

Small Signal N-Channel MOSFET

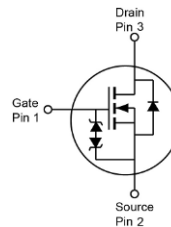
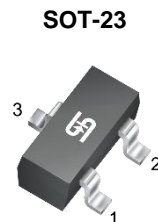
FEATURES

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

APPLICATIONS

- Infotainment
- Small Servo Motor Control
- Power MOSFET Gate Drivers
- Switching Applications

PRODUCT SUMMARY			
PARAMETER	VALUE	UNIT	
V_{DS}	100	V	
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	6	Ω
	$V_{GS} = 4.5V$	9	
Q_g	$V_{GS} = 4.5V$	1.1	nC



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

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	170	mA
Pulsed Drain Current (Note 1)	I_{DM}	0.68	A
Total Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	328
		$T_A = 125^\circ\text{C}$	65
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150	$^\circ\text{C}$

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Ambient Thermal Resistance (Note 2)	$R_{\theta JA}$	380	$^\circ\text{C/W}$

Notes:

1. Pulse Width $\leq 100\mu\text{s}$.
2. Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static (Note 3)						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	100	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	1.5	2	2.5	V
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}	--	--	± 10	μA
Zero Gate Voltage Drain Current	$V_{DS} = 100V, V_{GS} = 0V$	I_{DSS}	--	--	1	μA
	$V_{DS} = 100V, V_{GS} = 0V$ $T_J = 125^\circ\text{C}$		--	--	100	
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 170mA$	$R_{DS(on)}$	--	3.6	6	Ω
	$V_{GS} = 4.5V, I_D = 130mA$		--	4.3	9	
Forward Transconductance	$V_{DS} = 10V, I_D = 170mA$	g_{fs}	--	408	--	mS
Dynamic (Note 4)						
Total Gate Charge	$V_{DS} = 50V, I_D = 170mA,$ $V_{GS} = 10V$	Q_g	--	2	--	nC
Total Gate Charge	$V_{DS} = 50V, I_D = 130mA,$ $V_{GS} = 4.5V$	Q_g	--	1.1	--	nC
Gate-Source Charge		Q_{gs}	--	0.4	--	
Gate-Drain Charge		Q_{gd}	--	0.4	--	
Input Capacitance	$V_{DS} = 50V, V_{GS} = 0V,$ $f = 1.0MHz$	C_{iss}	--	34.7	--	pF
Output Capacitance		C_{oss}	--	6.2	--	
Reverse Transfer Capacitance		C_{rss}	--	2.9	--	
Switching (Note 5)						
Turn-On Delay Time	$V_{DD} = 50V, R_G = 6.0\Omega,$ $I_D = 170mA, V_{GS} = 10V$	$t_{d(on)}$	--	3.3	--	ns
Turn-On Rise Time		t_r	--	1.9	--	
Turn-Off Delay Time		$t_{d(off)}$	--	9.1	--	
Turn-Off Fall Time		t_f	--	19.3	--	
Source-Drain Diode						
Forward Voltage (Note 3)	$I_S = 170mA, V_{GS} = 0V$	V_{SD}	--	0.9	1.3	V

Notes:

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

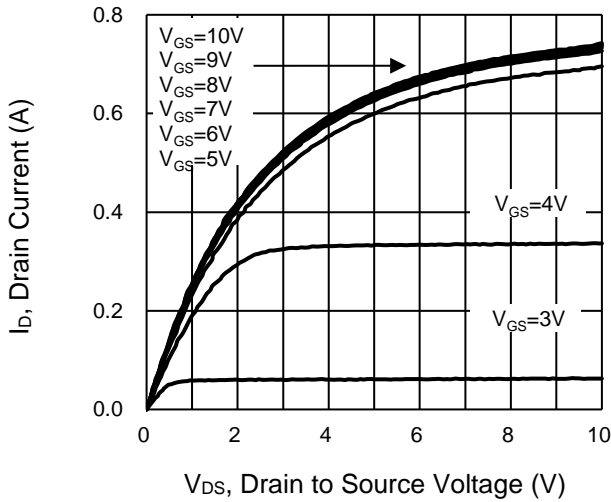
ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TQM123KCX RFG	SOT-23	3,000pcs / 7" Reel

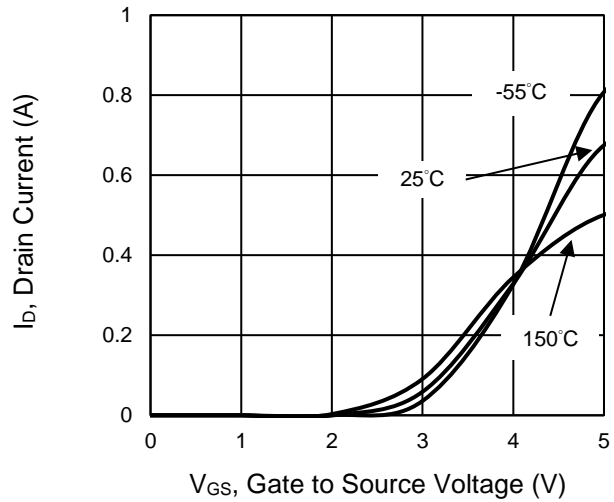
CHARACTERISTICS CURVES

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

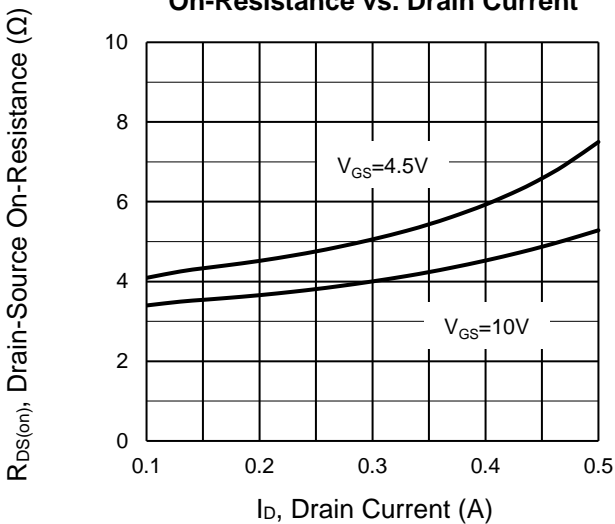
Output Characteristic



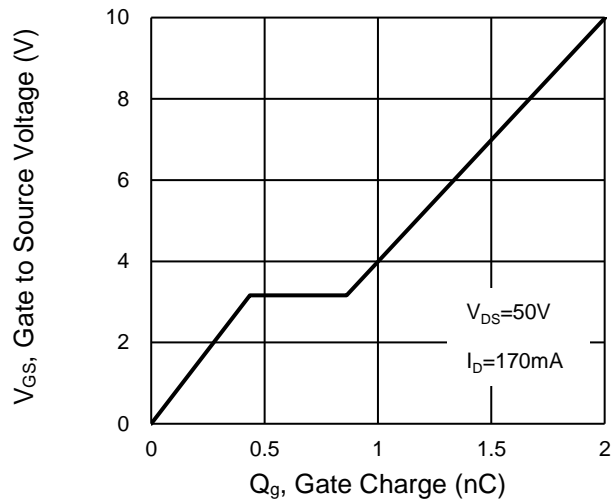
Transfer Characteristics



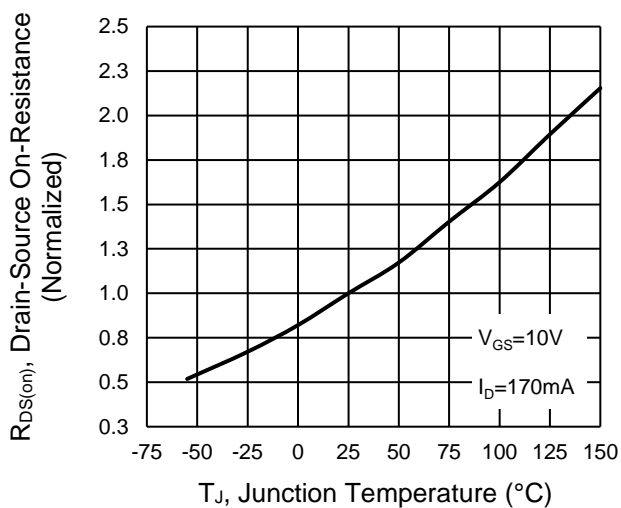
On-Resistance vs. Drain Current



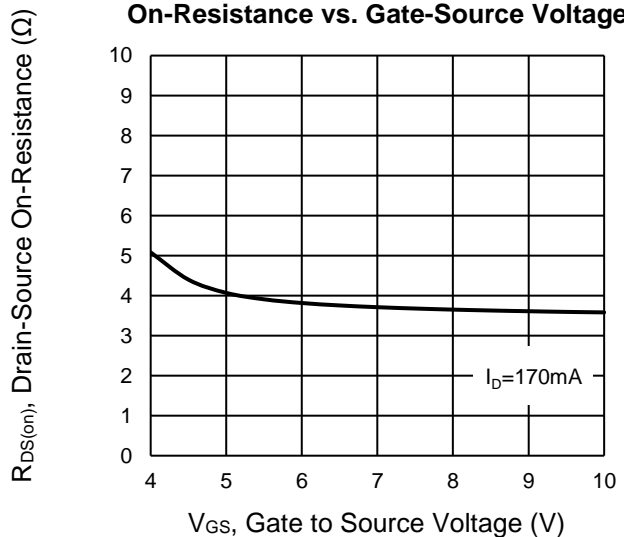
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



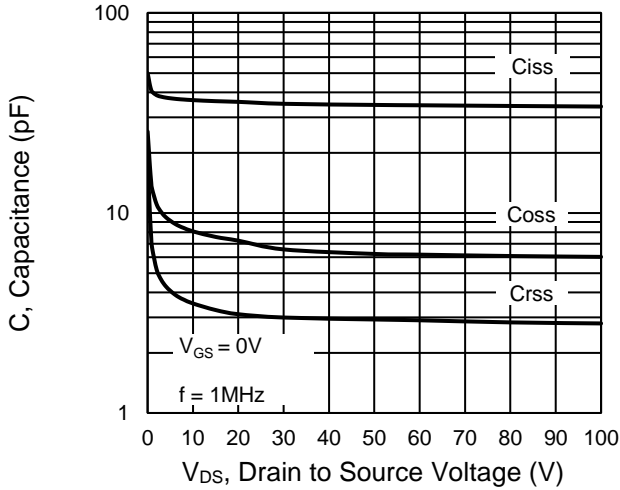
On-Resistance vs. Gate-Source Voltage



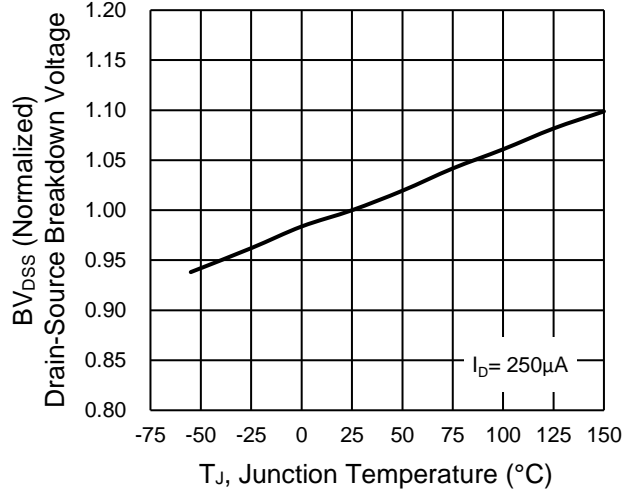
CHARACTERISTICS CURVES

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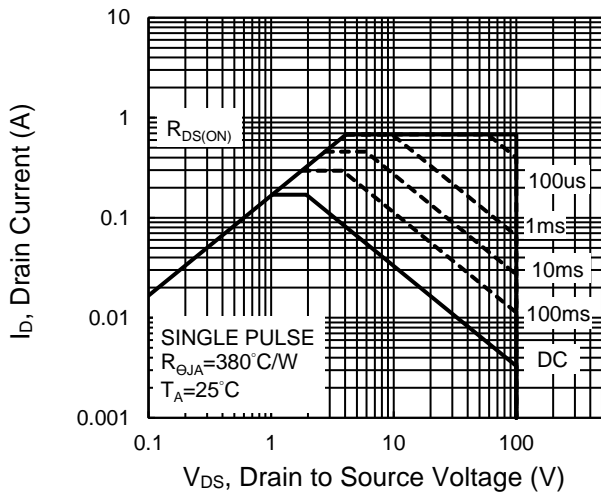
Capacitance vs. Drain-Source Voltage



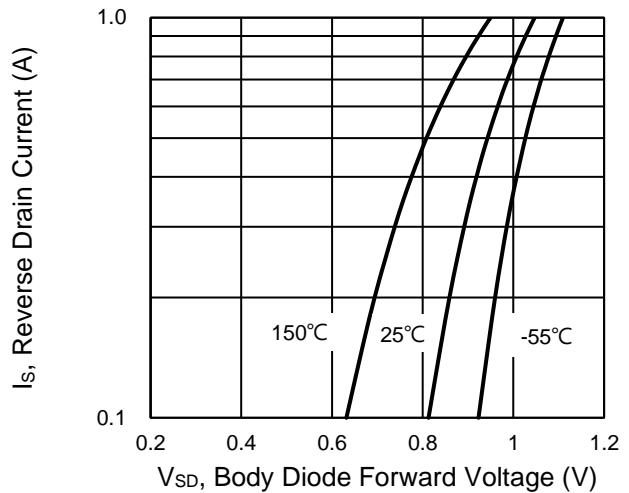
BV_{DSS} vs. Junction Temperature



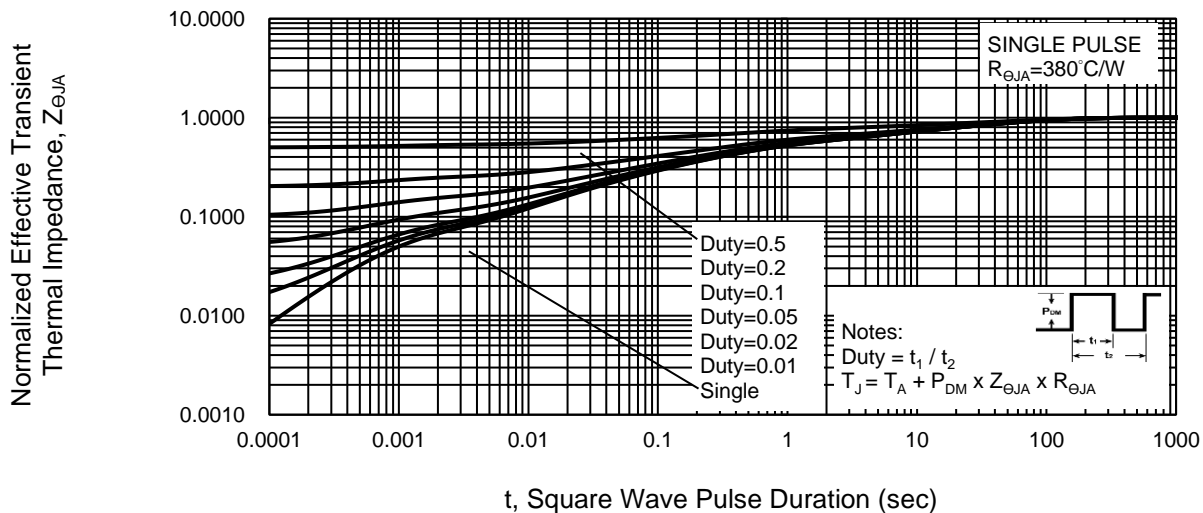
Maximum Safe Operating Area, Junction-to-Ambient



Source-Drain Diode Forward Current vs. Voltage



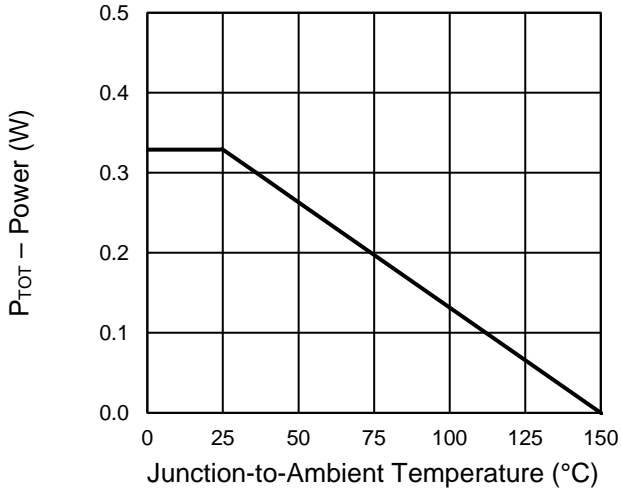
Normalized Thermal Transient Impedance, Junction-to-Ambient



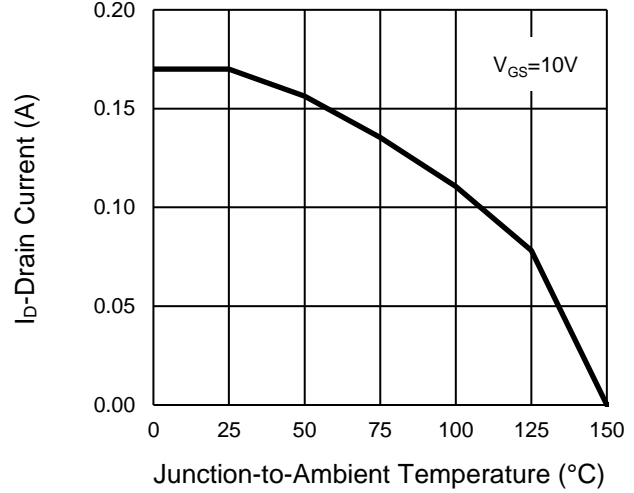
CHARACTERISTICS CURVES

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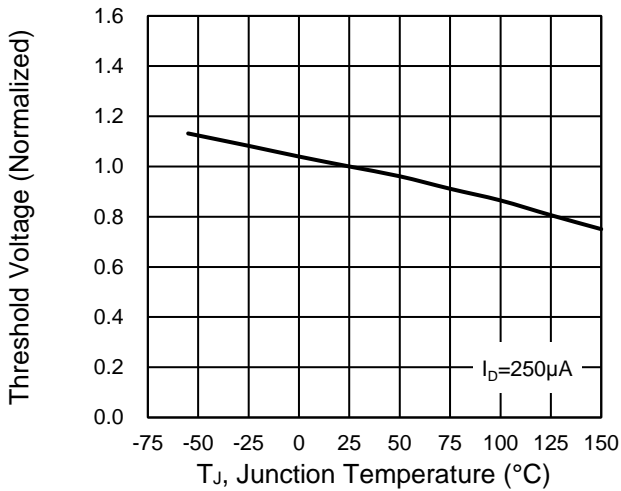
Power Dissipation



Drain Current

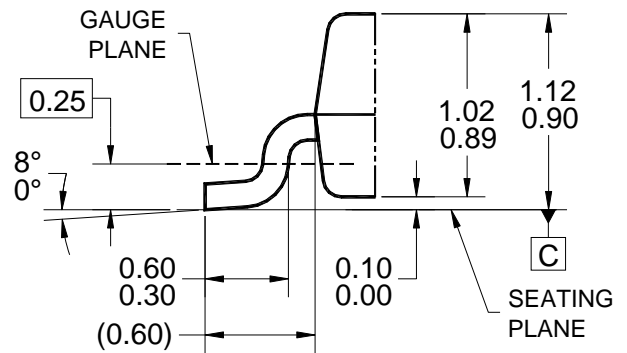
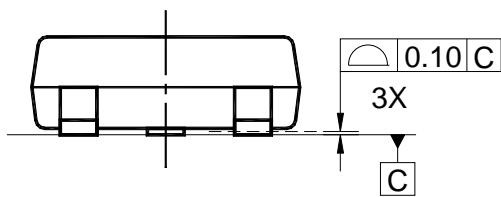
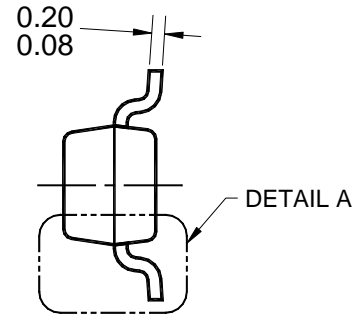
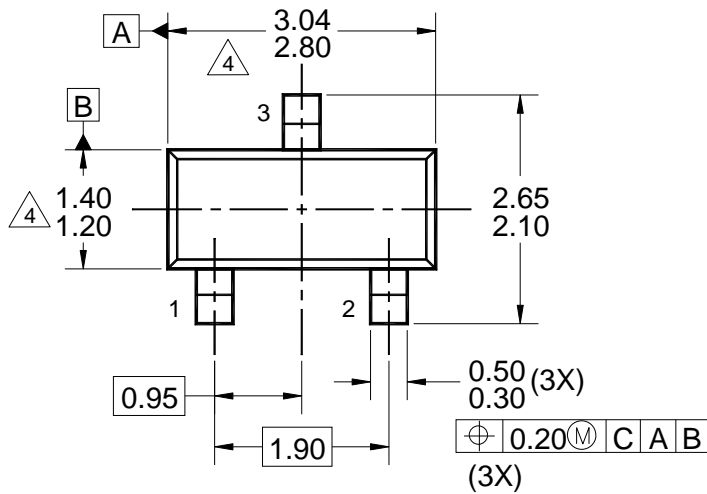


Normalized gate threshold voltage vs Temperature

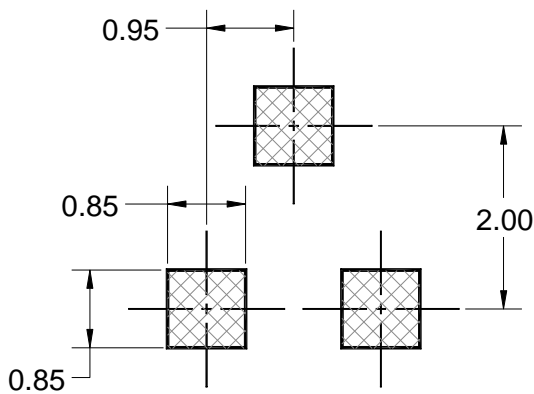


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

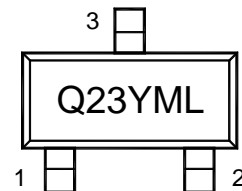
SOT-23



DETAIL A, ROTATED -90°
(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. PACKAGE OUTLINE REFERENCE: JEDEC TO-236, ISSUE H, VARIATION AB.
4. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
5. DWG NO. REF: HQ2SD07-SOT23SSD-105 REV A.

- 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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