

N-Channel Power MOSFET

800V, 4A, 3.0Ω

FEATURES

- Low $R_{DS(ON)}$ 3Ω (Max.)
- Low gate charge typical @ 20nC (Typ.)
- Improve dV/dt capability

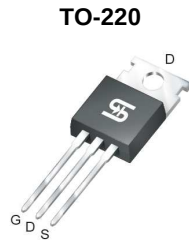
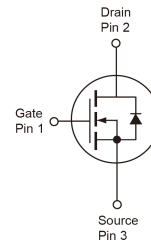
APPLICATION

- Power Supply
- Lighting

KEY PERFORMANCE PARAMETERS

PARAMETER	VALUE	UNIT
V_{DS}	800	V
$R_{DS(on)}$ (max)	3.0	Ω
Q_g	20	nC


ROHS
COMPLIANT

HALOGEN
FREE

ITO-220


ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	TO-220	ITO-220	UNIT
Drain-Source Voltage	V_{DS}	800		V
Gate-Source Voltage	V_{GS}	±30		V
Continuous Drain Current ^(Note 1)	I_D	4		A
		2.5		
Pulsed Drain Current ^(Note 2)	I_{DM}	16		A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	P_{DTOT}	123	38.7	W
Single Pulsed Avalanche Energy ^(Note 3)	E_{AS}	76		mJ
Single Pulsed Avalanche Current ^(Note 3)	I_{AS}	4		A
Repetitive Avalanche Energy	E_{AR}	12.3		mJ
Peak Diode Recovery ^(Note 7)	dV/dt	4.5		V
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150		°C

THERMAL PERFORMANCE

PARAMETER	SYMBOL	TO-220	ITO-220	UNIT
Junction to Case Thermal Resistance	$R_{\theta JC}$	1.01	3.23	°C/W
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	62.5		°C/W

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 in still air.

ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ 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}	800	--	--	V
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	V _{GS(TH)}	2.0	--	4.0	V
Gate Body Leakage	V _{GS} = ±30V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V _{DS} = 700V, V _{GS} = 0V	I _{DSS}	--	--	10	μA
Drain-Source On-State Resistance	V _{GS} = 10V, I _D = 1.2A	R _{DS(on)}	--	2.5	3.0	Ω
Forward Transconductance	V _{DS} = 30V, I _D = 1.2A	g _{fs}	--	7.1	--	S
Dynamic ^(Note 5)						
Total Gate Charge	V _{DS} = 640V, I _D = 4.0A, V _{GS} = 10V	Q _g	--	20	--	nC
Gate-Source Charge		Q _{gs}	--	3.7	--	
Gate-Drain Charge		Q _{gd}	--	8.2	--	
Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	C _{iss}	--	955	--	pF
Output Capacitance		C _{oss}	--	80	--	
Reverse Transfer Capacitance		C _{rss}	--	13	--	
Gate Resistance	F = 1MHz, open drain	R _g	--	--	3	Ω
Switching ^(Note 6)						
Turn-On Delay Time	V _{DD} = 400V, R _{GEN} = 25Ω, I _D = 4.0A, V _{GS} = 10V,	t _{d(on)}	--	49	--	ns
Turn-On Rise Time		t _r	--	38	--	
Turn-Off Delay Time		t _{d(off)}	--	146	--	
Turn-Off Fall Time		t _f	--	50	--	
Source-Drain Diode ^(Note 4)						
Forward On Voltage	I _S = 4.0A, V _{GS} = 0V	V _{SD}	--	--	1.5	V
Reverse Recovery Time	V _{GS} = 0V, I _S = 4A dI _F /dt = 100A/μs	t _{rr}	--	487	--	ns
Reverse Recovery Charge		Q _{rr}	--	2.8	--	μC

Notes:

- Current limited by package
- Pulse width limited by the maximum junction temperature
- $L = 10mH, I_{AS} = 4.0A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
- Pulse test: $PW \leq 300\mu s$, duty cycle $\leq 2\%$
- For DESIGN AID ONLY, not subject to production testing.
- Switching time is essentially independent of operating temperature.
- $I_{SD} \leq 8A, dI/dt \leq 200A/\mu s, V_{dd} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$.

ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM4N80CZ C0G	TO-220	50pcs / Tube
TSM4N80CI C0G	ITO-220	50pcs / Tube

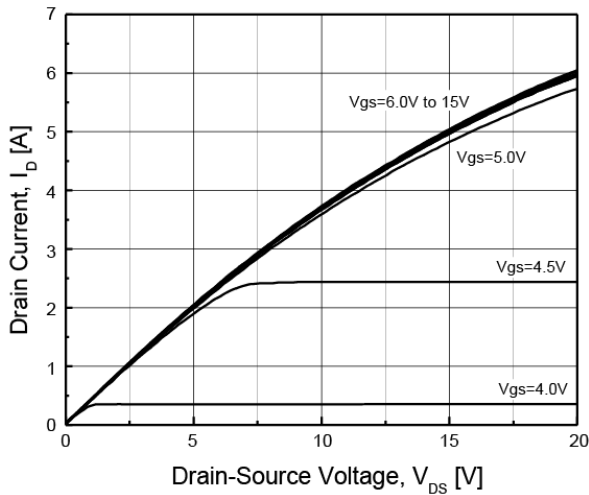
Note:

1. Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
2. Halogen-free according to IEC 61249-2-21 definition

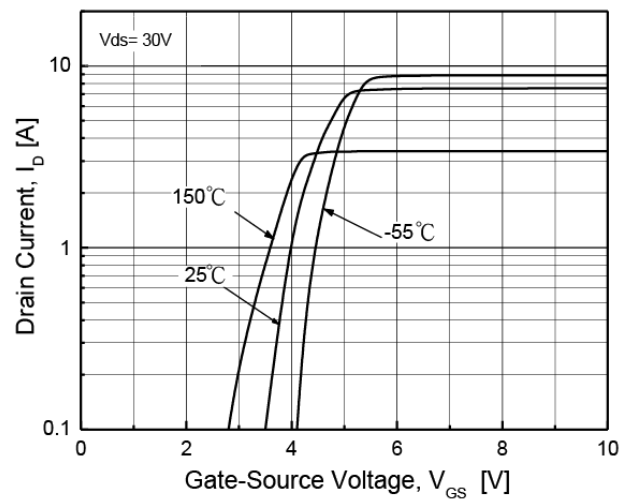
CHARACTERISTICS CURVES

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

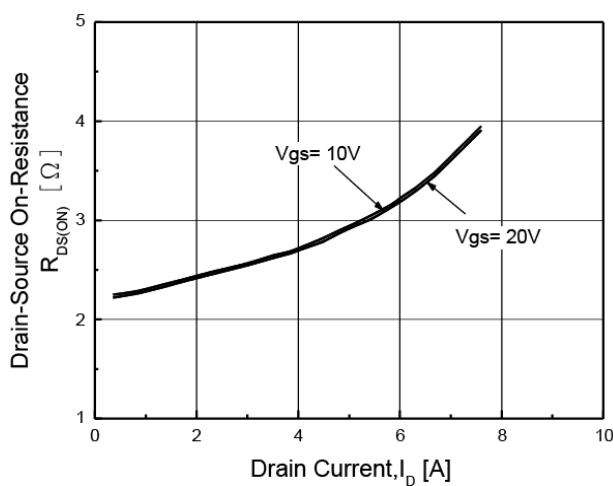
Output Characteristics



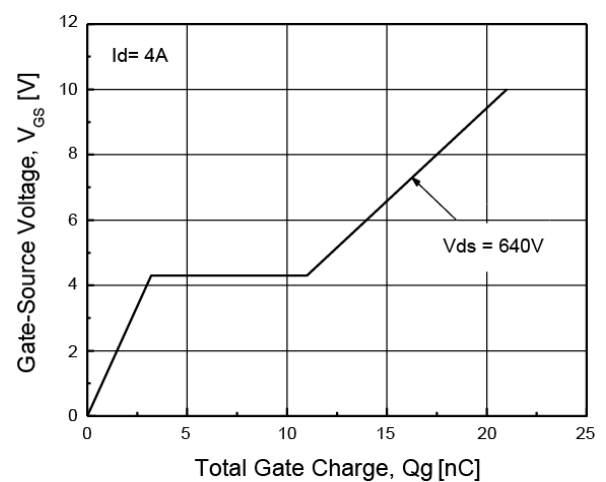
Transfer Characteristics



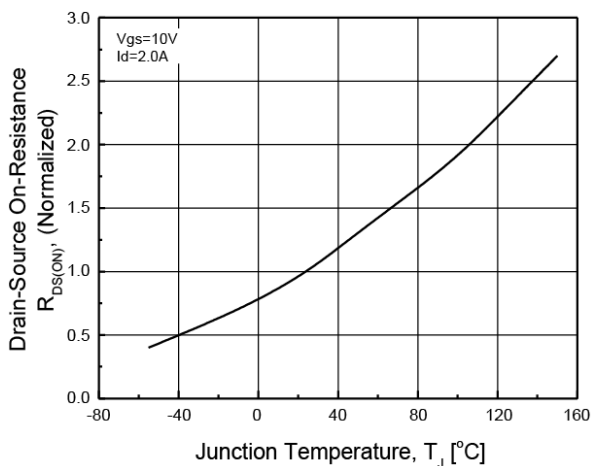
On-Resistance vs. Drain Current



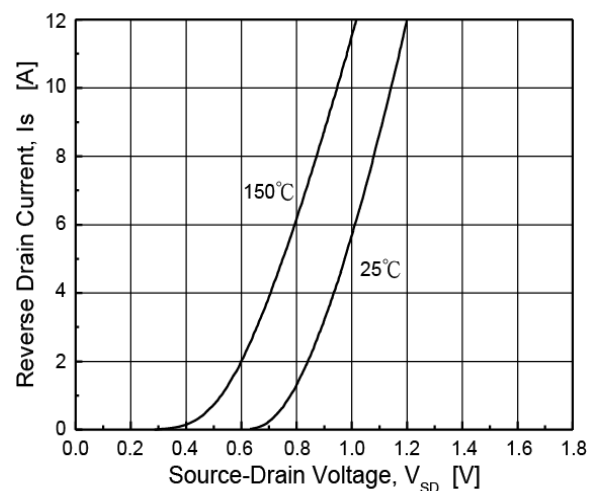
Gate Charge



On-Resistance vs. Junction Temperature



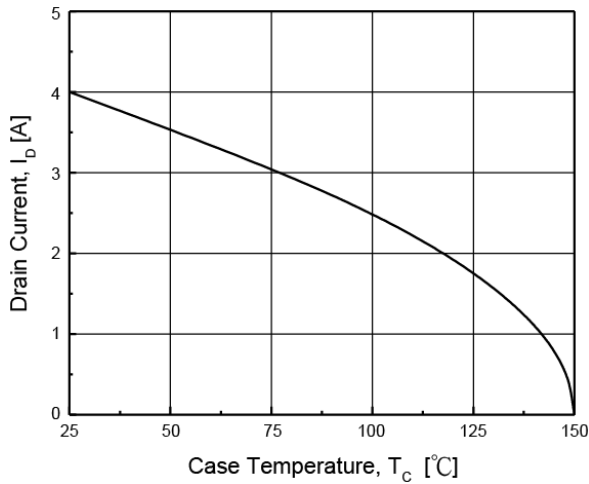
Source-Drain Diode Forward Voltage



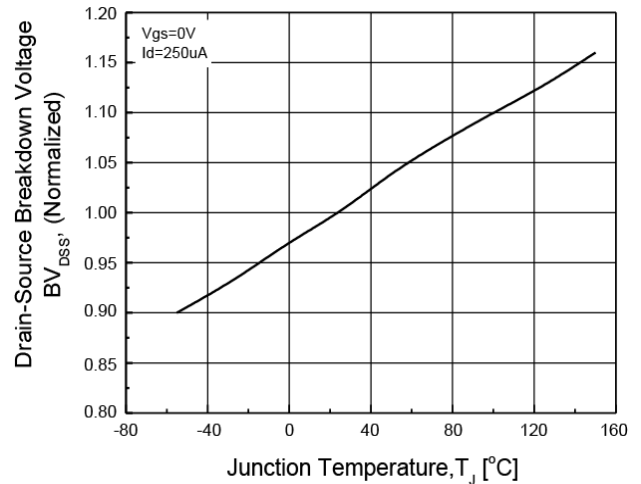
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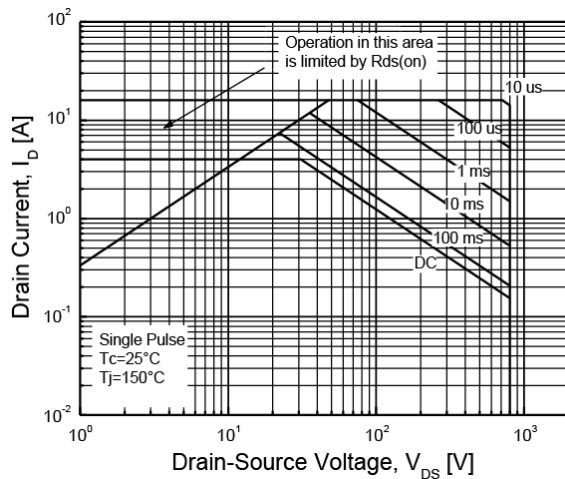
Drain Current vs. Case Temperature



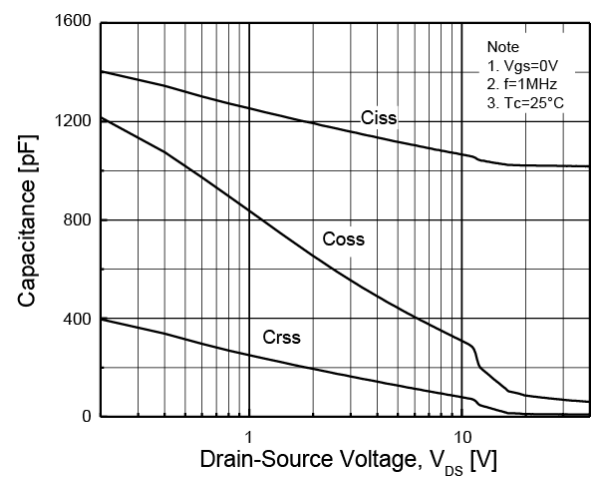
BV_{DSS} vs. Junction Temperature



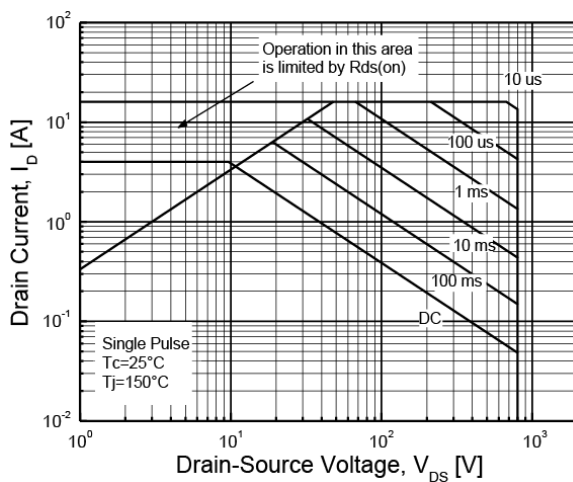
Maximum Safe Operating Area (TO-220)



Capacitance vs. Drain-Source Voltage



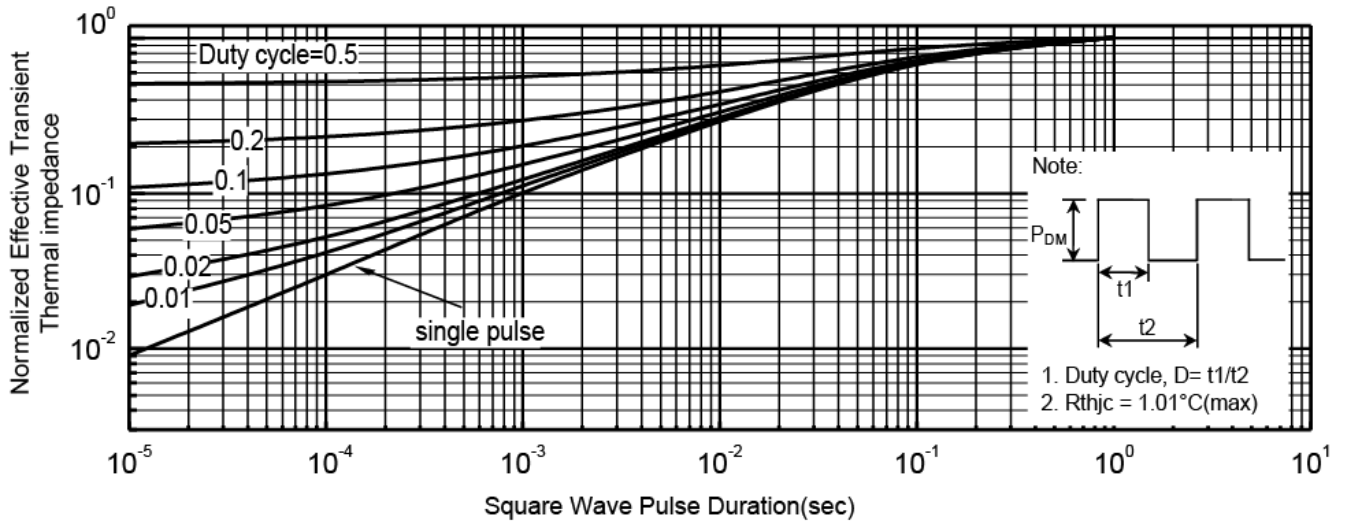
Maximum Safe Operating Area (ITO-220)



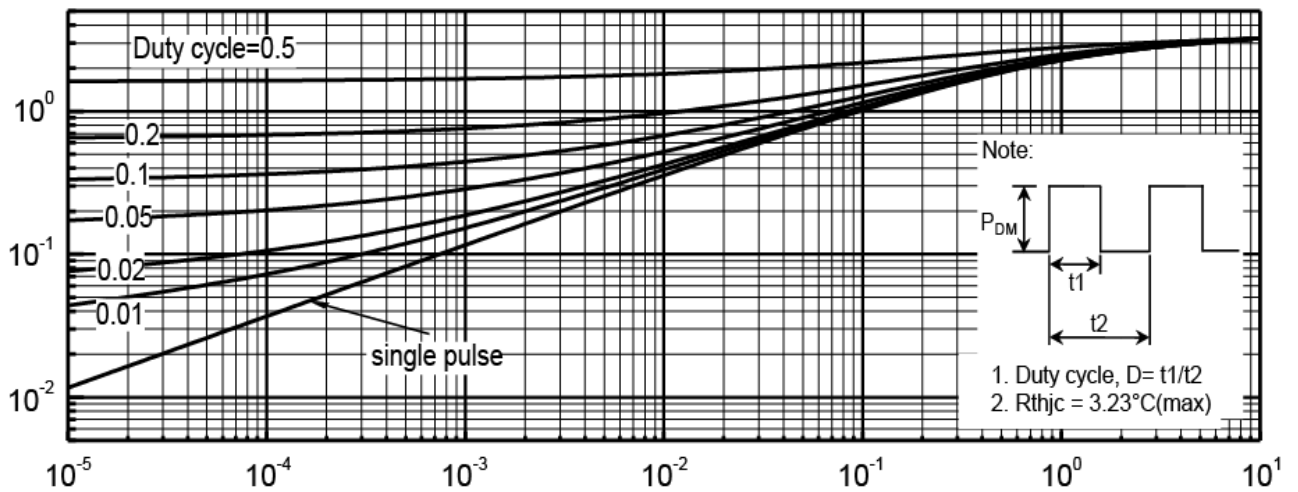
CHARACTERISTICS CURVES

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

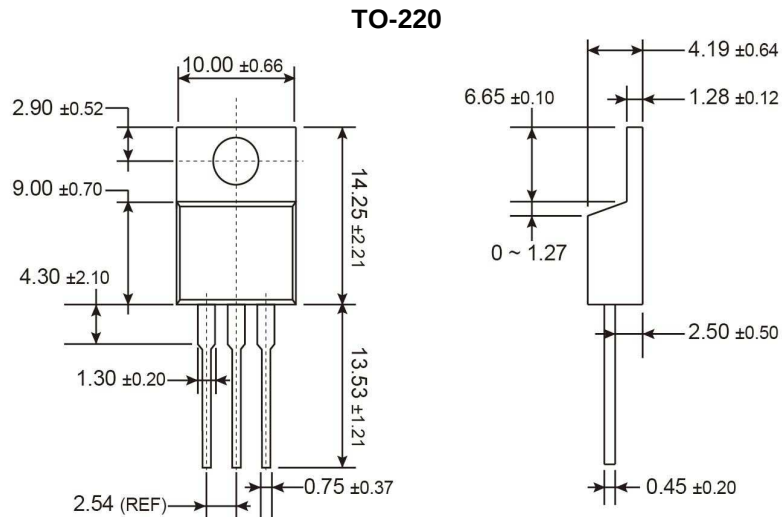
Normalized Thermal Transient Impedance, Junction-to-Ambient (TO-220)



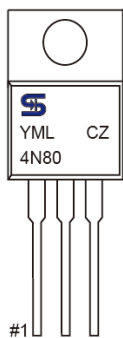
Normalized Thermal Transient Impedance, Junction-to-Ambient (ITO-220)



PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)



MARKING DIAGRAM

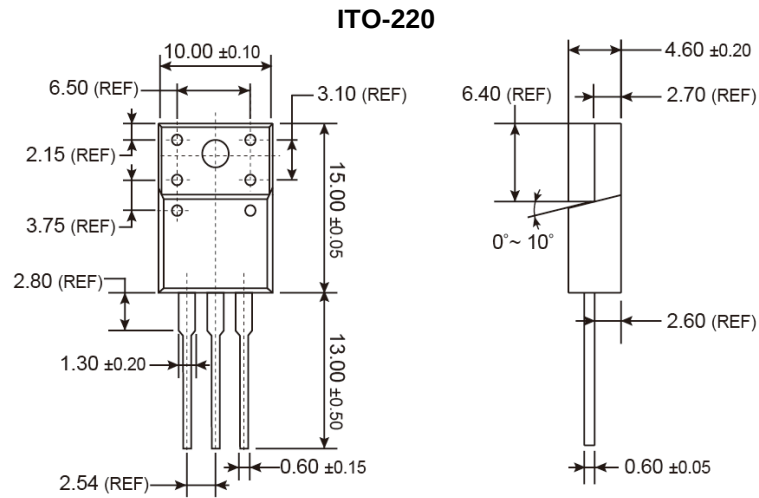


Y = Year Code
M = Month Code for Halogen Free Product

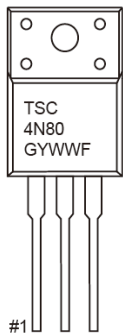
O =Jan	P =Feb	Q =Mar	R =Apr
S =May	T =Jun	U =Jul	V =Aug
W =Sep	X =Oct	Y =Nov	Z =Dec

L = Lot Code (1~9, A~Z)

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)



MARKING DIAGRAM



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

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