

P-Channel Enhancement Mode Power MOSFET

Description

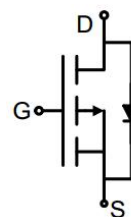
The SI7115DN-T1-GE3 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

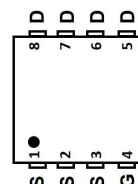
- V_{DS} -150V
- I_D (at $V_{GS} = -10V$) -9A
- $R_{DS(ON)}$ (at $V_{GS} = -10V$) < 280m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

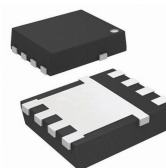
- Power switch
- DC/DC converters



Schematic diagram



pin assignment



DFN3X3-8L

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-150	V
Continuous Drain Current	I_D	-9	A
		-5.7	
Pulsed Drain Current (note1)	I_{DM}	-36	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	50	W
Single pulse avalanche energy (note2)	E_{AS}	56	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	50	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	R_{thJC}	2.5	$^\circ\text{C/W}$

Specifications T _J = 25°C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-150	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -150V, V _{GS} = 0V	--	--	-1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-2.0	-2.7	-4.0	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = -10V, I _D = -5A	--	220	280	mΩ
Forward Transconductance	g _{FS}	V _{DS} = -5V, I _D = -5A	--	11	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = -75V, f = 1.0MHz	--	1400	--	pF
Output Capacitance	C _{oss}		--	60	--	
Reverse Transfer Capacitance	C _{rss}		--	1	--	
Total Gate Charge	Q _g	V _{DD} = -75V, I _D = -5A, V _{GS} = -10V	--	28	--	nC
Gate-Source Charge	Q _{gs}		--	9	--	
Gate-Drain Charge	Q _{gd}		--	2	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = -75V, I _D = -5A, R _G = 1.6Ω	--	26	--	ns
Turn-on Rise Time	t _r		--	7	--	
Turn-off Delay Time	t _{d(off)}		--	28	--	
Turn-off Fall Time	t _f		--	12	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	-9	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = -5A, V _{GS} = 0V	--	--	-1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = -5A, V _{GS} = 0V di/dt=-100A/us	--	150	--	nC
Reverse Recovery Time	T _{rr}		--	37	--	ns

Notes

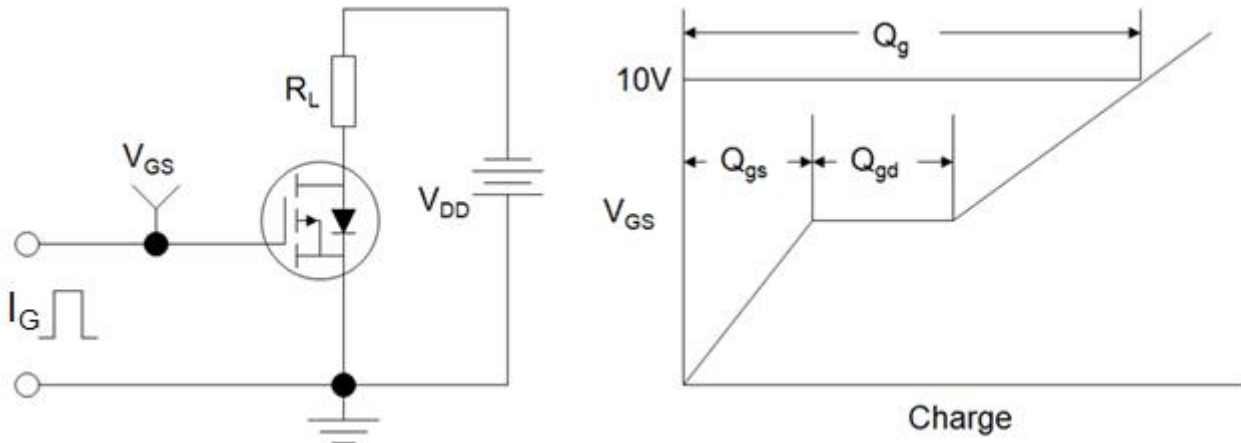
1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. EAS condition : $T_J = 25^{\circ}\text{C}$, $V_{DD} = -50V$, $V_{GS} = -10V$, $L = 0.5mH$, $R_g = 25\Omega$

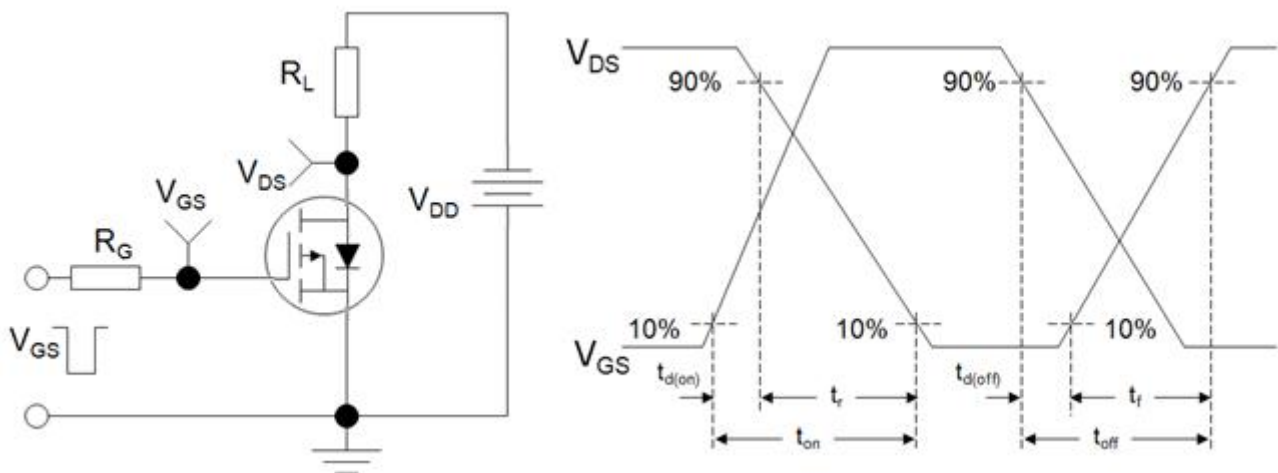
The table shows the minimum avalanche energy, which is 156mJ when the device is tested until failure

3. Identical low side and high side switch with identical R_G

Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

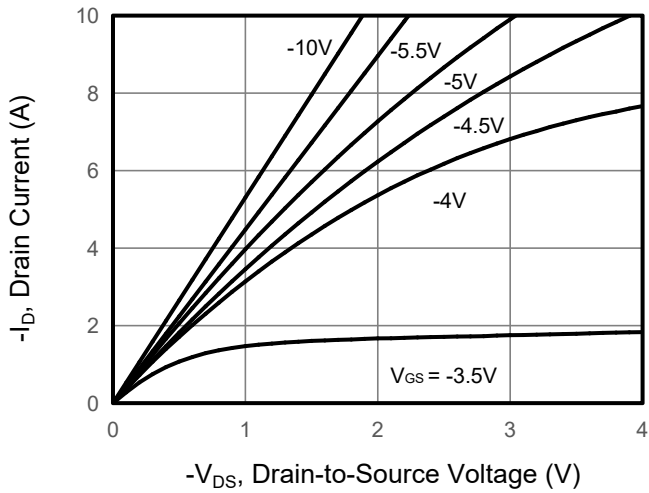


Figure 2. Transfer Characteristics

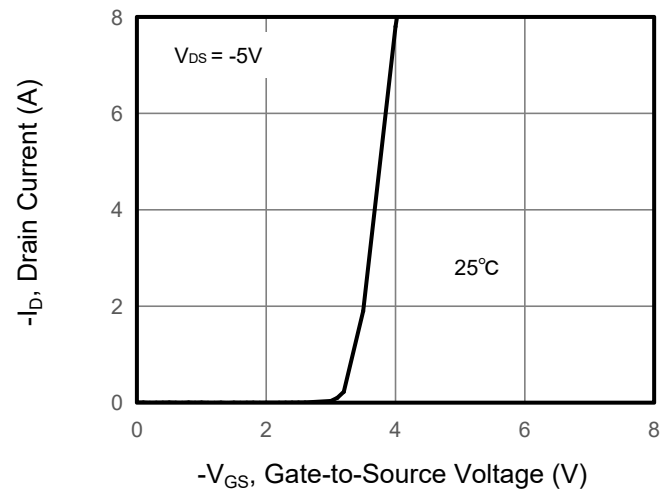


Figure 3. Drain Source On Resistance

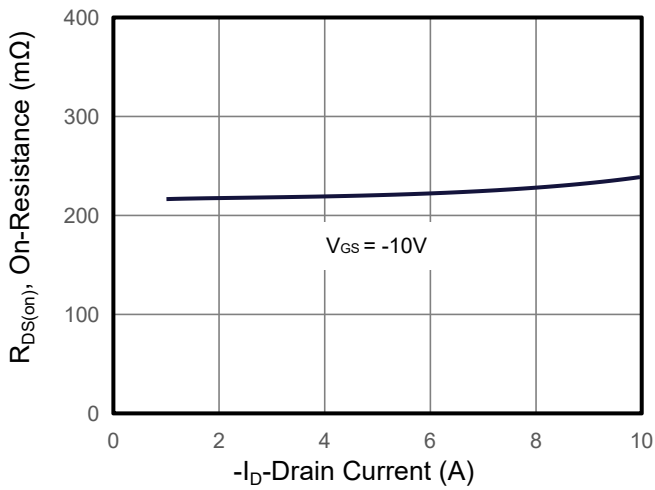


Figure 4. Gate Charge

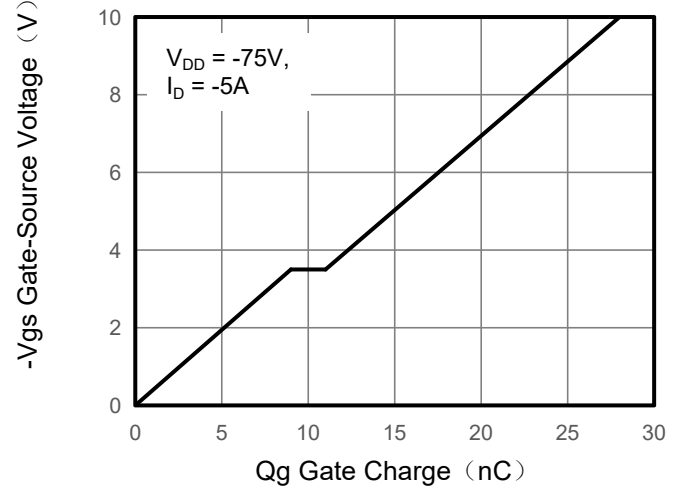


Figure 5. Capacitance

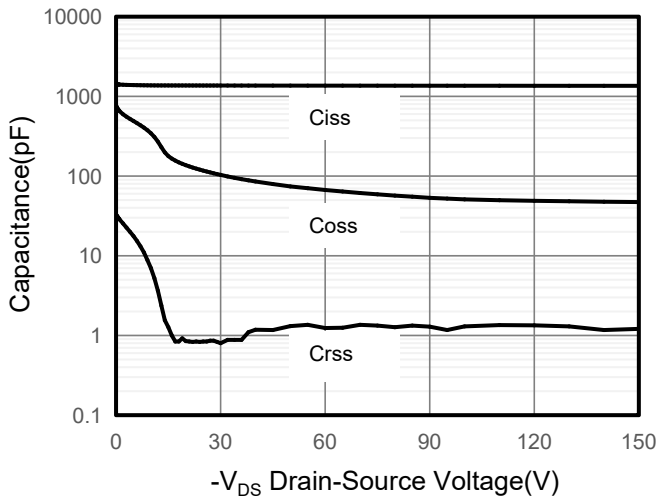
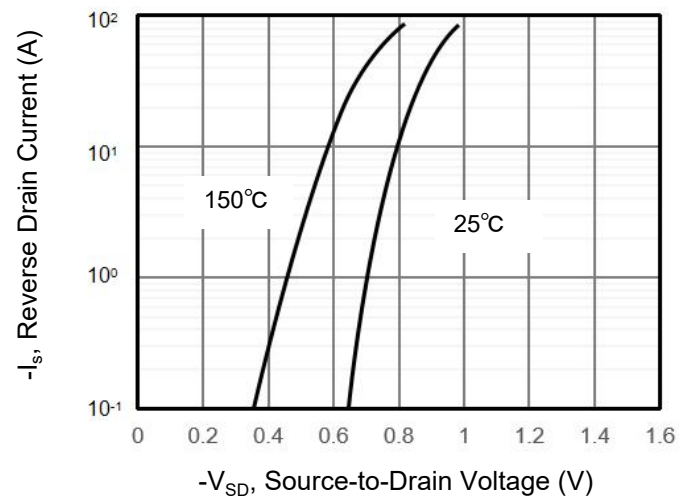


Figure 6. Source-Drain Diode Forward



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

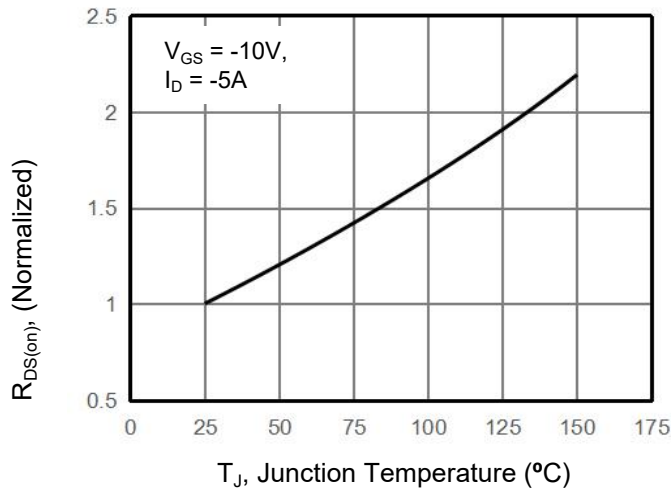


Figure 8. Safe Operation Area

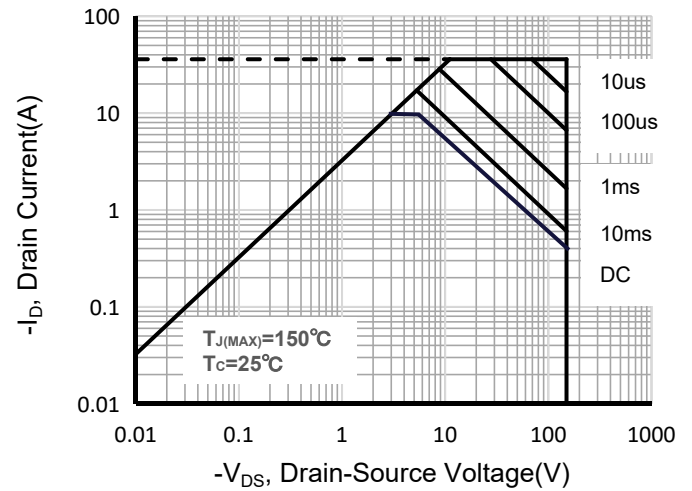


Figure 9. Maximum Continuous Drain Current vs Case Temperature

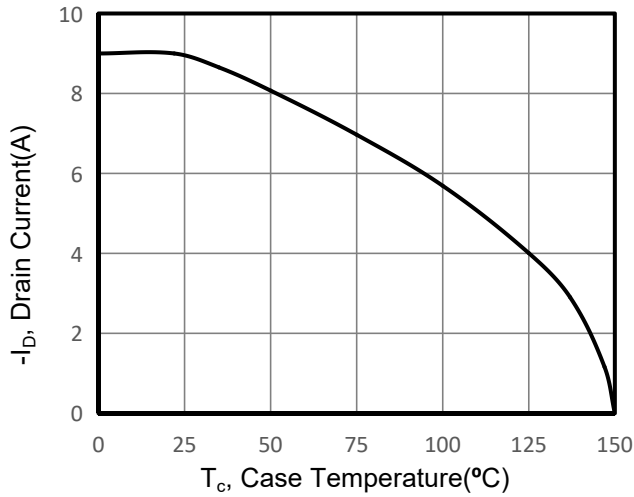
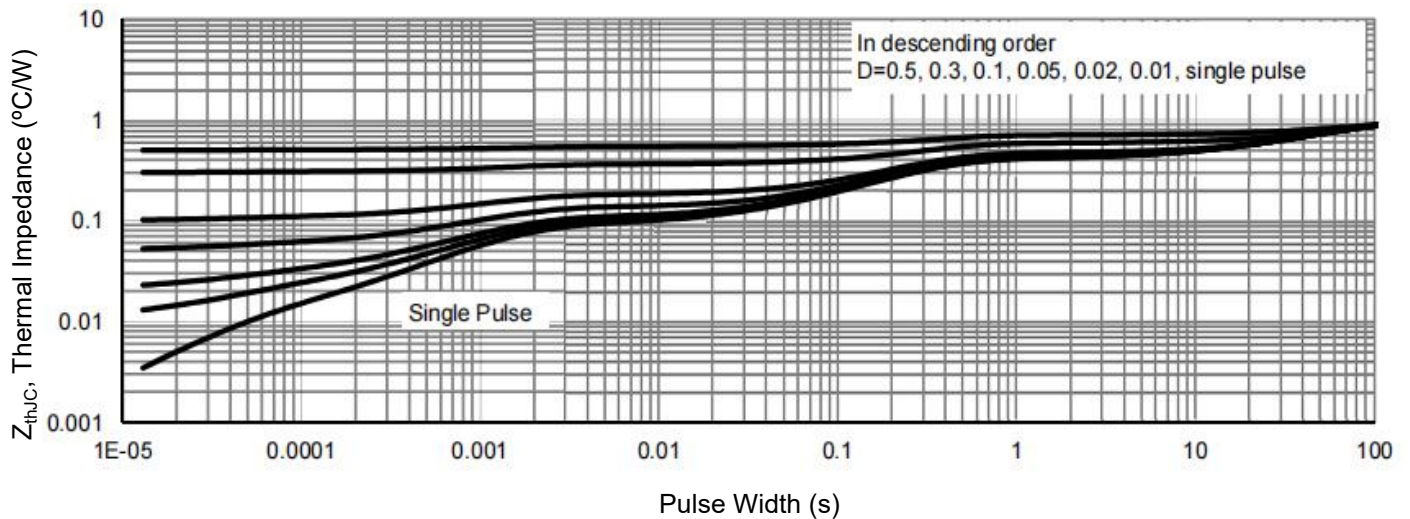
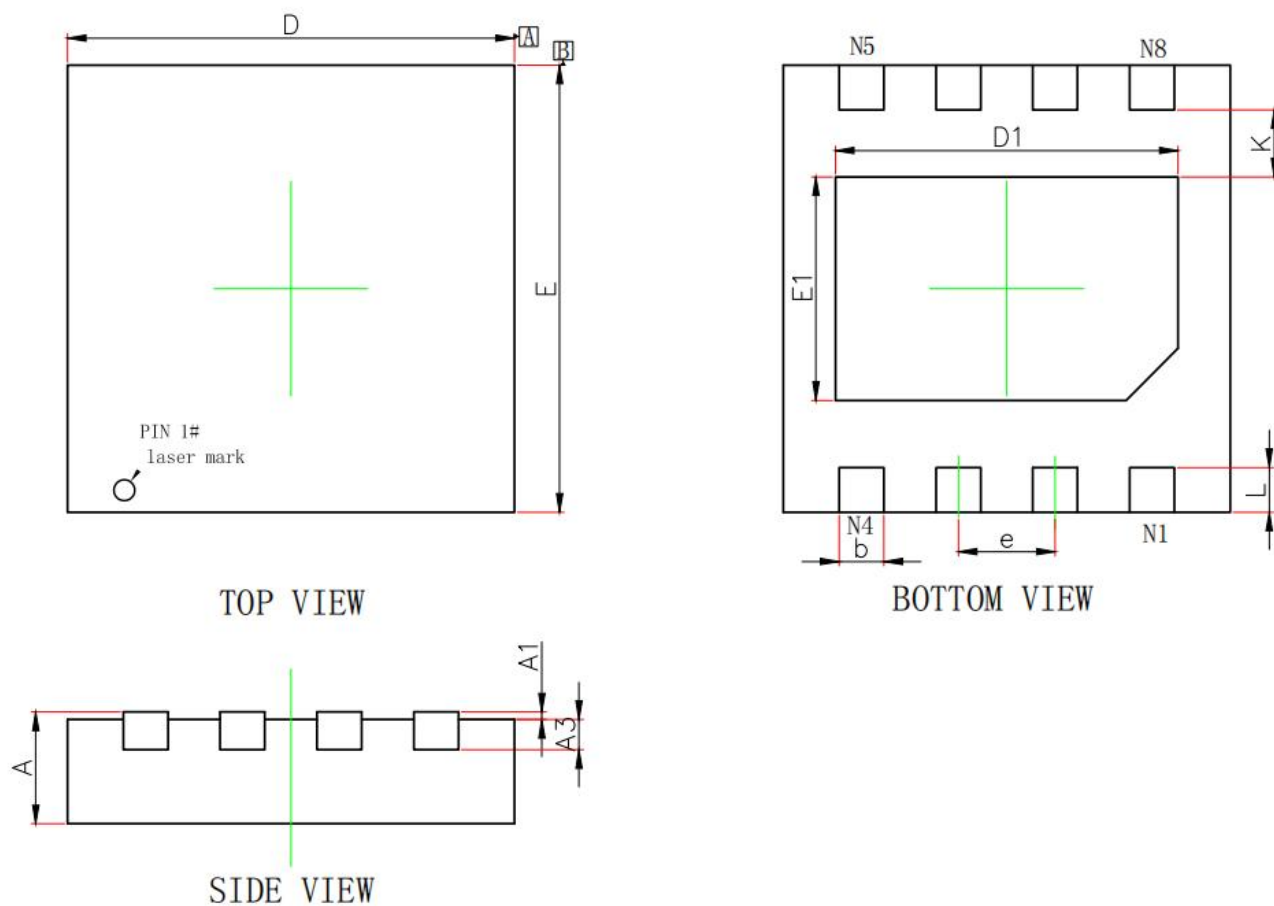


Figure 10. Normalized Maximum Transient Thermal Impedance



DFN3X3-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	3.000BSC.		0.118BSC.	
E	3.000BSC.		0.118BSC.	
D1	2.200	2.450	0.087	0.096
E1	1.400	1.600	0.055	0.063
k	0.250MIN.		0.010MIN.	
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
L	0.250	0.450	0.01	0.018