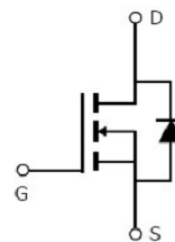


**Main Product Characteristics:**

$V_{DSS}$	700V
$R_{DS(on)}$	0.7 $\Omega$ (typ.)
$I_D$	7A <sup>①</sup>


**IPAK-NX**

**Marking and Pin Assignment**

**Schematic Diagram**
**Features and Benefits:**

- High dv/dt and avalanche capabilities
- 100% avalanche tested
- Low input capacitance and gate charge
- Low gate input resistance


**Description:**

The SSF7NS70UGX series MOSFETs is a new technology, which combines an innovative technology and advance process. This new technology achieves low  $R_{ds(on)}$ , energy saving, high reliability and uniformity, superior power density and space saving.

**Absolute Max Rating:**

Symbol	Parameter	Max.	Units
$I_D$ @ TC = 25°C	Continuous Drain Current, $V_{GS}$ @ 10V	7 <sup>①</sup>	A
$I_D$ @ TC = 100°C	Continuous Drain Current, $V_{GS}$ @ 10V	4.3 <sup>①</sup>	
$I_{DM}$	Pulsed Drain Current <sup>②</sup>	21	
$P_D$ @TC = 25°C	Power Dissipation <sup>③</sup>	41	W
	Linear Derating Factor	0.33	W/°C
$V_{DS}$	Drain-Source Voltage	700	V
$V_{GS}$	Gate-to-Source Voltage	± 30	V
$E_{AS}$	Single Pulse Avalanche Energy @ L=100mH	112	mJ
$I_{AS}$	Avalanche Current @ L=100mH	1.5	A
$T_J$ $T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +150	°C

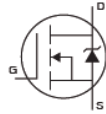
## Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ③	—	3.0	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Junction-to-ambient ( $t \leq 10\text{s}$ ) ④	—	62	$^{\circ}\text{C}/\text{W}$

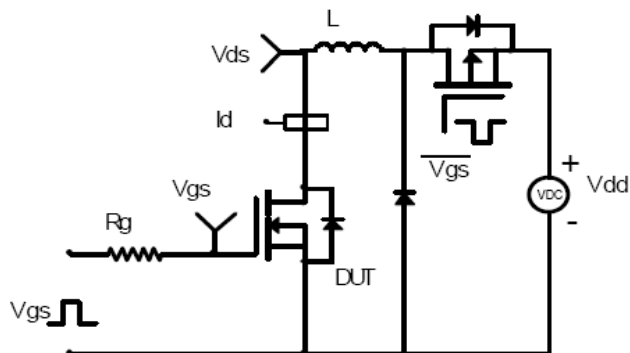
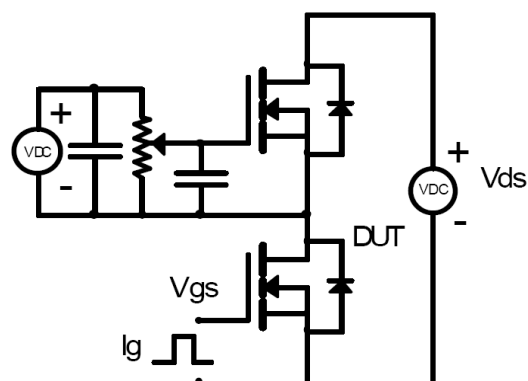
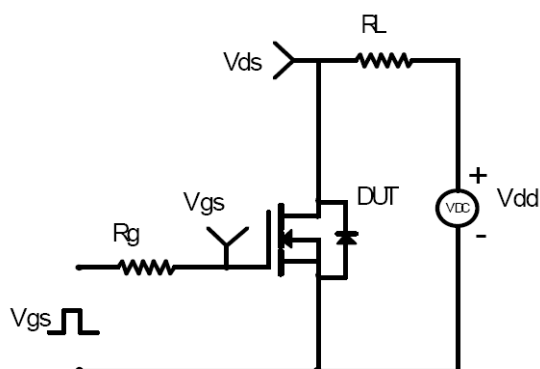
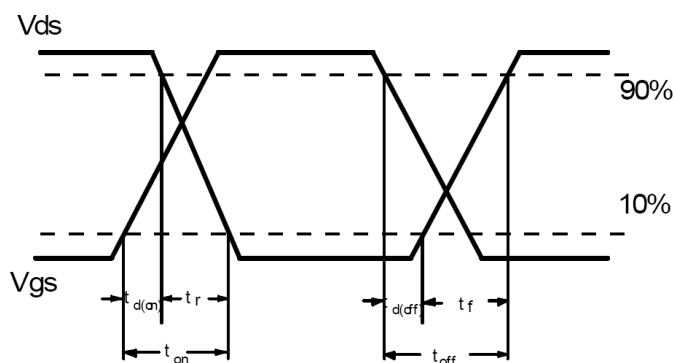
## Electrical Characteristics @ $T_A=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	700	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	0.7	0.85	$\Omega$	$V_{GS}=10\text{V}, I_D = 1\text{A}$ $T_J = 125^{\circ}\text{C}$
		—	1.54	—		
		—	0.85	0.95	$\Omega$	$V_{GS}=10\text{V}, I_D = 4.8\text{A}$ $T_J = 125^{\circ}\text{C}$
		—	2.47	—		
$V_{GS(th)}$	Gate threshold voltage	3	—	5	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ $T_J = 125^{\circ}\text{C}$
		—	3.3	—		
$I_{DSS}$	Drain-to-Source leakage current	—	—	1	$\mu\text{A}$	$V_{DS} = 700\text{V}, V_{GS} = 0\text{V}$ $T_J = 125^{\circ}\text{C}$
		—	—	50		
$I_{GSS}$	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 30\text{V}$ $V_{GS} = -30\text{V}$
		—	—	-100		
$Q_g$	Total gate charge	—	12	—	nC	$I_D = 2.2\text{A},$ $V_{DS}=480\text{V},$ $V_{GS} = 10\text{V}$
$Q_{gs}$	Gate-to-Source charge	—	3.2	—		
$Q_{gd}$	Gate-to-Drain("Miller") charge	—	5.2	—		
$t_{d(on)}$	Turn-on delay time	—	12	—	ns	$V_{GS}=10\text{V}, V_{DS} = 400\text{V},$ $R_{GEN}=10.2\Omega, I_D = 2.2\text{A}$
$t_r$	Rise time	—	8.5	—		
$t_{d(off)}$	Turn-Off delay time	—	24	—		
$t_f$	Fall time	—	14	—		
$C_{iss}$	Input capacitance	—	528	—	pF	$V_{GS} = 0\text{V}$ $V_{DS} = 100\text{V}$ $f = 1\text{MHz}$
$C_{oss}$	Output capacitance	—	21	—		
$C_{rss}$	Reverse transfer capacitance	—	2.7	—		

## Source-Drain Ratings and Characteristics

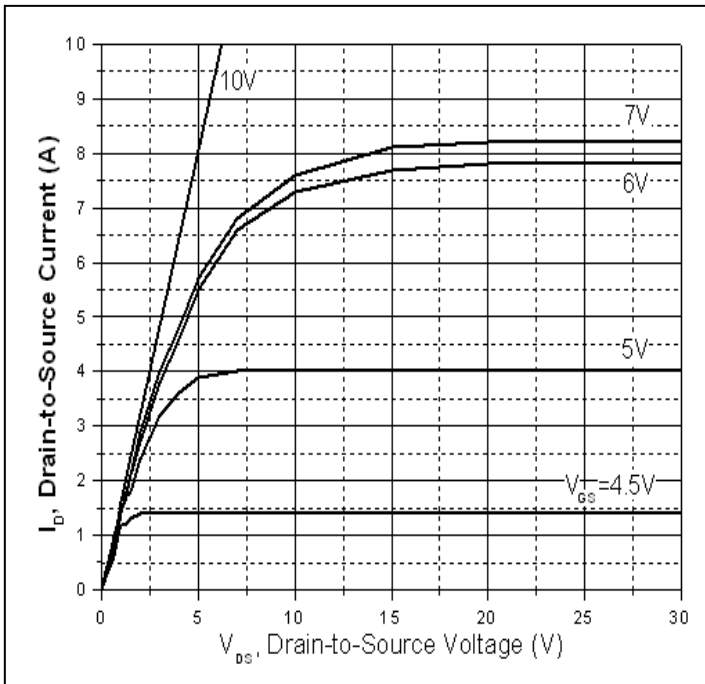
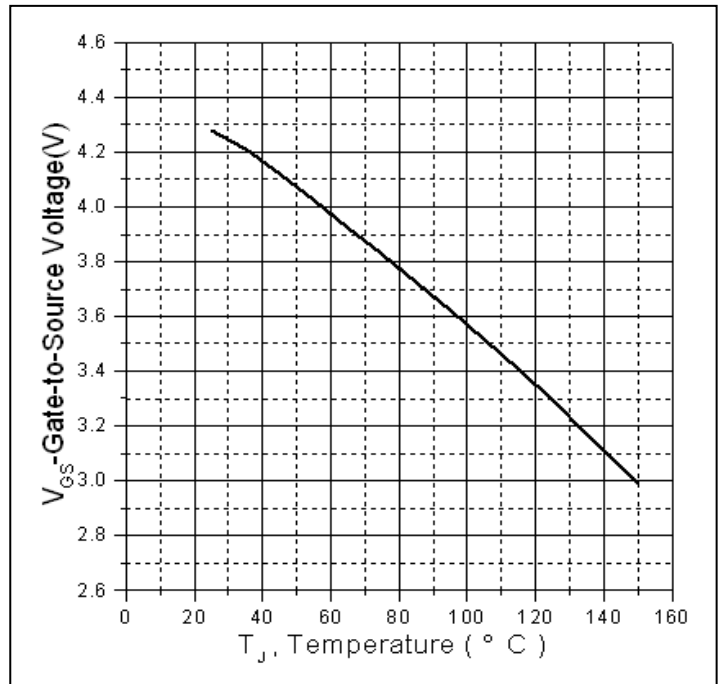
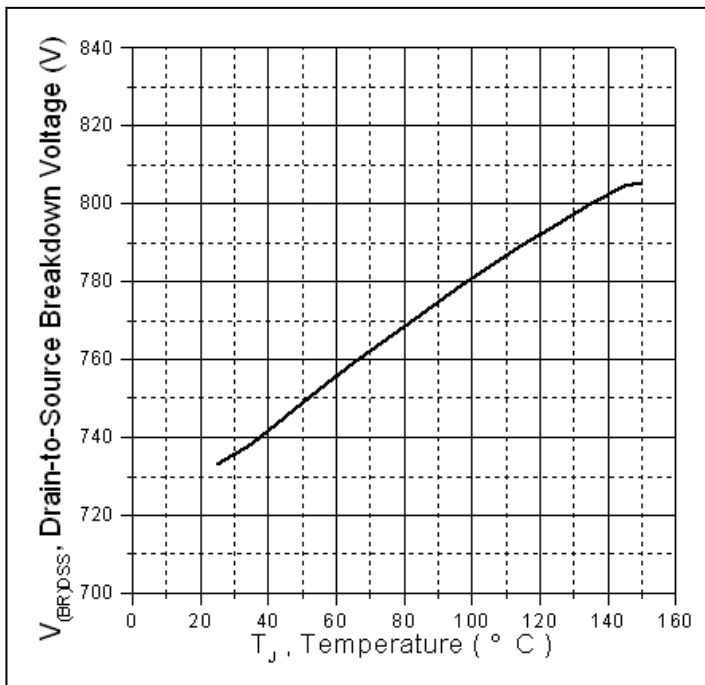
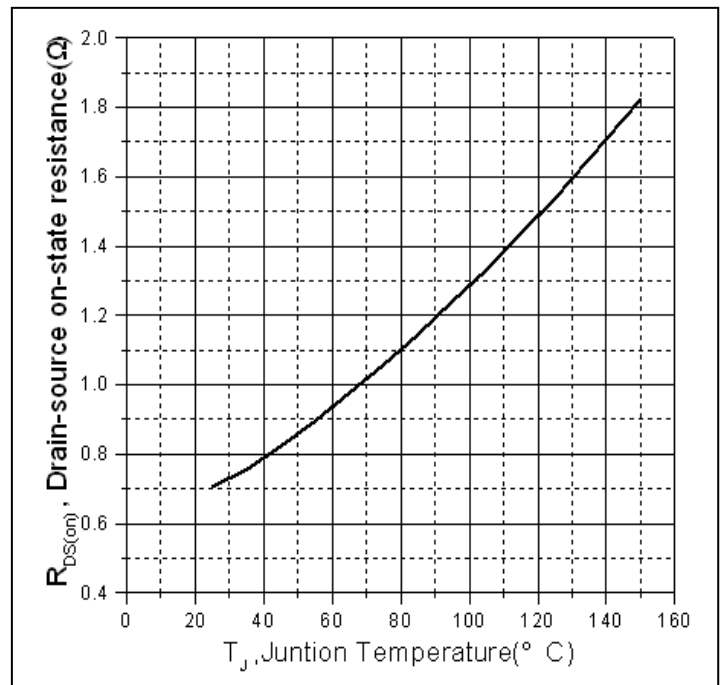
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	7 ①	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode)	—	—	21	A	
$V_{SD}$	Diode Forward Voltage	—	0.85	1.2	V	$I_S=4.8\text{A}, V_{GS}=0\text{V}$
$t_{rr}$	Reverse Recovery Time	—	133	—	nS	$T_J = 25^{\circ}\text{C}, I_F = 2.2\text{A},$ $di/dt = 100\text{A}/\mu\text{s}$
$Q_{rr}$	Reverse Recovery Charge	—	819	—	nC	

## Test circuits and Waveforms

**EAS Test Circuit:**

**Gate charge test circuit:**

**Switching Time Test Circuit:**

**Switching Waveforms:**


### Notes:

- ① Calculated continuous current based on maximum allowable junction temperature.
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.
- ④ 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  $T_A = 25^\circ\text{C}$

**Typical electrical and thermal characteristics**

**Figure 1: Typical Output Characteristics**

**Figure 2. Gate to source cut-off voltage**

**Figure 3. Drain-to-Source Breakdown Voltage Vs. Case Temperature**

**Figure 4: Normalized On-Resistance Vs. Case Temperature ( $V_{GS}=10V, I_D = 1A$ )**

Typical electrical and thermal characteristics

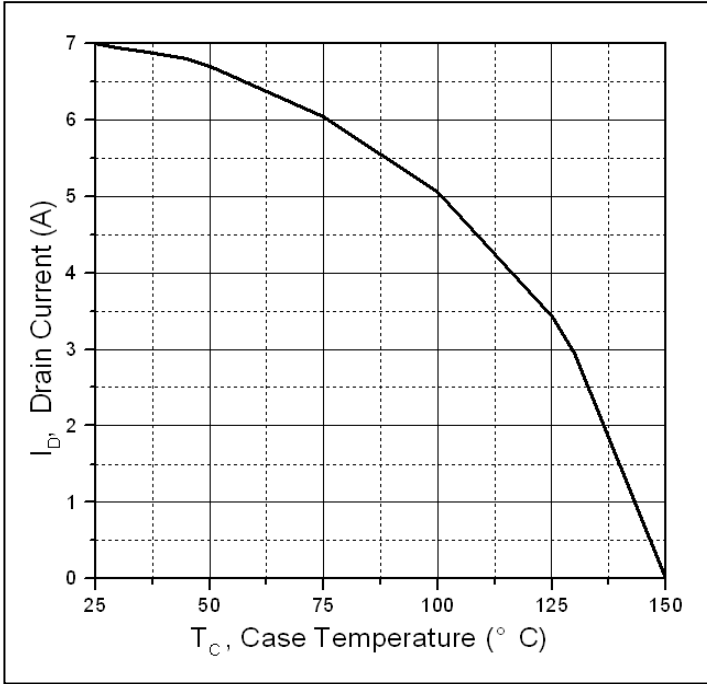


Figure 5. Maximum Drain Current Vs. Case Temperature

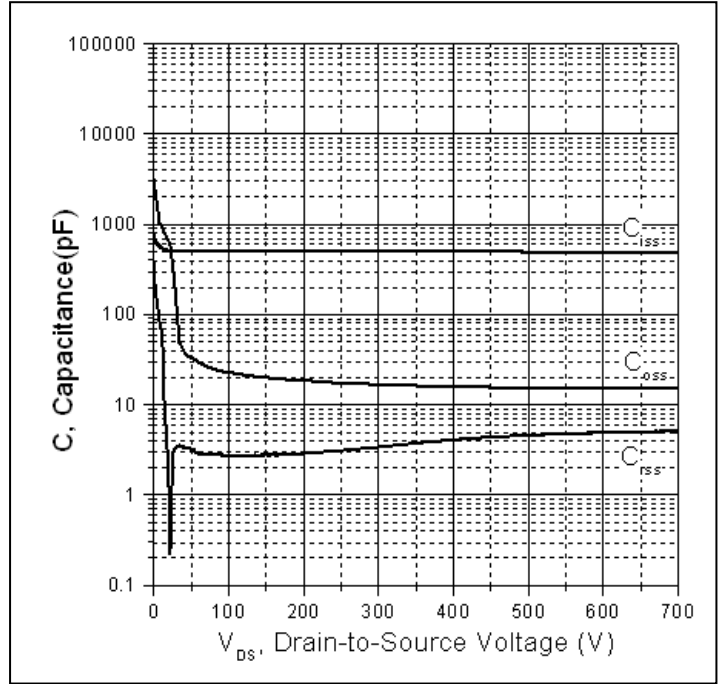


Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage

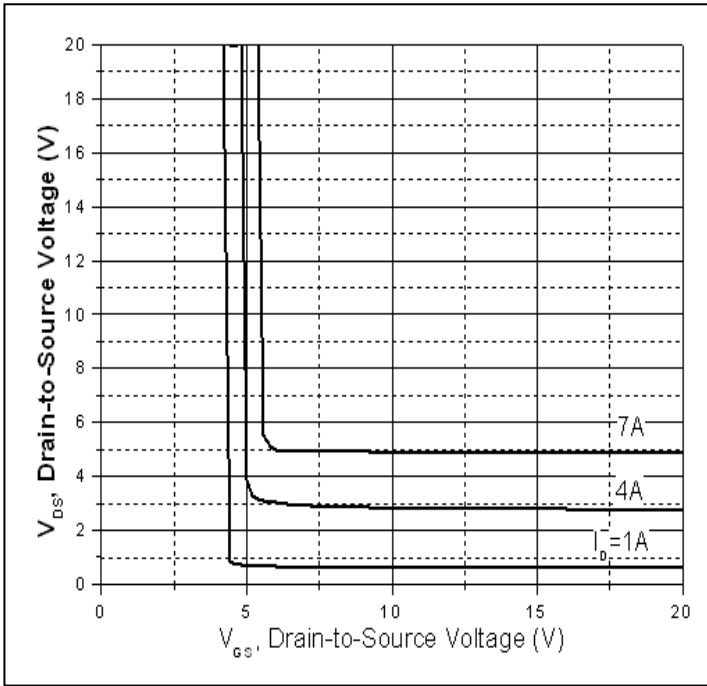


Figure 7. Drain-to-Source Voltage Vs. Gate-to-Source Voltage

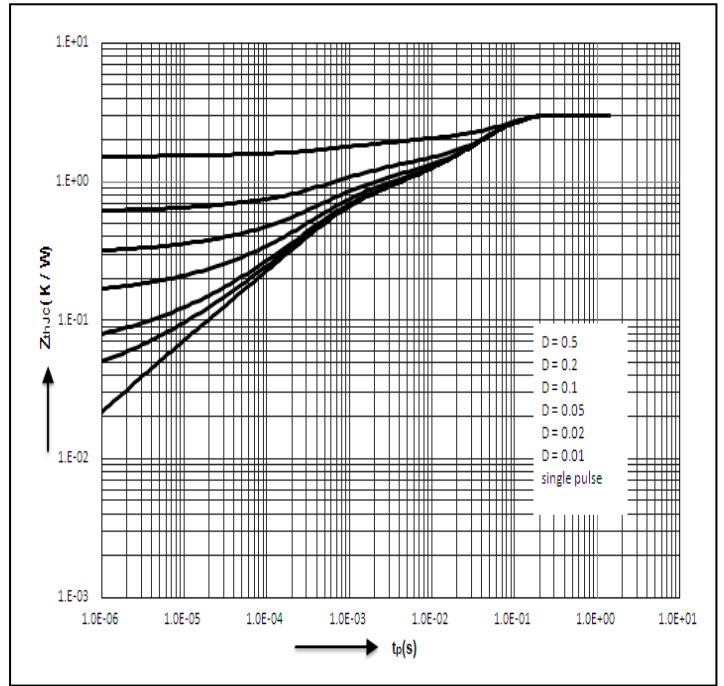
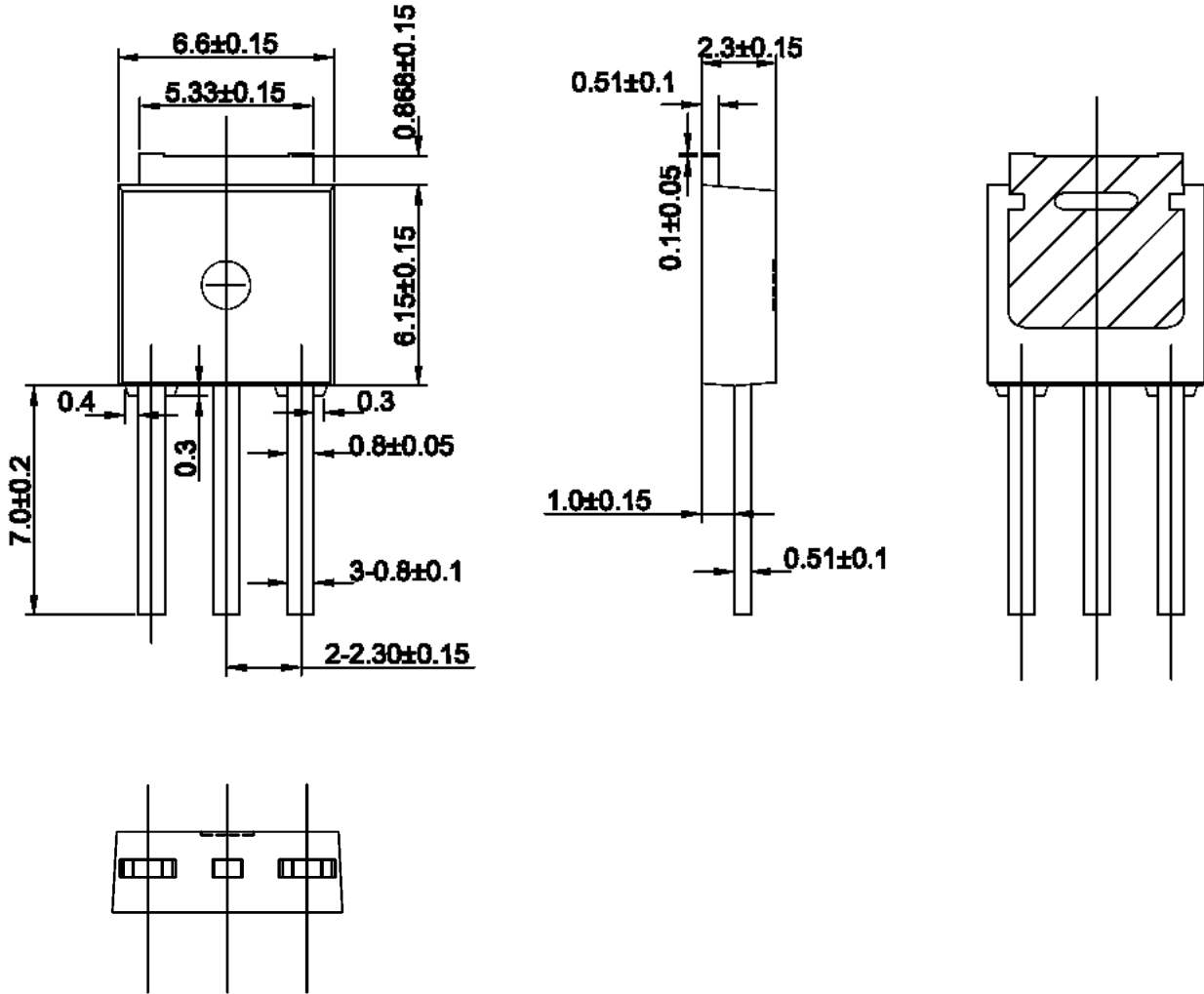


Figure 8. Maximum Effective Transient Thermal Impedance, Junction-to-Case

**Mechanical Data:**

IPAK-NX Package outline dimension (Unit: mm)



**Ordering and Marking Information**
**Device Marking: SSF7NS70UGX**
**Package (Available)**
**IPAK-NX**
**Operating Temperature Range**
**C : -55 to 150 °C**
**Devices per Unit**

Package Type	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
IPAK-NX	80	56	4480	5	22400

**Reliability Test Program**

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	$T_j=150^{\circ}\text{C}$ @ 80% of Max $V_{DSS}/V_{CES}/V_R$	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	$T_j=150^{\circ}\text{C}$ @ 100% of Max $V_{GSS}$	168 hours 500 hours 1000 hours	3 lots x 77 devices

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