Small Signal N-Channel MOSFET

FEATURES

- AEC-Q101 Qualified
- Advanced trench cell design
- ESD protected G-S 2kV (HBM)
- RoHS Compliant
- Halogen-free

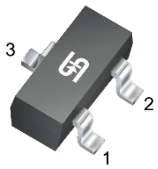
APPLICATIONS

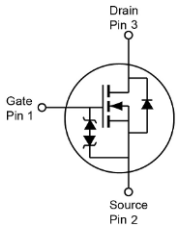
- Switching circuits
- High-speed line driver
- Low-side loadswitch
- Relay driver

PRODUCT SUMMARY			
PARAMETER		**VALUE**	**UNIT**
V_{DS}		60	V
$R_{DS(on)}$ (max)	V_{GS} = 10V	1.6	Ω
	V_{GS} = 4.5V	2	
Q_g	V_{GS} = 4.5V	0.9	nC

Pb-Free RoHS COMPLIANT HALOGEN FREE

SOT-323





Note: MSL 1 (Moisture Sensitivity Level) per J-STD-020

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)				
PARAMETER		**SYMBOL**	**LIMIT**	**UNIT**
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_A = 25°C	I_D	320	mA
Pulsed Drain Current (Note 1)		I_{DM}	1.28	A
Total Power Dissipation	T_A = 25°C	P_D	316	mW
	T_A = 125°C		63	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	°C

THERMAL PERFORMANCE			
PARAMETER	**SYMBOL**	**LIMIT**	**UNIT**
Junction to Ambient Thermal Resistance (Note 2)	$R_{\Theta JA}$	395	°C/W

Notes:

1. Pulse Width ≤ 100μs.
2. Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)						
PARAMETER	**CONDITIONS**	**SYMBOL**	**MIN**	**TYP**	**MAX**	**UNIT**
Static (Note 3)						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	BV_{DSS}	60	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	$V_{GS(TH)}$	0.8	1.5	2.5	V
Gate Body Leakage	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±10	μA
Zero Gate Voltage Drain Current	V_{DS} = 60V, V_{GS} = 0V	I_{DSS}	--	--	1	μA
	V_{DS} = 60V, V_{GS} = 0V, T_J =125°C		--	--	100	
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 320mA	$R_{DS(on)}$	--	1.2	1.6	Ω
	V_{GS} = 4.5V, I_D = 300mA		--	1.5	2	
Forward Transconductance	V_{DS} = 10V, I_D = 320mA	g_{fs}	--	479	--	mS
Dynamic (Note 4)						
Total Gate Charge	V_{DS} = 30V, I_D = 320mA, V_{GS} = 10V	Q_g	--	1.7	--	nC
Total Gate Charge	V_{DS} = 30V, I_D = 300mA, V_{GS} = 4.5V	Q_g	--	0.9	--	nC
Gate-Source Charge		Q_{gs}	--	0.3	--	
Gate-Drain Charge		Q_{gd}	--	0.3	--	
Input Capacitance	V_{DS} = 30V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	27.5	--	pF
Output Capacitance		C_{oss}	--	8.1	--	
Reverse Transfer Capacitance		C_{rss}	--	4.2	--	
Switching (Note 5)						
Turn-On Delay Time	V_{DD} = 30V, R_G = 6.0Ω, I_D = 320mA, V_{GS} = 10V	$t_{d(on)}$	--	2.9	--	ns
Turn-On Rise Time		t_r	--	1.8	--	
Turn-Off Delay Time		$t_{d(off)}$	--	7.2	--	
Turn-Off Fall Time		t_f	--	4.8	--	
Source-Drain Diode						
Forward Voltage (Note 3)	I_S = 320mA, V_{GS} = 0V	V_{SD}	--	0.9	1.2	V

Notes:

3. Pulse test: Pulse Width ≤ 300μs, duty cycle ≤ 2%.
4. Defined by design. Not subject to production test.
5. Switching time is essentially independent of operating temperature.

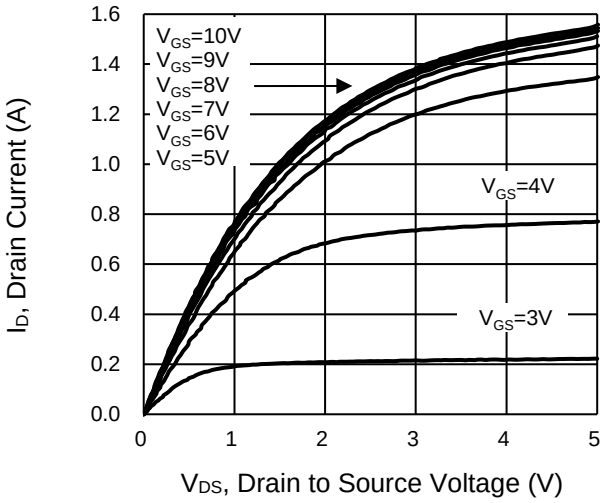
ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TQM2N7002KCU RFG	SOT-323	3,000pcs / 7” Reel

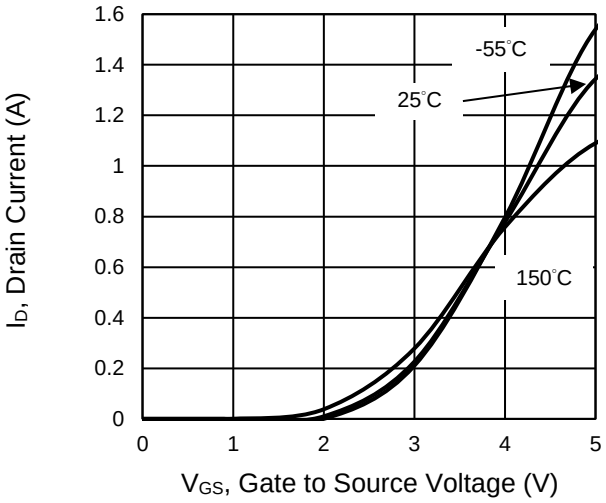
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

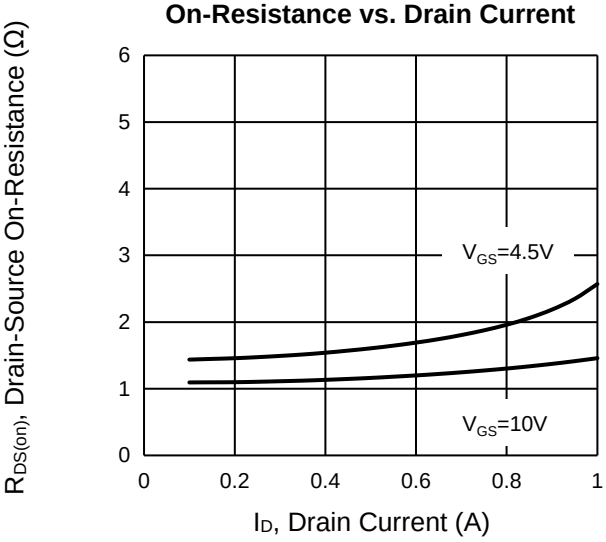
Output Characteristic



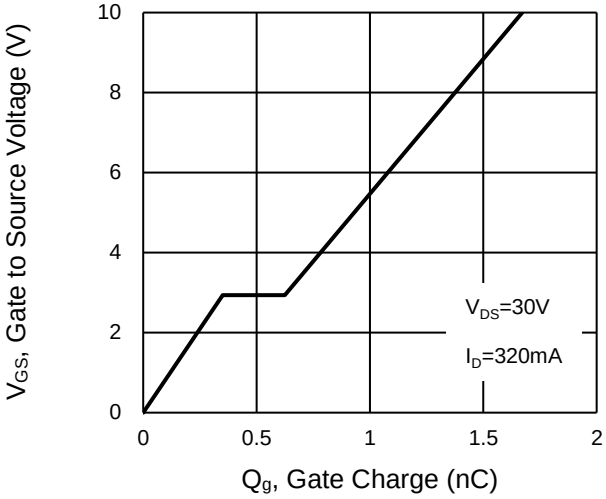
Transfer Characteristics



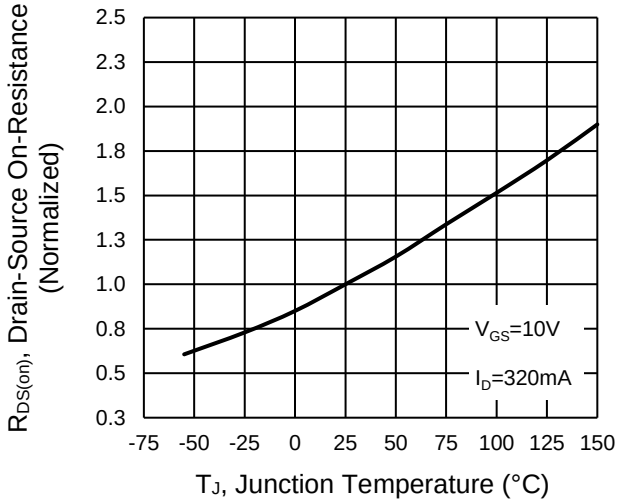
On-Resistance vs. Drain Current



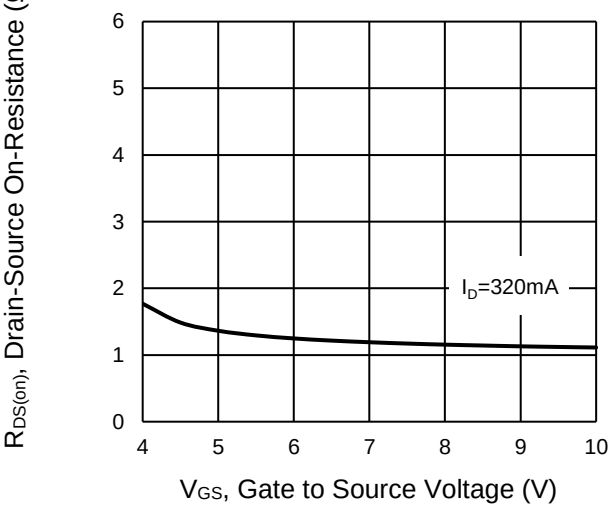
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



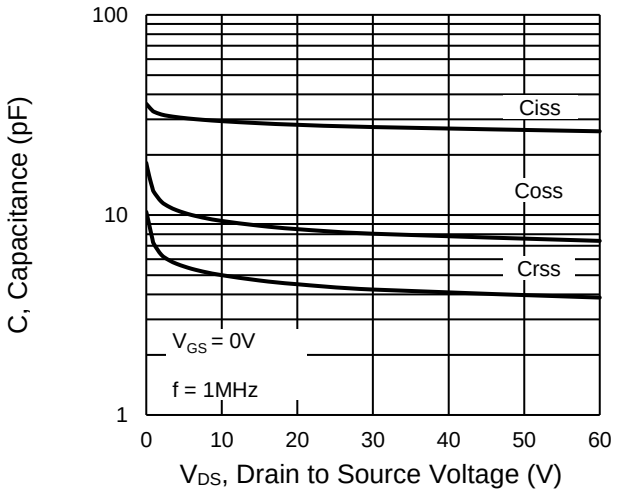
On-Resistance vs. Gate-Source Voltage



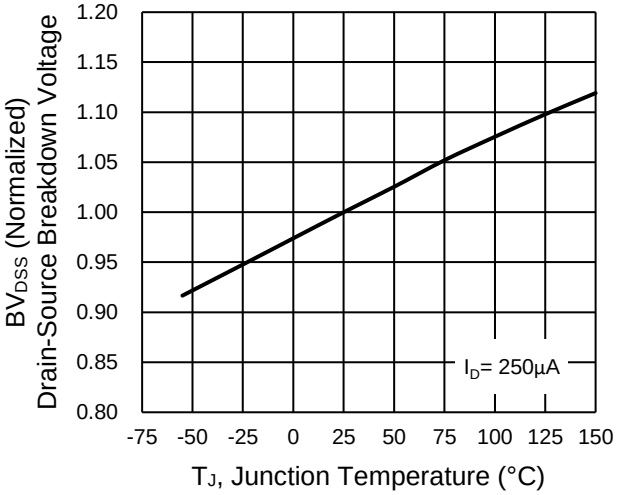
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

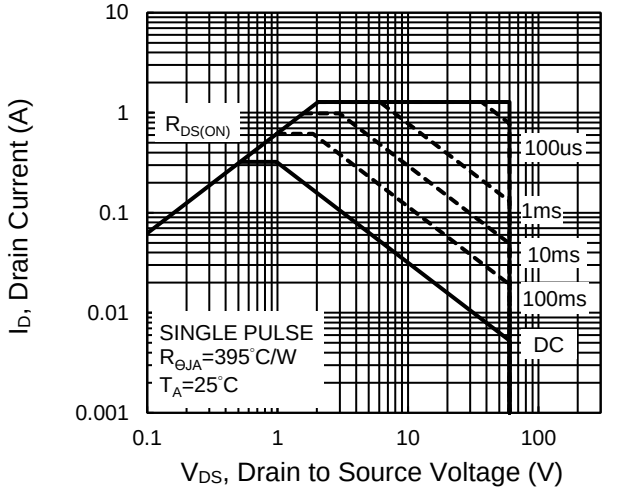
Capacitance vs. Drain-Source Voltage



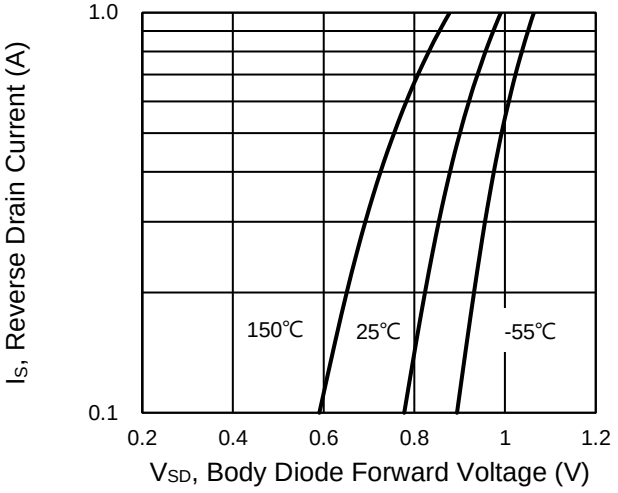
BV_{DSS} vs. Junction Temperature



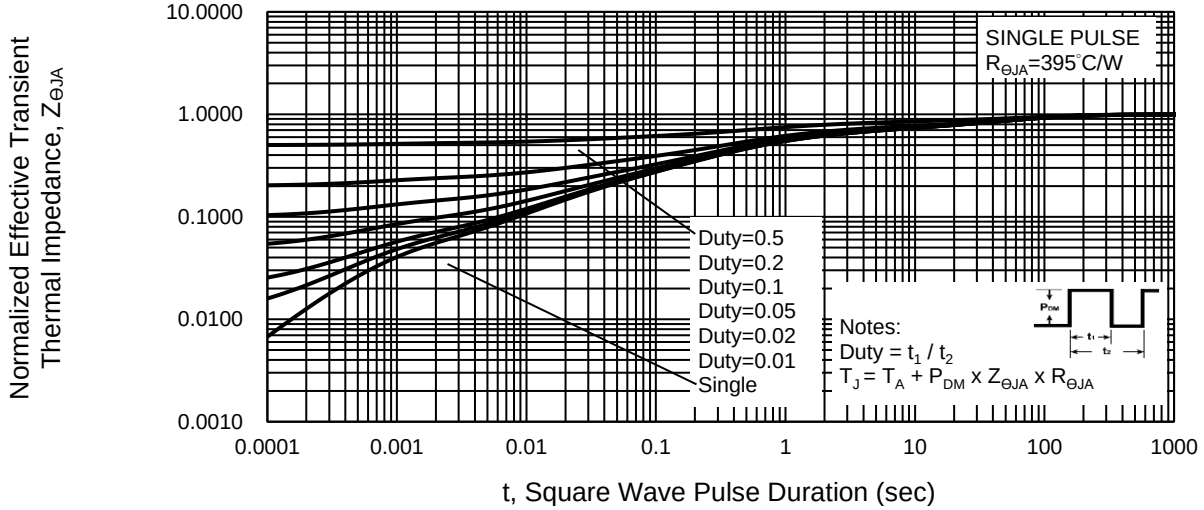
Maximum Safe Operating Area, Junction-to-Ambient



Source-Drain Diode Forward Current vs. Voltage



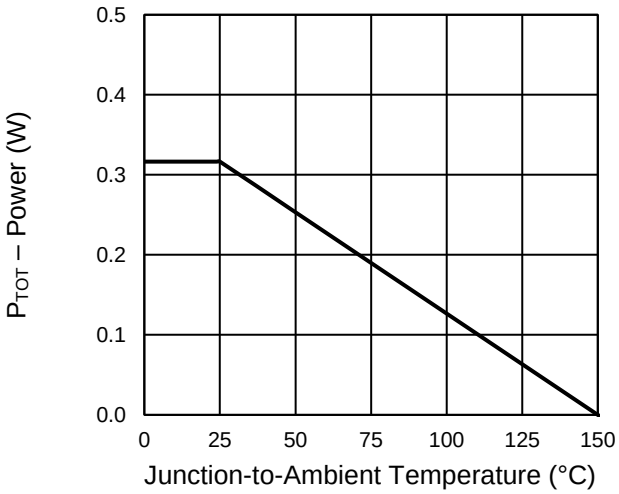
Normalized Thermal Transient Impedance, Junction-to-Ambient



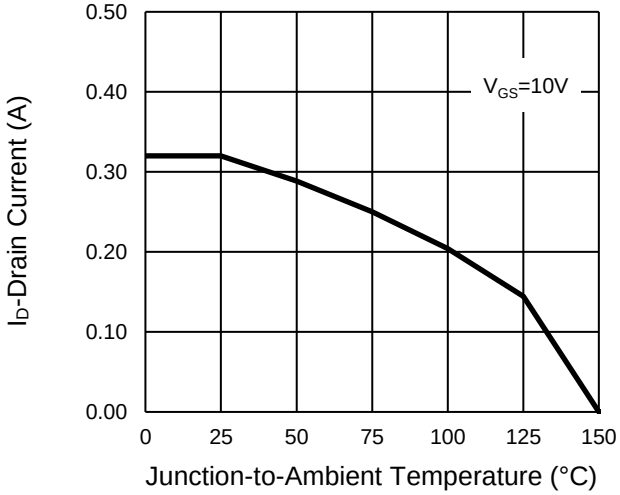
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

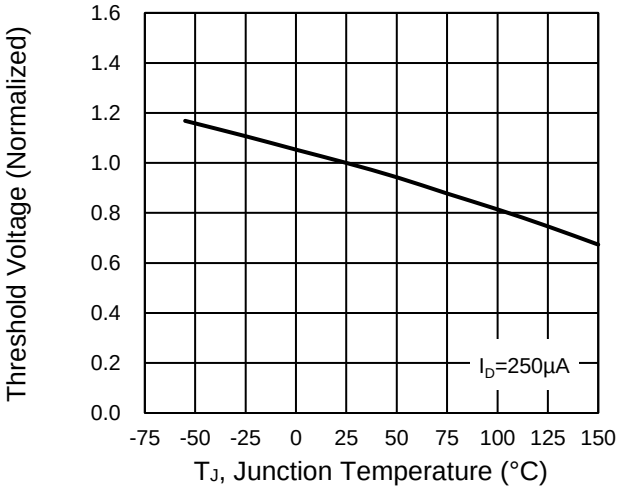
Power Dissipation



Drain Current

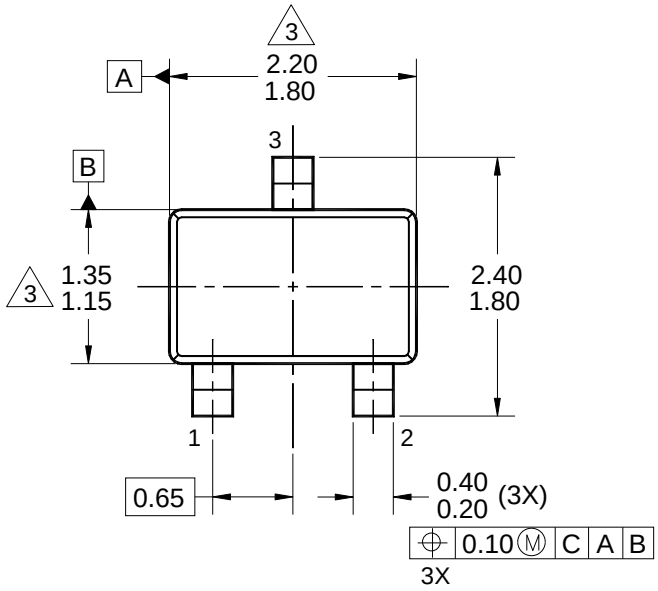


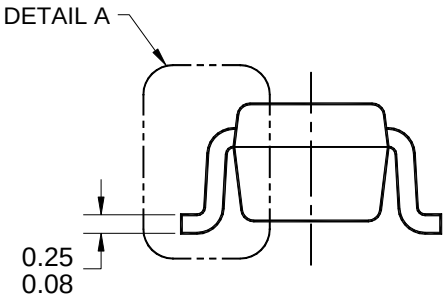
Normalized gate threshold voltage vs Temperature

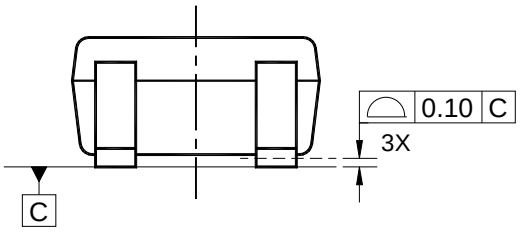


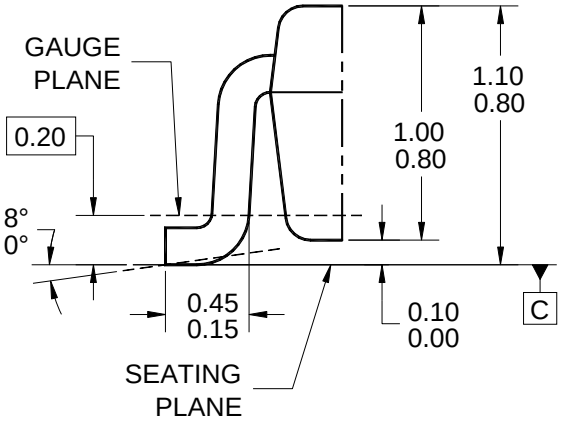
PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

SOT-323

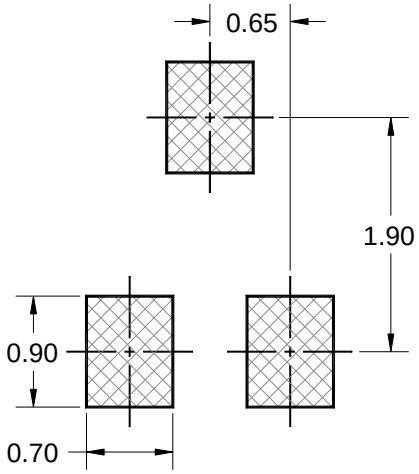




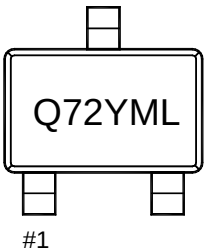




DETAIL A
(SCALE 2:1)



SUGGESTED PAD LAYOUT



MARKING DIAGRAM

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
4. DWG NO. REF: HQ2SD07-SOT323-098 REV B.

Y = Year Code

M = 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 (1~9,A~Z)

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