

Small Signal Dual N-Channel MOSFET

FEATURES

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

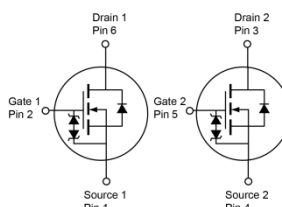
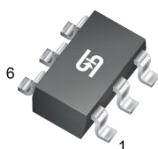
APPLICATIONS

- 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



SOT-363



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
Drain-Source Voltage		V_{DS}	60
Gate-Source Voltage		V_{GS}	± 20
Continuous Drain Current	$T_A = 25^\circ\text{C}$	I_D	320
Pulsed Drain Current (Note 1)		I_{DM}	1.28
Total Power Dissipation	$T_A = 25^\circ\text{C}$	P_D	320
	$T_A = 125^\circ\text{C}$		64
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150

THERMAL PERFORMANCE			
PARAMETER		SYMBOL	LIMIT
Junction to Ambient Thermal Resistance (Note 2)		$R_{\theta JA}$	390

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°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)}	0.5	1.1	1.5	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)}	--	1.1	1.6	Ω
	V _{GS} = 4.5V, I _D = 290mA		--	1.3	2	
	V _{GS} = 2.5V, I _D = 100mA		--	2.2	6.5	
Forward Transconductance	V _{DS} = 10V, I _D = 320mA	g _{fs}	--	615	--	mS
Dynamic (Note 4)						
Total Gate Charge	V _{DS} = 30V, I _D = 320mA, V _{GS} = 10V	Q _g	--	1.8	--	nC
Total Gate Charge	V _{DS} = 30V, I _D = 290mA, 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}	--	28	--	pF
Output Capacitance		C _{oss}	--	8	--	
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)}	--	2.6	--	ns
Turn-On Rise Time		t _r	--	1.8	--	
Turn-Off Delay Time		t _{d(off)}	--	8.2	--	
Turn-Off Fall Time		t _f	--	7.4	--	
Source-Drain Diode						
Forward Voltage (Note 3)	I _S = 320mA, V _{GS} = 0V	V _{SD}	--	0.9	1.2	V

Notes:

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

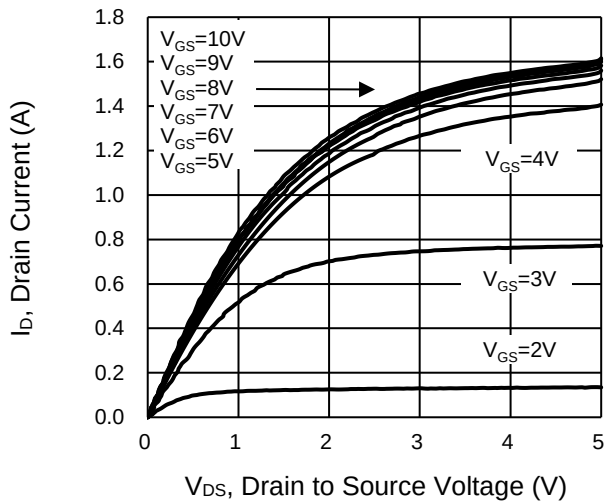
ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TQM138KDCU6 RFG	SOT-363	3,000pcs / 7" Reel

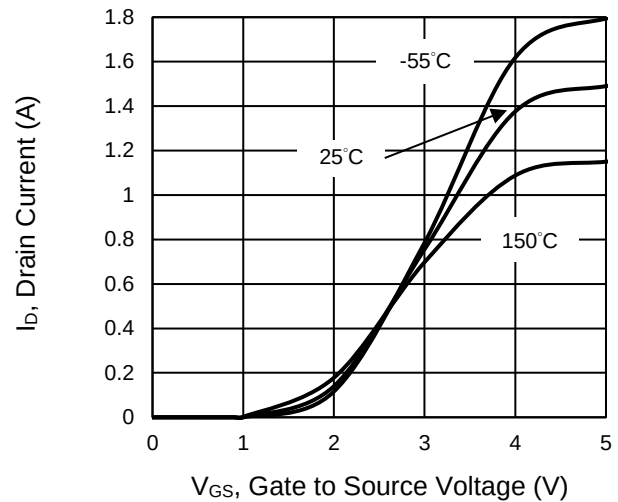
CHARACTERISTICS CURVES

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

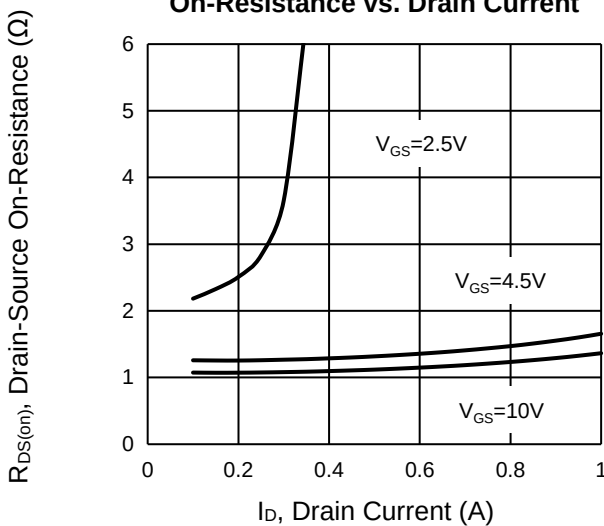
Output Characteristic



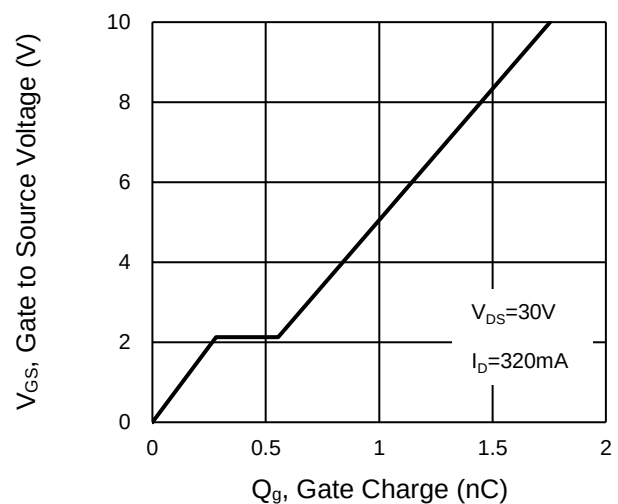
Transfer Characteristics



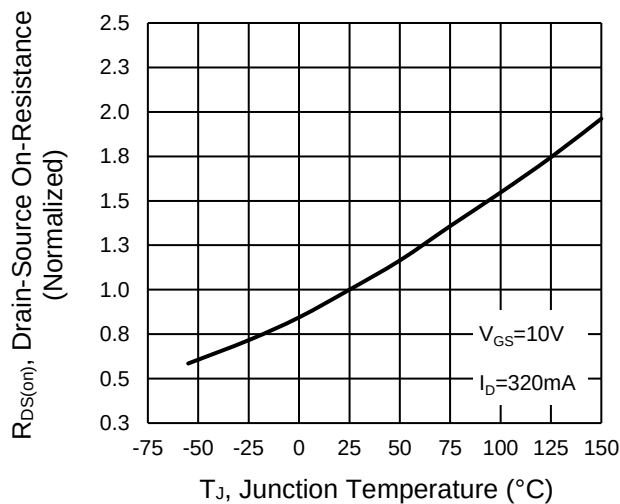
On-Resistance vs. Drain Current



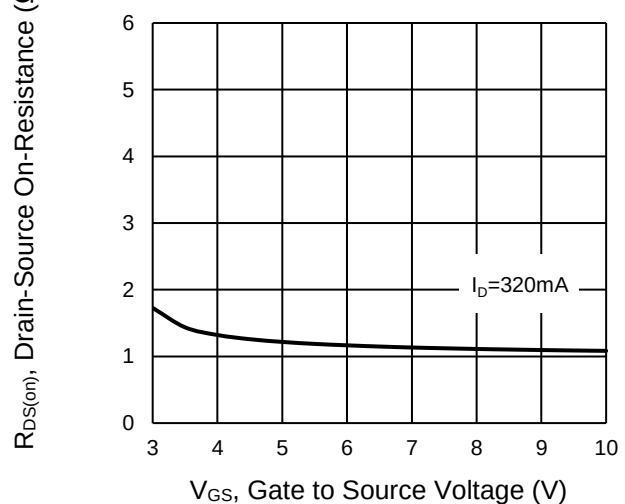
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



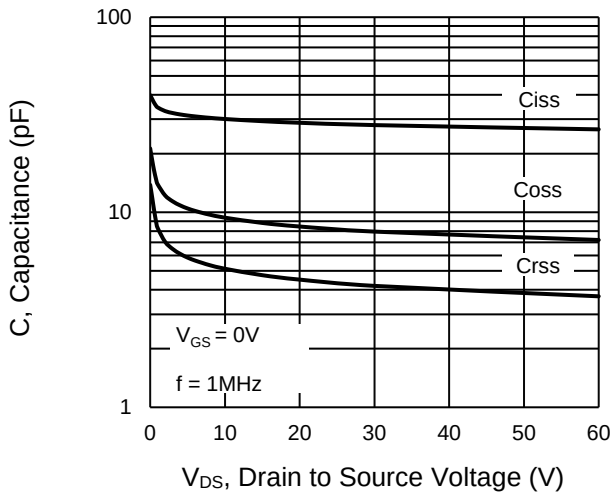
On-Resistance vs. Gate-Source Voltage



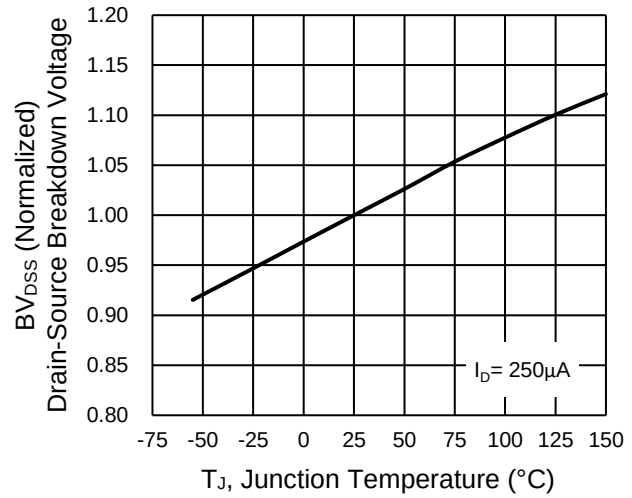
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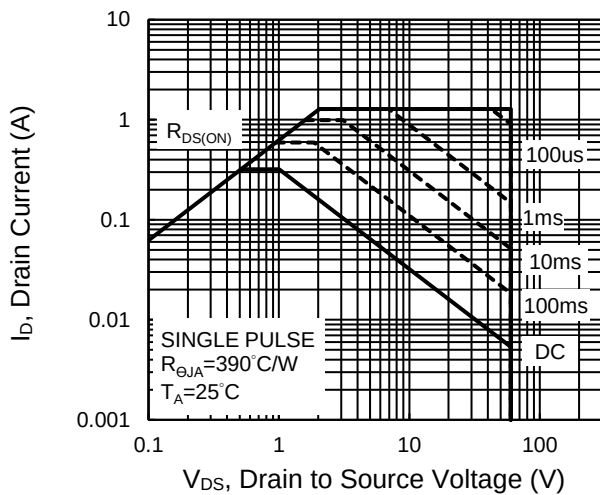
Capacitance vs. Drain-Source Voltage



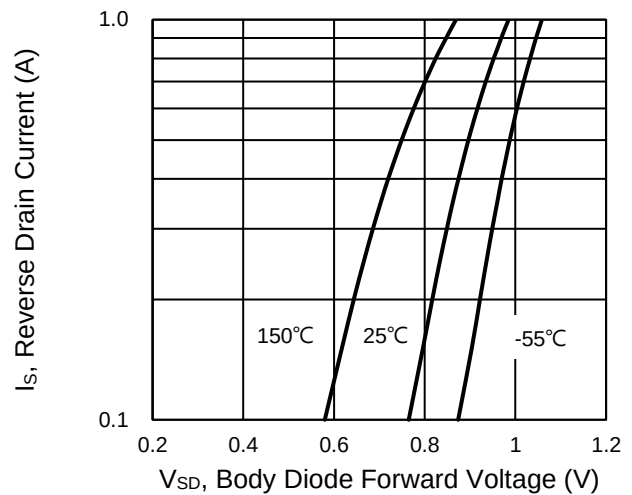
BV_{DSS} vs. Junction Temperature



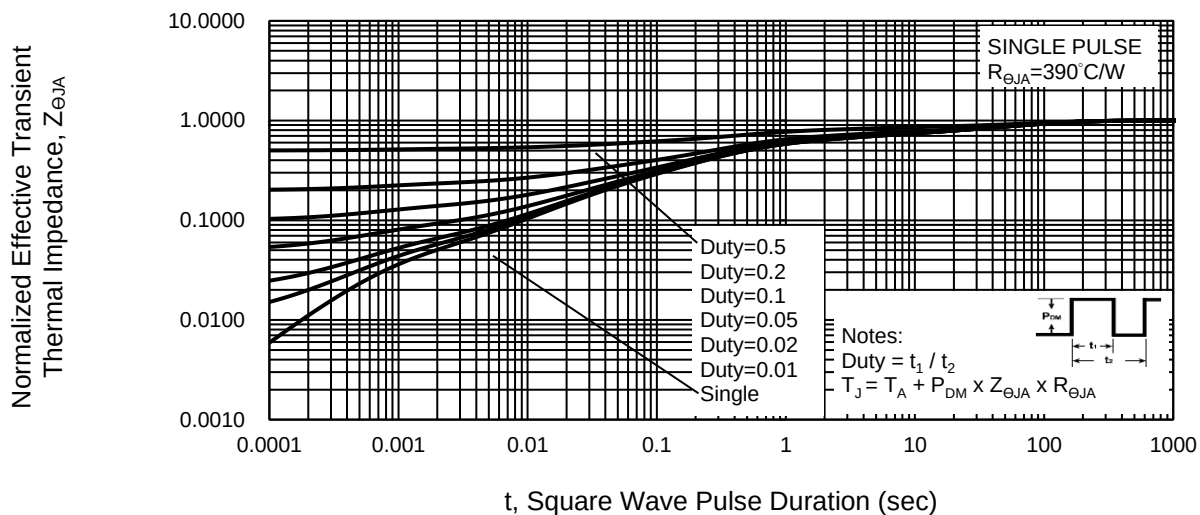
Maximum Safe Operating Area, Junction-to-Ambient



Source-Drain Diode Forward Current vs. Voltage

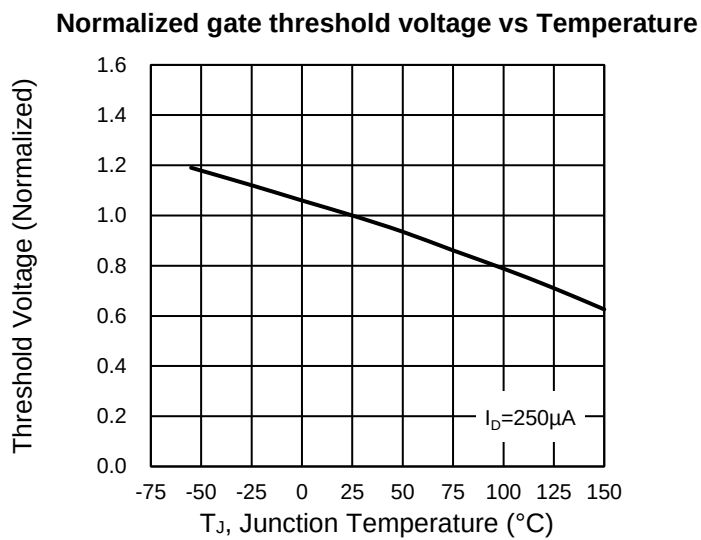
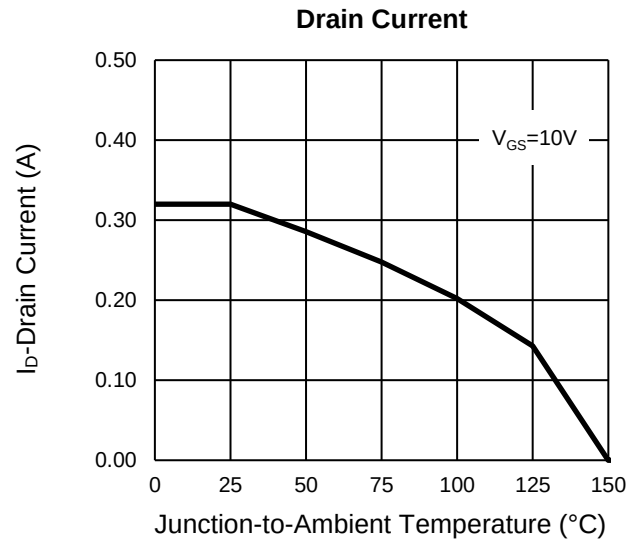
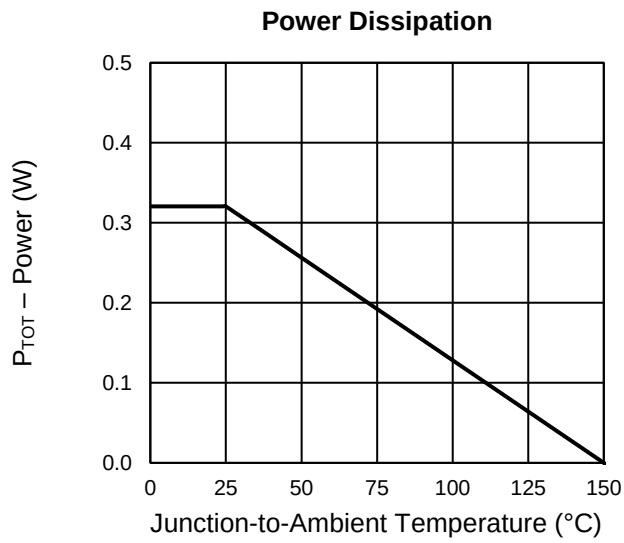


Normalized Thermal Transient Impedance, Junction-to-Ambient



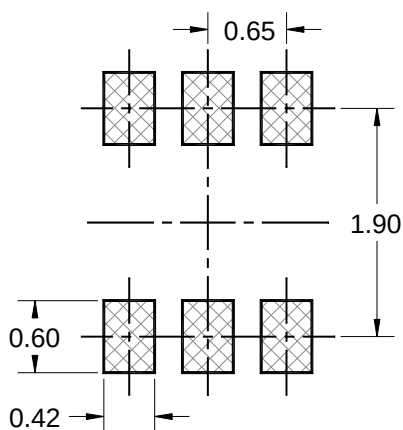
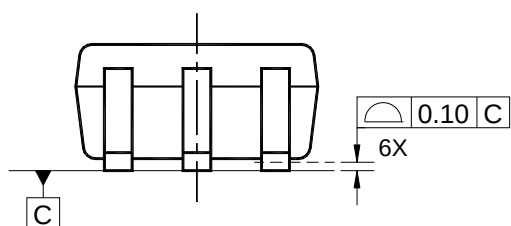
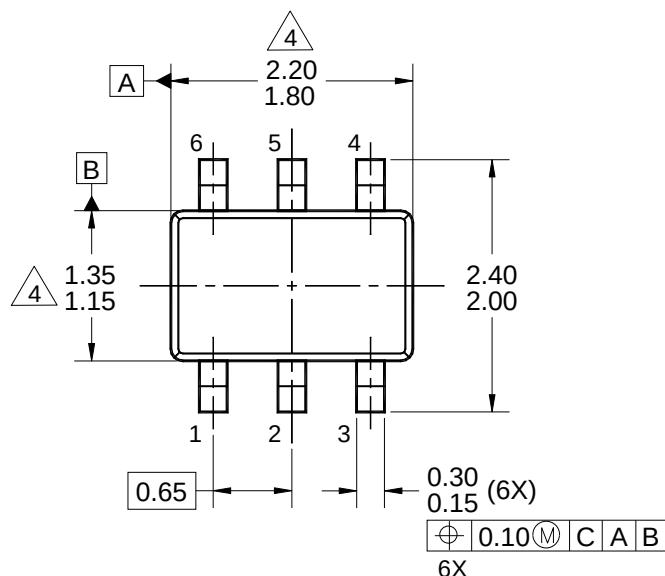
CHARACTERISTICS CURVES

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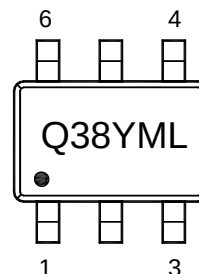
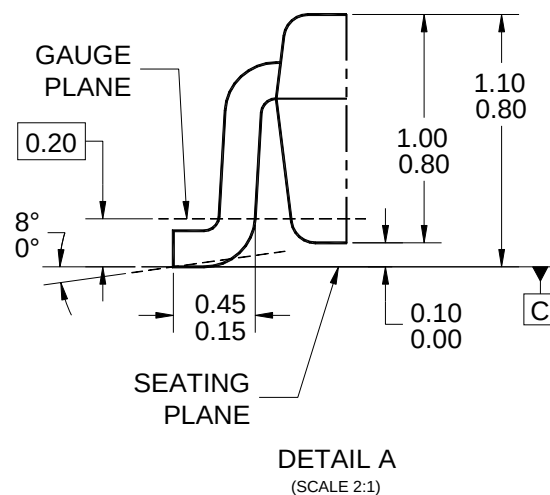


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

SOT-363



SUGGESTED PAD LAYOUT



MARKING DIAGRAM

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)

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. PACKAGE OUTLINE REFERENCE: JEITA ED-7500A, EIAJ SC-88.
4. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
5. DWG NO. REF: HQ2SD07-SOT363-097 REV A.

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