

Enhancement Mode N-Channel Power MOSFET

Features

- ◆ Low $R_{DS(on)}$ & FOM
- ◆ Excellent low switching loss
- ◆ Excellent stability and uniformity
- ◆ Easy to drive

Applications

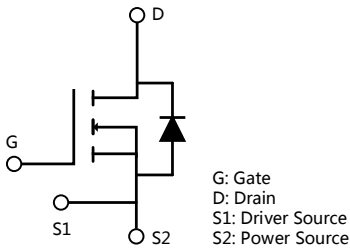
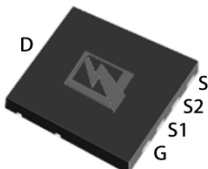
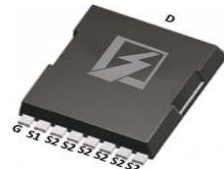
- ◆ PC power
- ◆ Server power supply
- ◆ Telecom
- ◆ Solar inverter
- ◆ Super charger for automobiles

■ General Description

OSS60R099xF use advanced GreenMOST™ technology to provide low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. This device is suitable for telecom and super charger applications.

◆ $V_{DS, min@Tjmax}$	650 V
◆ $I_{D, pulse}$	90 A
◆ $R_{DS(ON), max @ V_{GS}=10 V}$	99 mΩ
◆ Q_g	21.6 nC

■ Schematic and Package Information

SCHEMATIC DIAGRAM	PIN ASSIGNMENT-TOP VIEW	
 <p>G: Gate D: Drain S1: Driver Source S2: Power Source</p>	 <p>PDFN8×8 OSS60R099JF</p>	 <p>TOLL OSS60R099TF</p>

■ Absolute Maximum Ratings at $T_j=25^{\circ}\text{C}$ unless otherwise noted

PARAMETER	SYMBOL	VALUE	UNIT
Drain source voltage	V_{DS}	600	V
Gate source voltage	V_{GS}	±30	V
Continuous drain current ¹⁾ , $T_C=25^{\circ}\text{C}$	I_D	30	A
Continuous drain current ¹⁾ , $T_C=100^{\circ}\text{C}$		19	
Pulsed drain current ²⁾ , $T_C=25^{\circ}\text{C}$	$I_{D, pulse}$	90	A
Continuous diode forward current ¹⁾ , $T_C=25^{\circ}\text{C}$	I_S	30	A
Diode pulsed current ²⁾ , $T_C=25^{\circ}\text{C}$	$I_{S, pulse}$	90	A
Power dissipation ³⁾ , $T_C=25^{\circ}\text{C}$	P_D	219	W
Single pulsed avalanche energy ⁴⁾	E_{AS}	577.6	mJ
MOSFET dv/dt ruggedness, $V_{DS}=0\text{...}480\text{ V}$	dv/dt	50	V/ns
Reverse diode dv/dt , $V_{DS}=0\text{...}480\text{ V}$, $I_{SD}\leq I_D$	dv/dt	15	V/ns
Operation and storage temperature	T_{stg}, T_j	-55 to 150	$^{\circ}\text{C}$

■ Thermal Characteristics

PARAMETER	SYMBOL	VALUE	UNIT
Thermal resistance, junction-case	$R_{\theta JC}$	0.57	$^{\circ}\text{C}/\text{W}$
Thermal resistance, junction-ambient ⁵⁾	$R_{\theta JA}$	62.5	$^{\circ}\text{C}/\text{W}$

■ Electrical Characteristics at $T_j=25^{\circ}\text{C}$ unless otherwise specified

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Drain-source breakdown voltage	BV_{DSS}	600			V	$V_{GS}=0\text{ V}, I_D=1\text{ mA}$
		650	740			$V_{GS}=0\text{ V}, I_D=1\text{ mA}, T_j=150^{\circ}\text{C}$
Gate threshold voltage	$V_{GS(th)}$	2.9		3.9	V	$V_{DS}=V_{GS}, I_D=1\text{ mA}$
Drain-source on-state resistance	$R_{DS(on)}$		0.080	0.099	Ω	$V_{GS}=10\text{ V}, I_D=15\text{ A}$
			0.192			$V_{GS}=10\text{ V}, I_D=15\text{ A}, T_j=150^{\circ}\text{C}$
Gate-source leakage current	I_{GSS}			100	nA	$V_{GS}=30\text{ V}$
				-100		$V_{GS}=-30\text{ V}$
Drain-source leakage current	I_{DSS}			1	μA	$V_{DS}=600\text{ V}, V_{GS}=0\text{ V}$

■ Dynamic Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Input capacitance	C_{iss}		1282.1		pF	$V_{GS}=0\text{ V}, V_{DS}=50\text{ V}, f=100\text{ kHz}$
Output capacitance	C_{oss}		235.9		pF	
Reverse transfer capacitance	C_{rss}		9.1		pF	
Turn-on delay time	$t_{d(on)}$		24.9		ns	$V_{GS}=10\text{ V}, V_{DS}=400\text{ V}, R_G=2\ \Omega, I_D=20\text{ A}$
Rise time	t_r		32.3		ns	
Turn-off delay time	$t_{d(off)}$		42.3		ns	
Fall time	t_f		27.5		ns	

■ Gate Charge Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Total gate charge	Q_g		21.6		nC	$I_D=20\text{ A}$, $V_{DS}=400\text{ V}$, $V_{GS}=10\text{ V}$
Gate-source charge	Q_{gs}		6.9		nC	
Gate-drain charge	Q_{gd}		7.8		nC	
Gate plateau voltage	V_{plateau}		6.5		V	

■ Body Diode Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Diode forward voltage	V_{SD}			1.4	V	$I_S=30\text{ A}$, $V_{GS}=0\text{ V}$
Reverse recovery time	t_{rr}		416.0		ns	$V_R=400\text{ V}$, $I_S=20\text{ A}$, $di/dt=100\text{ A}/\mu\text{s}$
Reverse recovery charge	Q_{rr}		6.8		μC	
Peak reverse recovery current	I_{rrm}		32.1		A	

■ Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d is based on max. junction temperature, using junction-case thermal resistance.
- 4) $V_{DD}=100\text{ V}$, $R_G=50\ \Omega$, $L=60\text{ mH}$, starting $T_j=25\text{ }^\circ\text{C}$.
- 5) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_a=25\text{ }^\circ\text{C}$.

■ **Electrical Characteristics Diagrams**

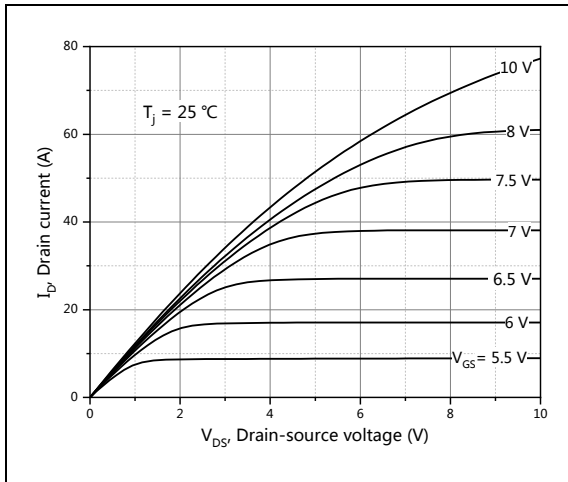


Figure 1, Typ. output characteristics

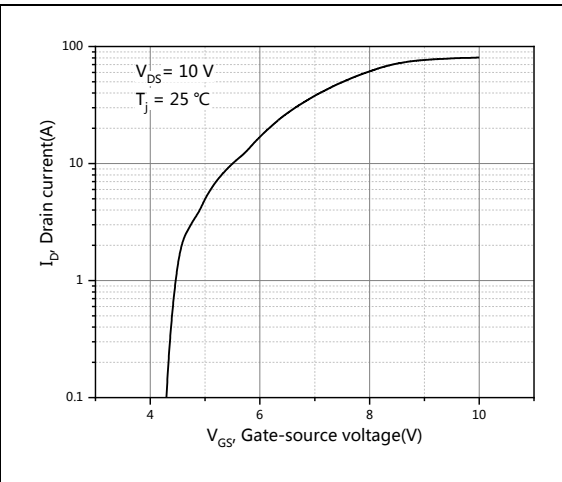


Figure 2, Typ. transfer characteristics

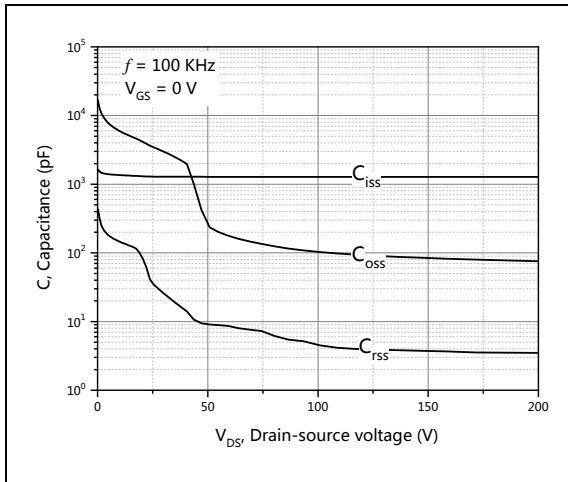


Figure 3, Typ. capacitances

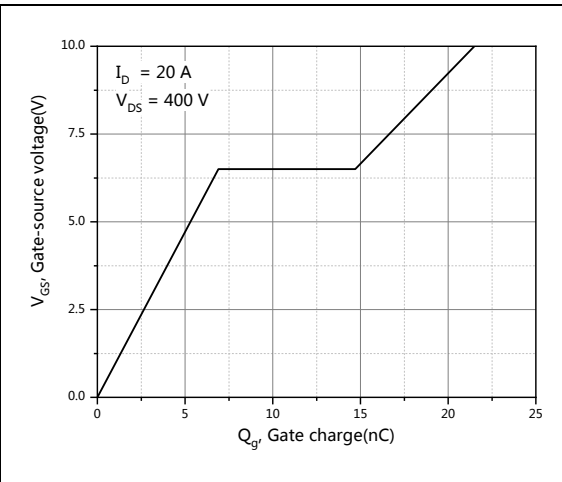


Figure 4, Typ. gate charge

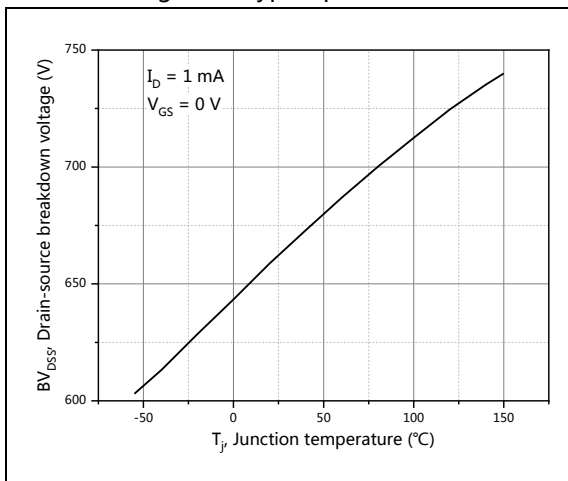


Figure 5, Drain-source breakdown voltage

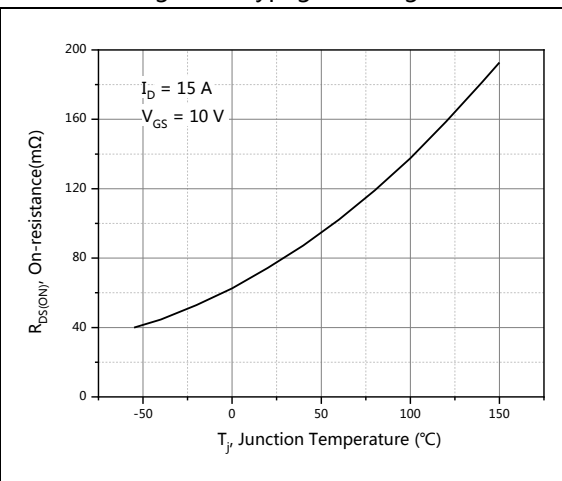


Figure 6, Drain-source on-state resistance

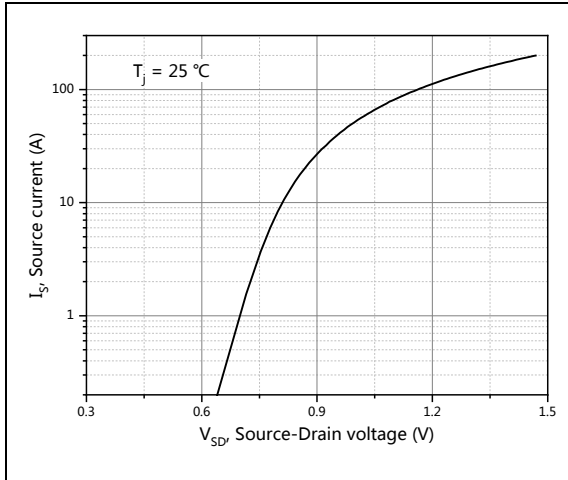


Figure 7, Forward characteristic of body diode

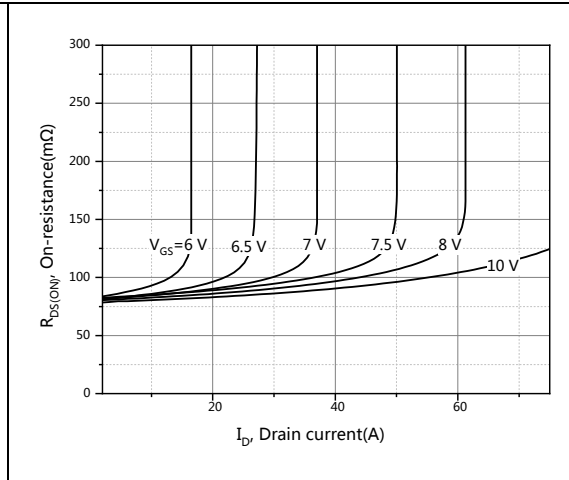


Figure 8, Drain-source on-state resistance

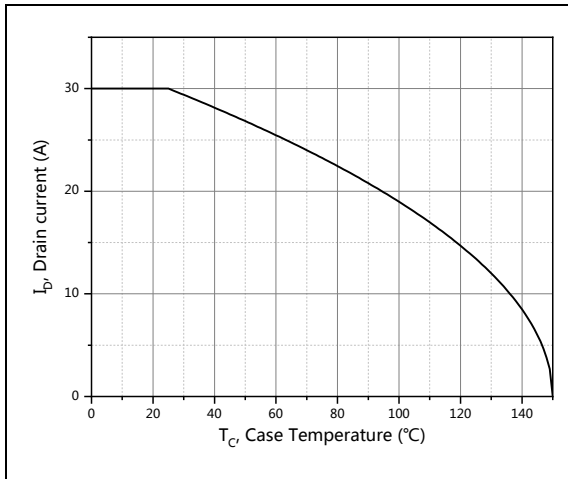


Figure 9, Drain current

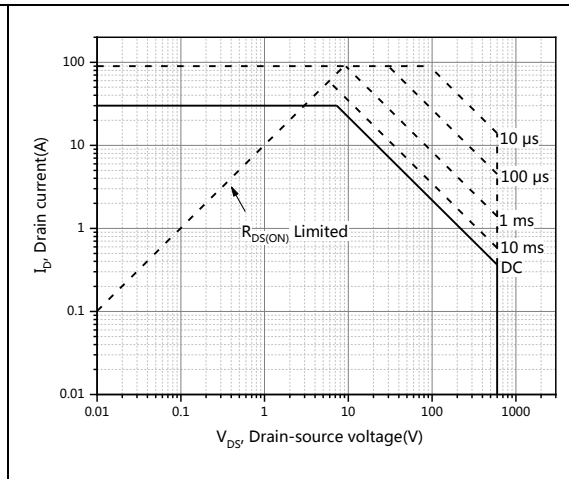


Figure 10, Safe operation area $T_C=25\text{ }^\circ\text{C}$

■ Test circuits and waveforms

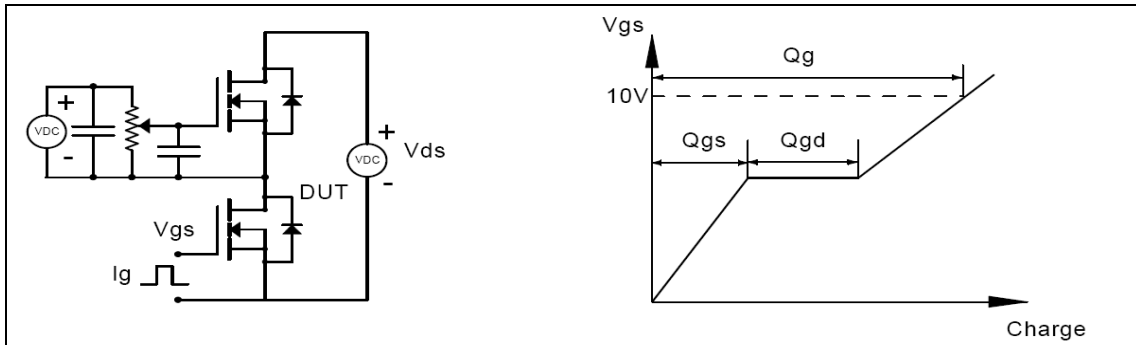


Figure 1, Gate charge test circuit & waveform

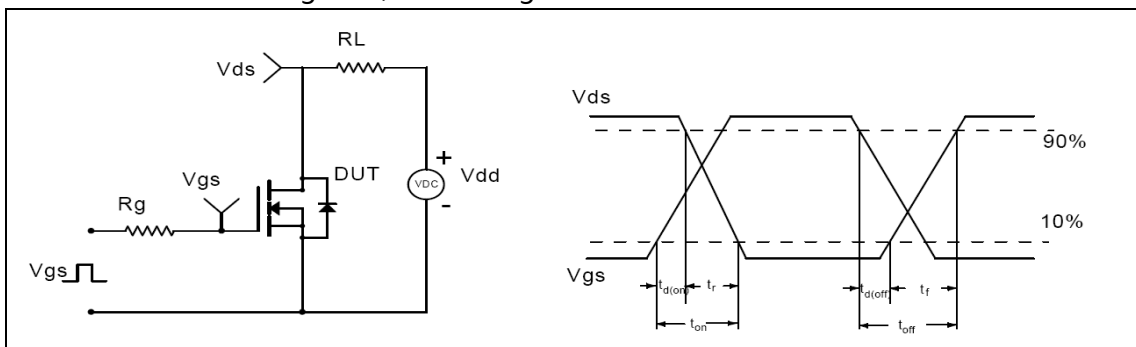


Figure 2, Switching time test circuit & waveforms

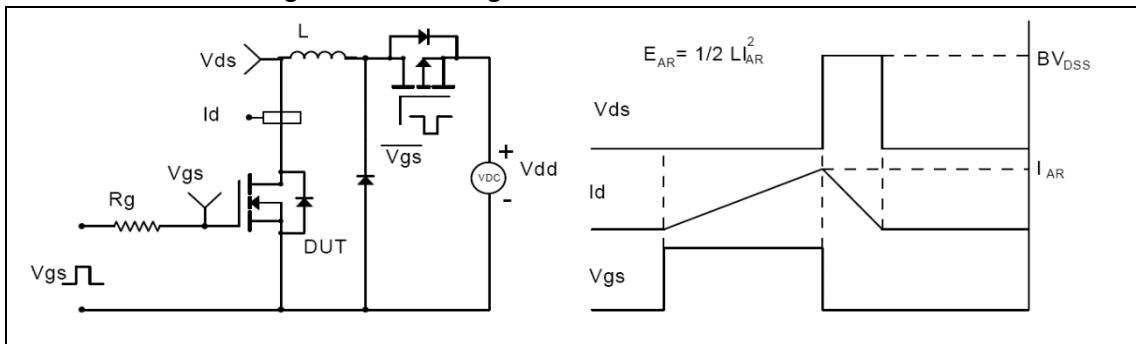


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

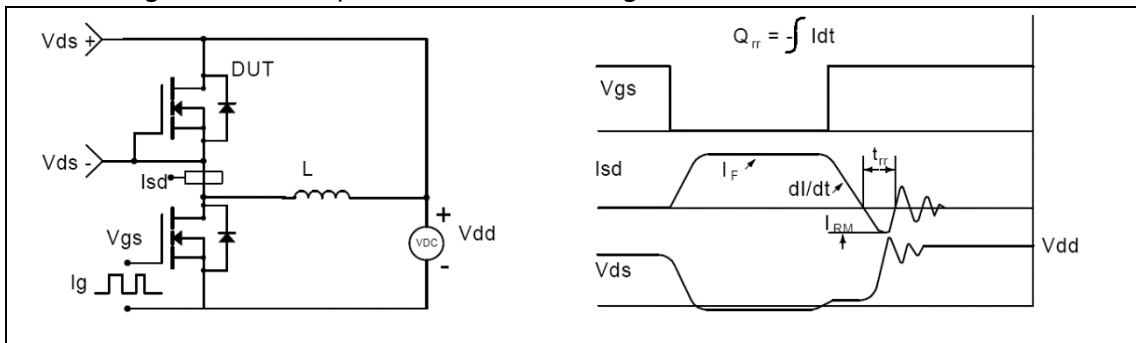
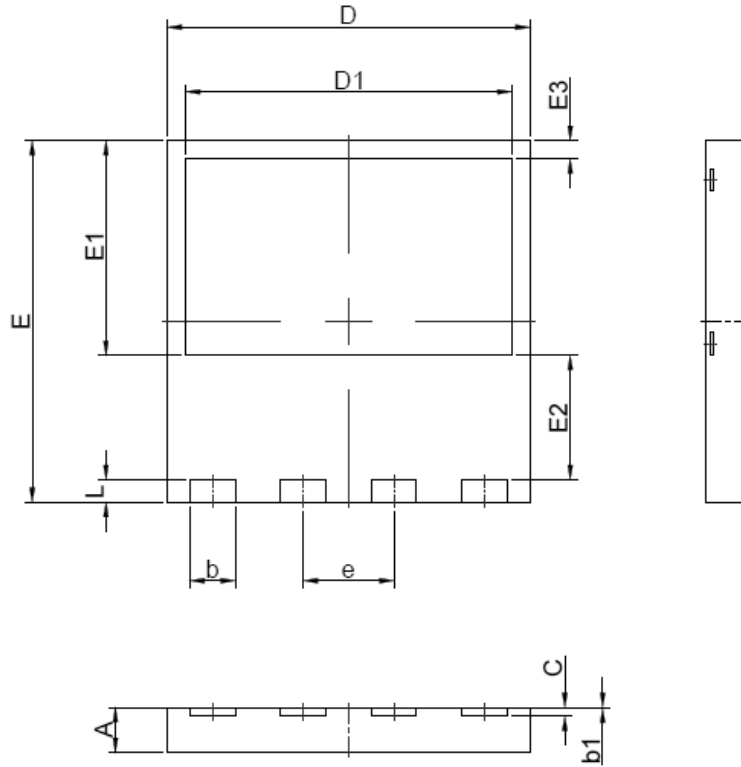


Figure 4, Diode reverse recovery test circuit & waveforms

■ Package Information

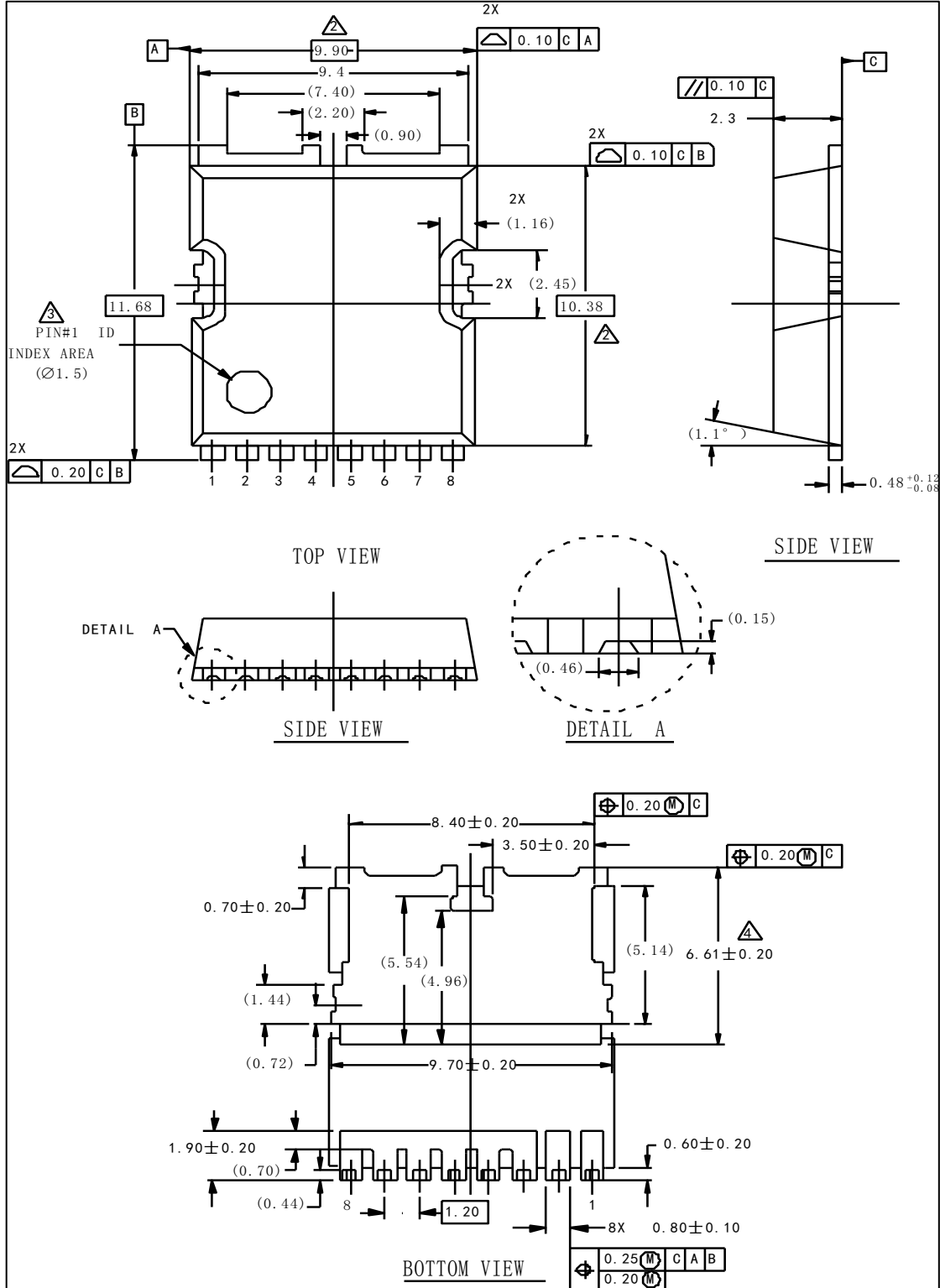
Figure1, PDFN8×8 package outline dimension



DIM	MIN	MAX	TYP
A	0.90	1.10	1.00
b	0.90	1.10	1.00
b1	0.00	0.05	0.02
C	0.2 REF		
D	7.90	8.10	8.00
D1	7.10	7.30	7.20
E	7.90	8.10	8.00
E1	4.65	4.85	4.75
E2	2.65	2.85	2.75
E3	0.30	0.50	0.40
e	2.0 BSC		
L	0.40	0.60	0.50

■ Package Information

Figure2, TOLL package outline dimension



■ Ordering Information

Package	Units/Reel	Reels/Inner Box	Units/Inner Box	Inner Box/Carton Box	Units/Carton Box
PDFN8×8	2500	1	2500	10	25000
TOLL	2500	1	2500	10	25000

■ Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSS60R099JF	PDFN8×8	yes	yes	yes
OSS60R099TF	TOLL	yes	yes	yes