

N-Channel Power MOSFET

600V, 10A, 0.75Ω

FEATURES

- Advanced high dense cell design.
- High power and Current handling 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



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ 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 @ $T_C = 25^\circ\text{C}$	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°C unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static						
Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	BV _{DSS}	600	--	--	V
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	V _{GS(TH)}	2	3.1	4	V
Gate Body Leakage	V _{GS} = ±30V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V _{DS} = 600V, V _{GS} = 0V	I _{DSS}	--	--	20	μA
Drain-Source On-State Resistance (Note 4)	V _{GS} = 10V, I _D = 5A	R _{DS(on)}	--	0.61	0.75	Ω
Dynamic (Note 5)						
Total Gate Charge	V _{DS} = 300V, I _D = 10A, V _{GS} = 10V	Q _g	--	45.8	--	nC
Gate-Source Charge		Q _{gs}	--	11.5	--	
Gate-Drain Charge		Q _{gd}	--	16	--	
Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	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} = 300V, R _G = 10Ω, I _D = 10A, V _{GS} = 10V,	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 = 10A, V _{GS} = 0V	V _{SD}	--	0.8	1.5	V

Notes:

1. Current limited by package.
2. Pulse width limited by the maximum junction temperature.
3. $L = 0.75\text{mH}, I_{AS} = 10A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
4. Pulse test: $PW \leq 300\mu s$, 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

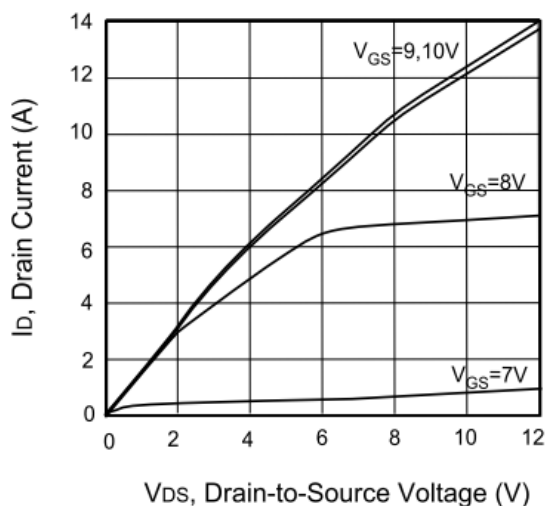
PART NO.	PACKAGE	PACKING
TSM10N60CZ C0	TO-220	50pcs/Tube
TSM10N60CI C0	ITO-220	50pcs/Tube
TSM10N60CZ C0G	TO-220	50pcs/Tube
TSM10N60CI C0G	ITO-220	50pcs/Tube

Not Recommended

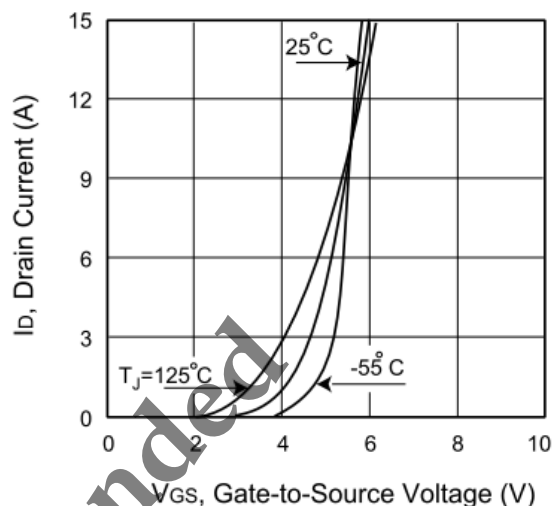
CHARACTERISTICS CURVES

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

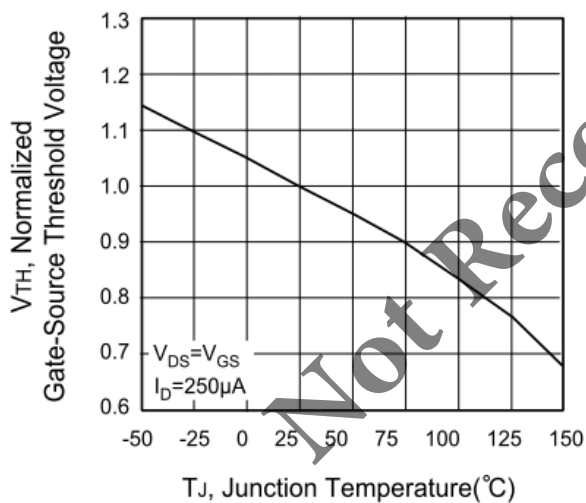
Output Characteristics



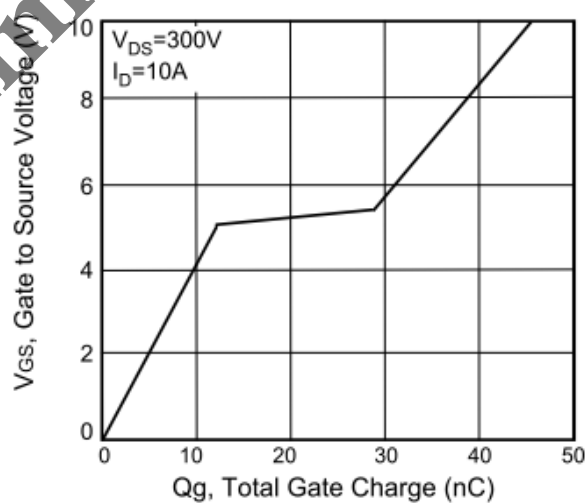
Transfer Characteristics



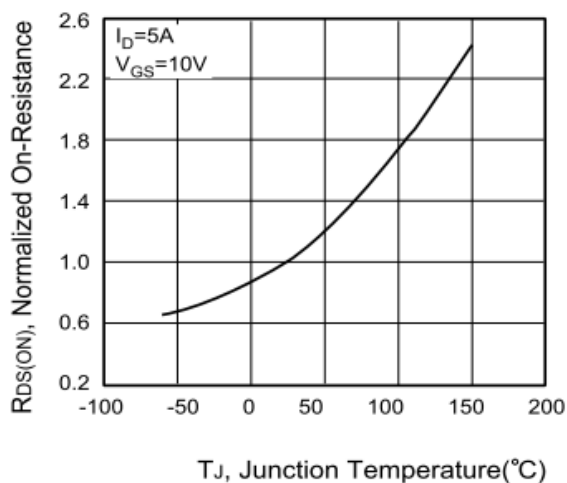
Threshold Voltage



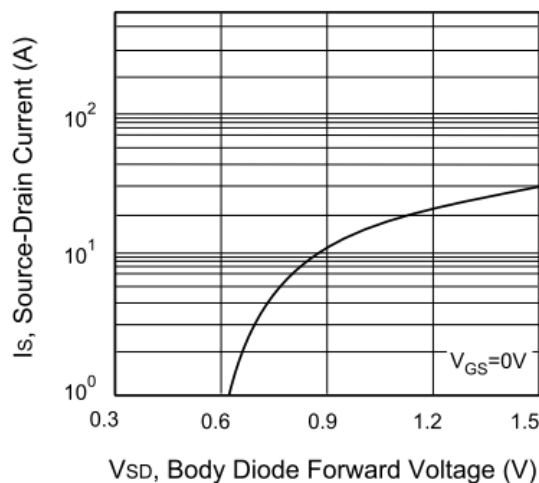
Gate Charge



On-Resistance vs. Junction Temperature



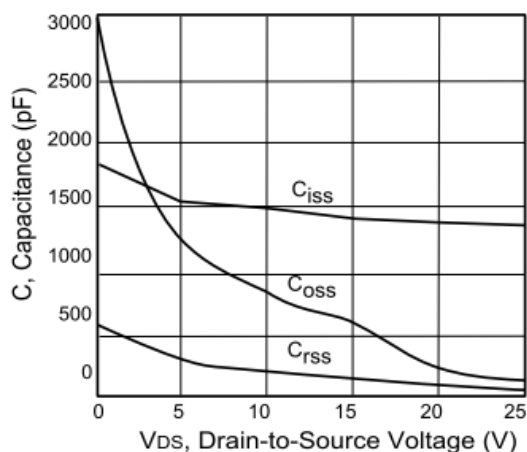
Source-Drain Diode Forward Voltage



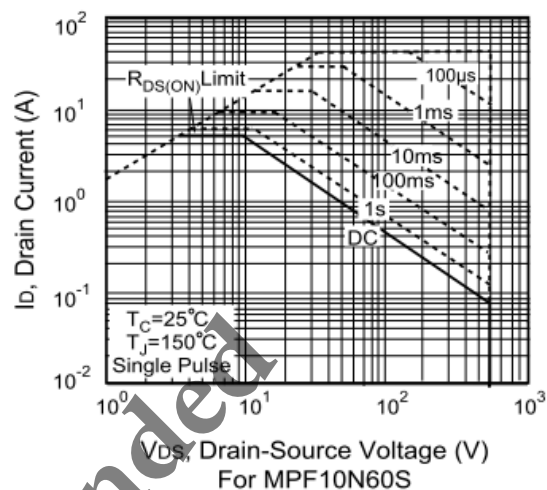
CHARACTERISTICS CURVES

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

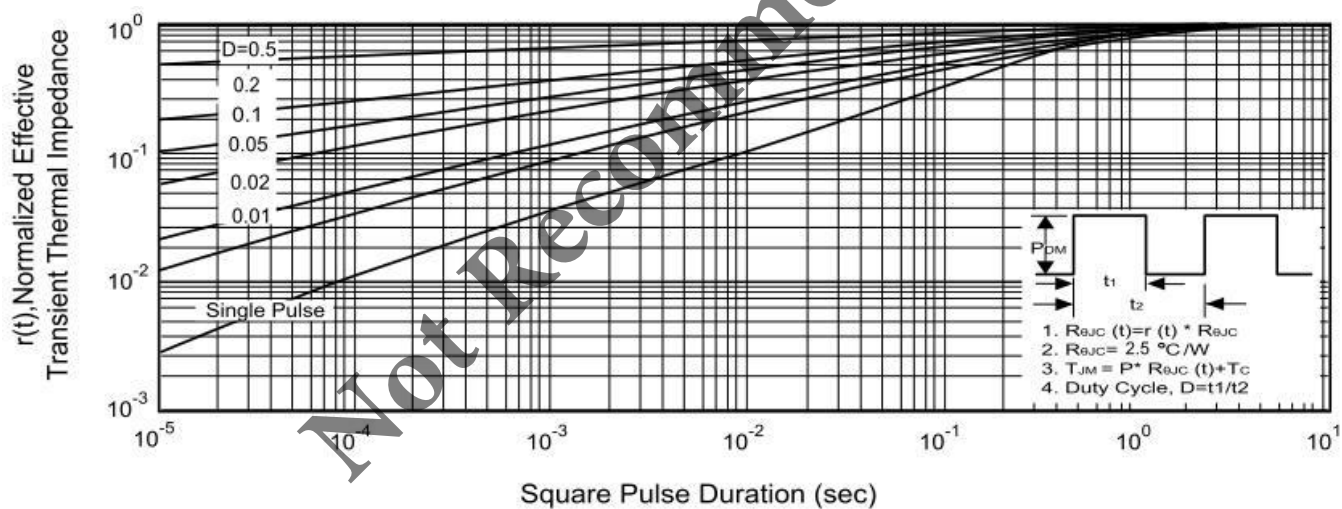
Capacitance Characteristics



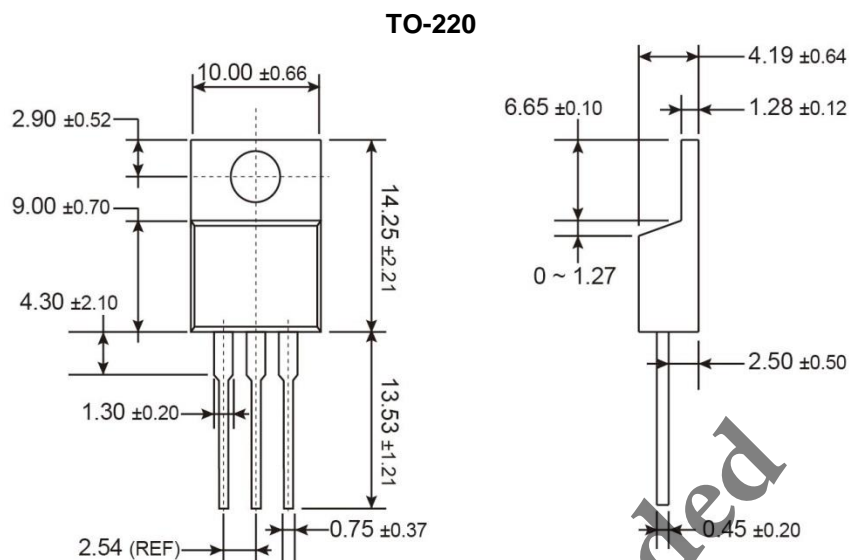
Maximum Safe Operating Area - ITO-220



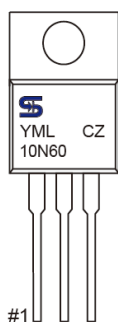
Normalized Thermal Transient Impedance



PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)



MARKING DIAGRAM



Y = Year Code

M = Month Code

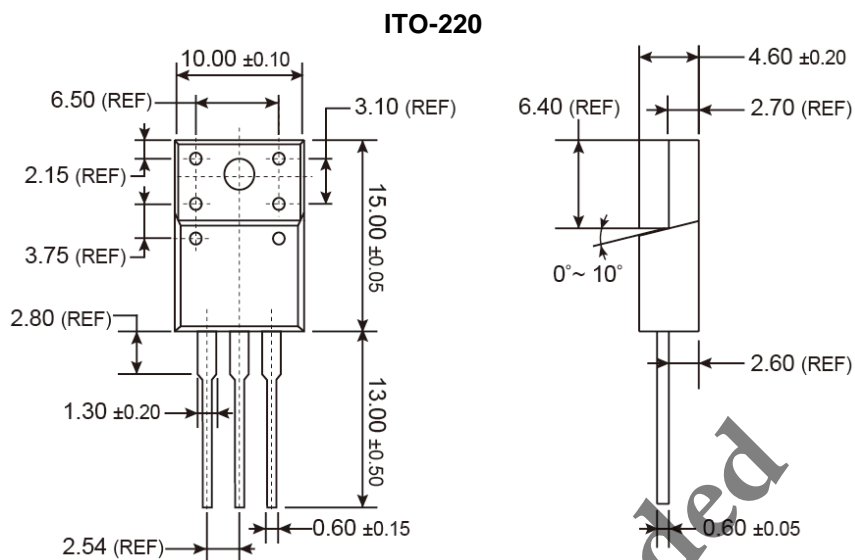
(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apr, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)

= Month Code for Halogen Free Product

(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apr, **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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