6. Switching time is essentially independent of operating temperature.

ORDERING INFORMATION

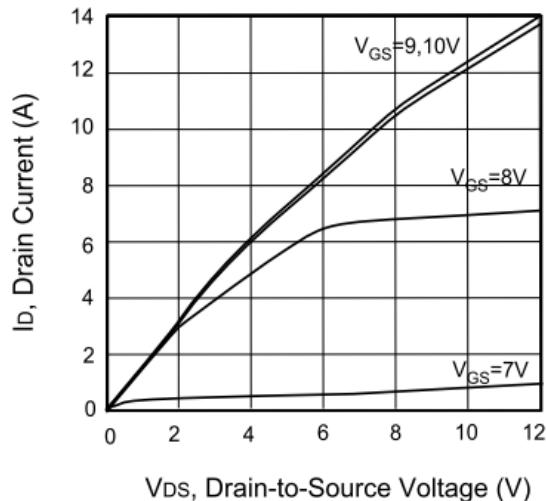
PART NO.	PACKAGE	PACKING
TSM10N60CZ C0	TO-220	50pcs/Tube
TSM10N60CI C0	ITO-220	50pcs/Tube
TSM10N60CZ C0G	TO-220	50pcs/Tube
TSM10N60CI C0G	ITO-220	50pcs/Tube

Not Recommended

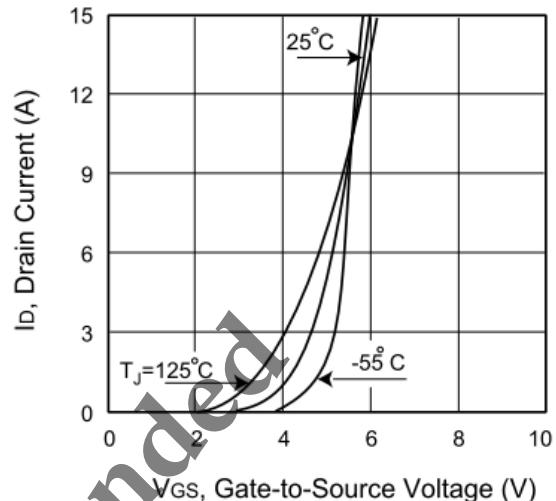
CHARACTERISTICS CURVES

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

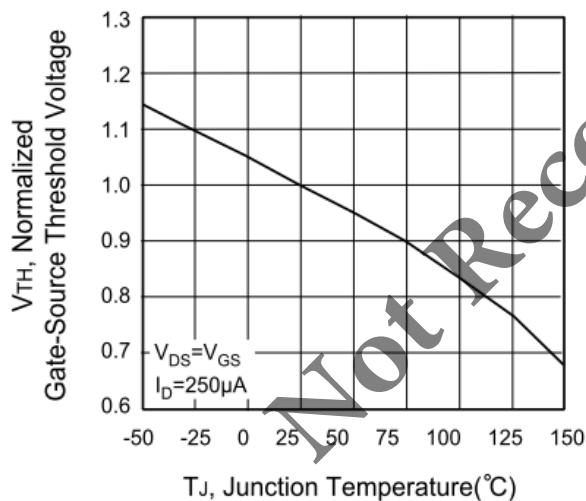
Output Characteristics



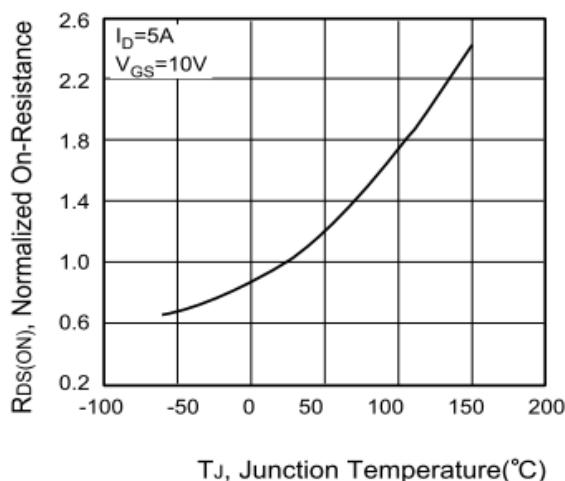
Transfer Characteristics



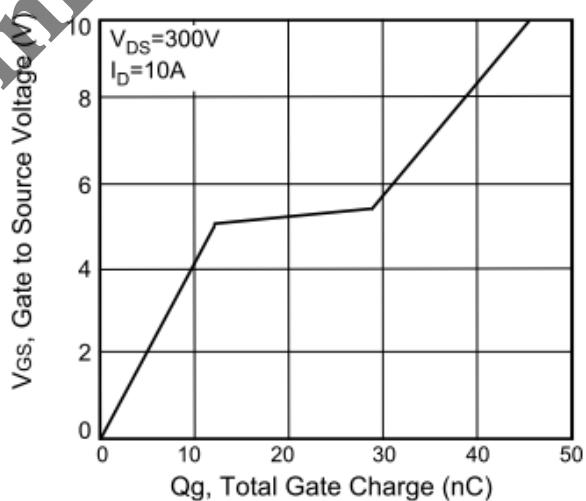
Threshold Voltage



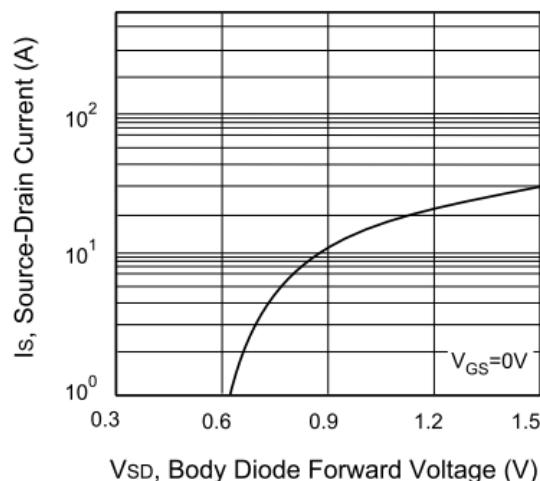
On-Resistance vs. Junction Temperature



Gate Charge



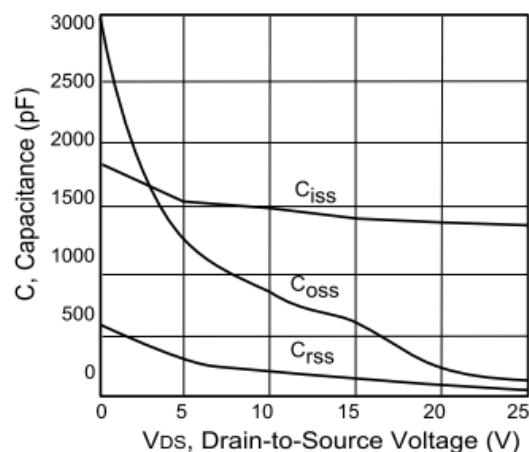
Source-Drain Diode Forward Voltage



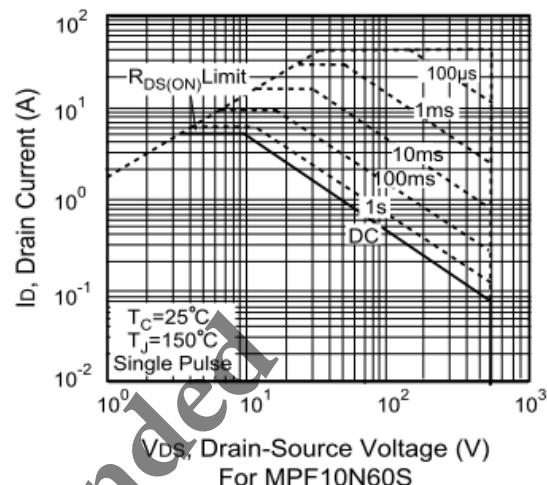
CHARACTERISTICS CURVES

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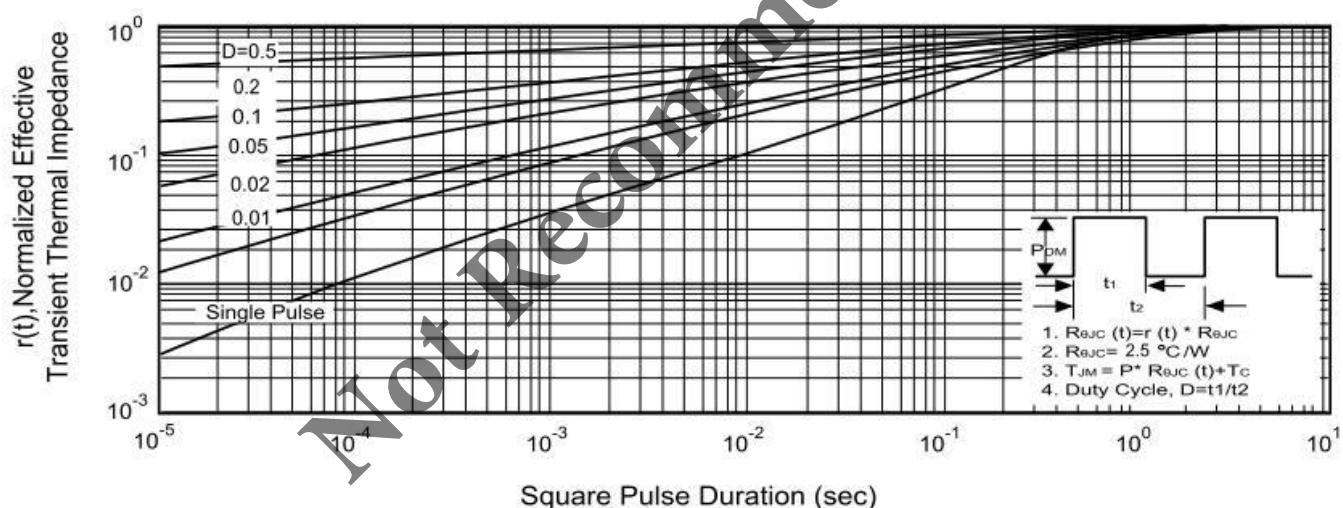
Capacitance Characteristics



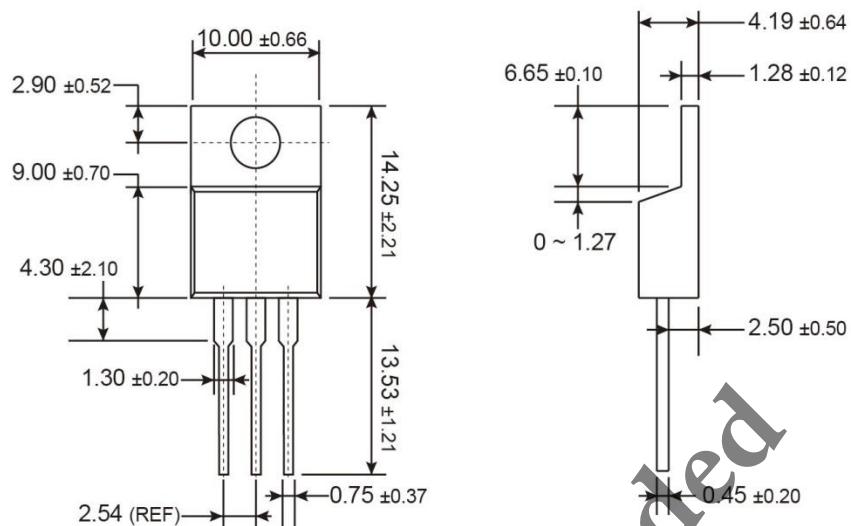
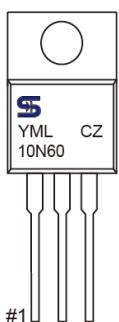
Maximum Safe Operating Area - ITO-220



Normalized Thermal Transient Impedance



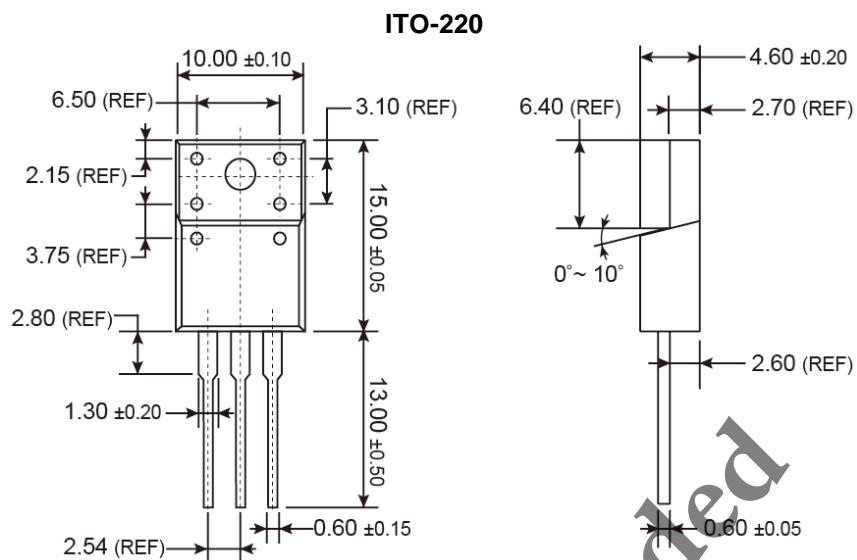
PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-220

MARKING DIAGRAM

Y = Year Code

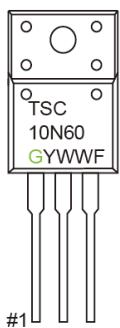
M = Month Code

**(A=Jan, B=Feb, C=Mar, D=Apl, E=May, F=Jun, G=Jul, H=Aug,
I=Sep, J=Oct, K=Nov, L=Dec)**
= Month Code for Halogen Free Product
**(O=Jan, P=Feb, Q=Mar, R=Apl, S=May, T=Jun, U=Jul, V=Aug,
W=Sep, X=Oct, Y=Nov, Z=Dec)**
L = Lot Code

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)



MARKING DIAGRAM



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

Not Recommended

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