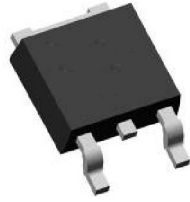
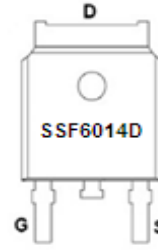


Main Product Characteristics

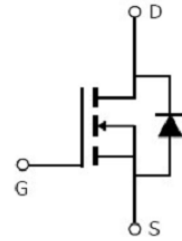
V_{DSS}	60V
$R_{DS(on)}$	12m Ω (typ.)
I_D	60A



TO-252 (DPAK)



Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced trench MOSFET process technology
- Ideal for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 175°C operating temperature



Description

The SSF6014D utilizes the latest processing techniques to achieve high cell density, low on-resistance and high repetitive avalanche rating. These features make this device extremely efficient and reliable for use in power switching applications and a wide variety of other applications.

Absolute Maximum Rating

Symbol	Parameter	Max.	Units
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ①	60	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ①	42	
I_{DM}	Pulsed Drain Current②	240	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation③	115	W
	Linear Derating Factor	0.74	W/°C
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ $L=0.3\text{mH}$	235	mJ
I_{AS}	Avalanche Current @ $L=0.3\text{mH}$	39	A
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C

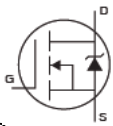
Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ^③	1.31	—	°C/W
$R_{\theta JA}$	Junction-to-Ambient ^④	—	62	°C/W

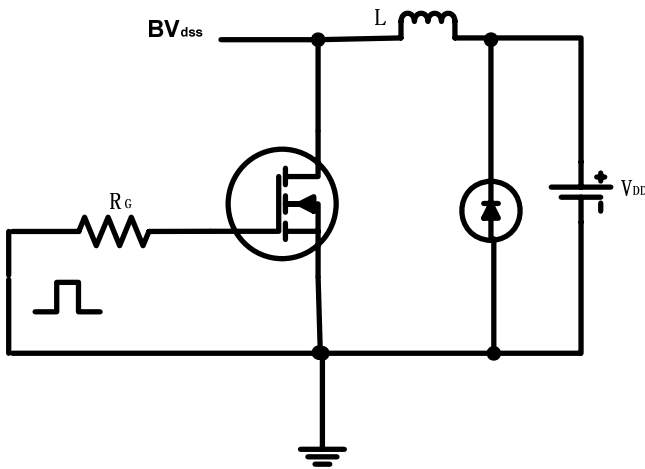
Electrical Characteristics (T_A=25°C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	60	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source On-resistance	—	12	14	mΩ	$V_{GS}=10V, I_D = 30A$
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$ $T_J = 125^\circ C$
		—	2.0	—		
I_{DSS}	Drain-to-Source Leakage Current	—	—	2	μA	$V_{DS} = 60V, V_{GS} = 0V$ $T_J = 150^\circ C$
		—	—	10		
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$ $V_{GS} = -20V$
		—	—	-100		
Q_g	Total Gate Charge	—	45	—	nC	$I_D = 30A,$ $V_{DS}=30V,$ $V_{GS} = 10V$
Q_{gs}	Gate-to-Source Charge	—	4	—		
Q_{gd}	Gate-to-Drain("Miller") Charge	—	15	—		
$t_{d(on)}$	Turn-on Delay Time	—	14.6	—	ns	$V_{GS}=10V, V_{DS}=30V,$ $R_L=15\Omega,$ $R_{GEN}=2.5\Omega$
t_r	Rise Time	—	14.2	—		
$t_{d(off)}$	Turn-Off Delay Time	—	40	—		
t_f	Fall Time	—	7.3	—		
C_{iss}	Input Capacitance	—	1480	—	pF	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1MHz$
C_{oss}	Output Capacitance	—	190	—		
C_{rss}	Reverse Transfer Capacitance	—	135	—		

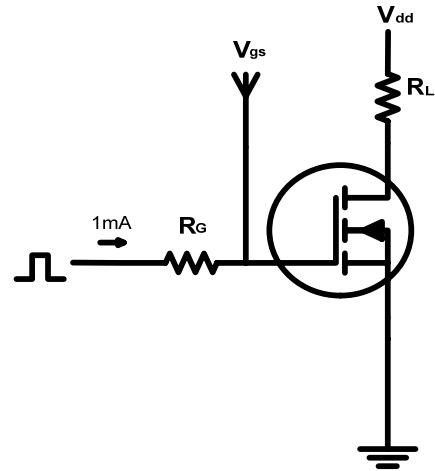
Source-Drain Ratings and Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	60	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	240	A	
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$I_S=30A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	—	33	—	ns	$T_J = 25^\circ C, I_F = 60A,$ $di/dt = 100A/\mu s$
Q_{rr}	Reverse Recovery Charge	—	61	—	nC	

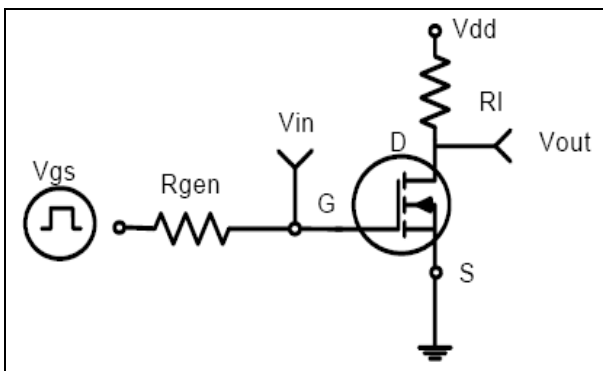
Test Circuits and Waveforms



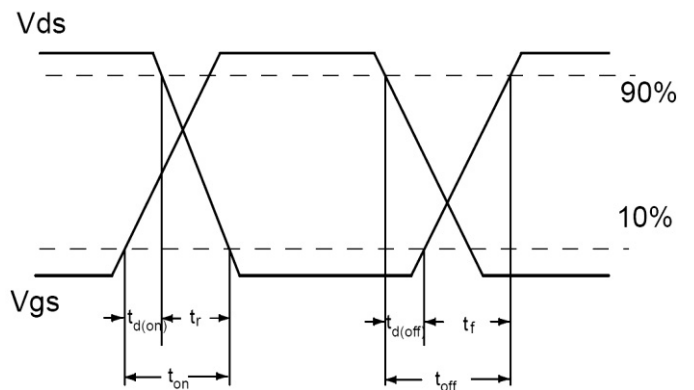
E_{AS} Test Circuit



Gate Charge Test Circuit



Switching Time Test Circuit



Switching Waveforms

Notes

- ① The maximum current rating is limited by bond-wires.
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ The power dissipation P_D 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 1in^2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$

Typical Electrical and Thermal Characteristics

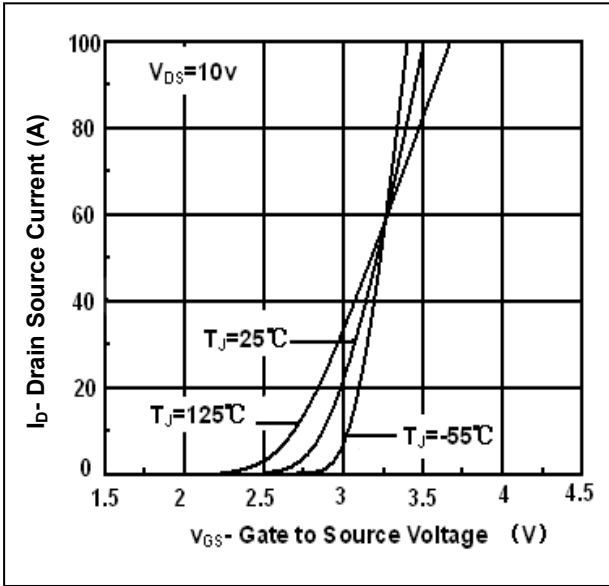


Figure 1. Transfer Characteristic

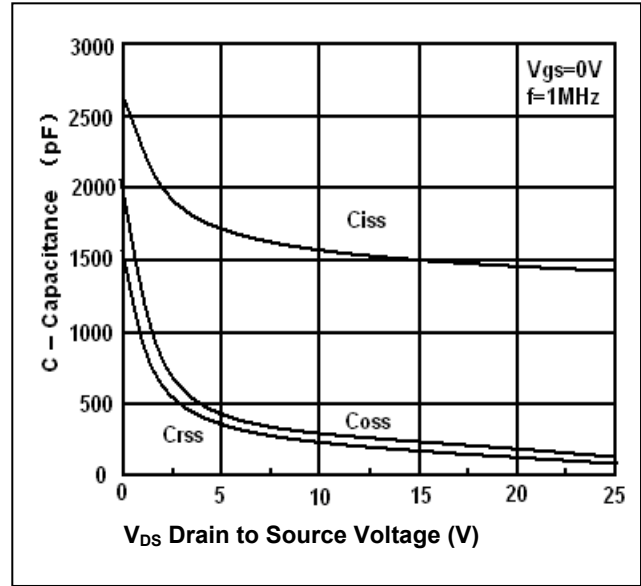


Figure 2. Capacitance vs Drain to Source Voltage

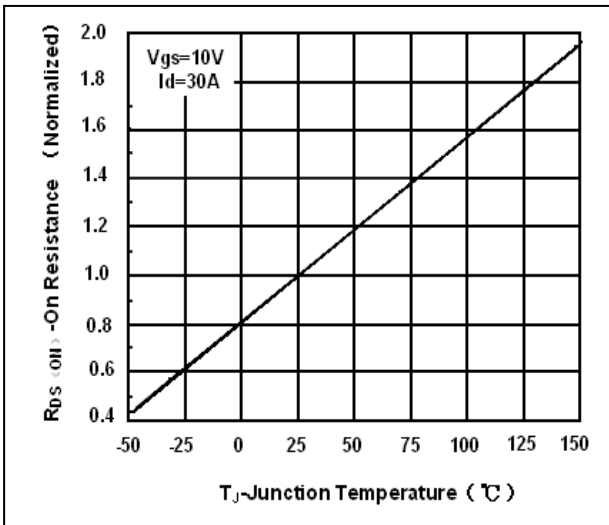


Figure 3. On Resistance vs. Junction Temperature

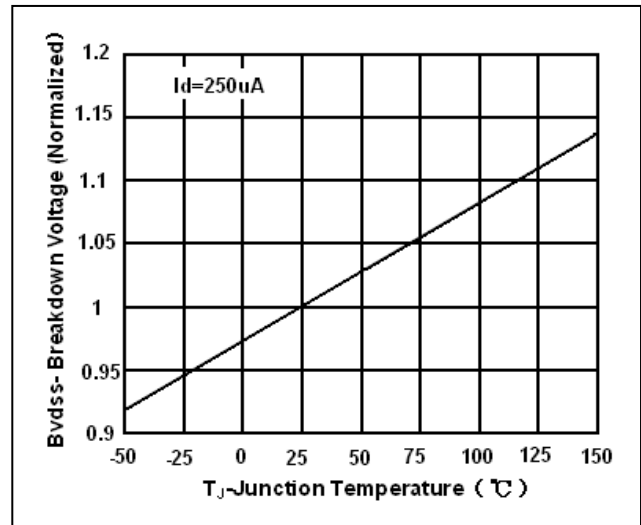


Figure 4. Breakdown Voltage vs. Junction Temperature

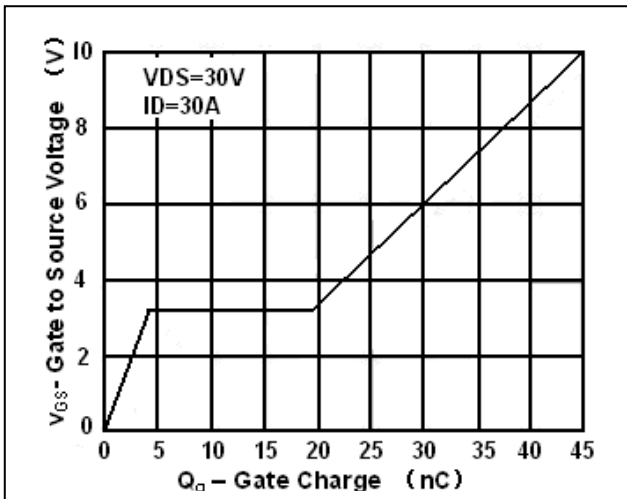


Figure 5 .Gate to Source Voltage vs Gate Charge

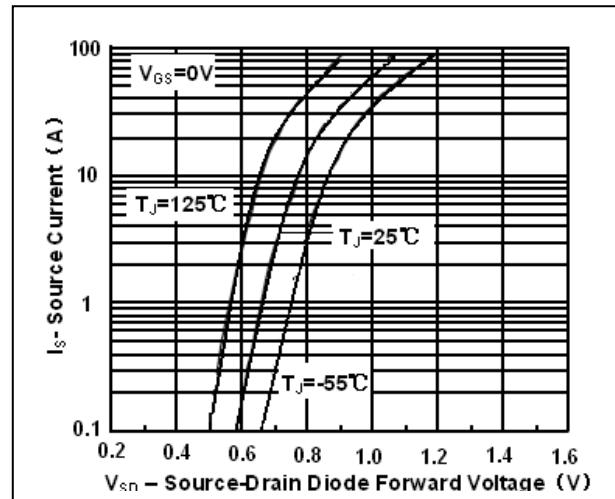


Figure 6. Source-Drain Diode Forward Voltage

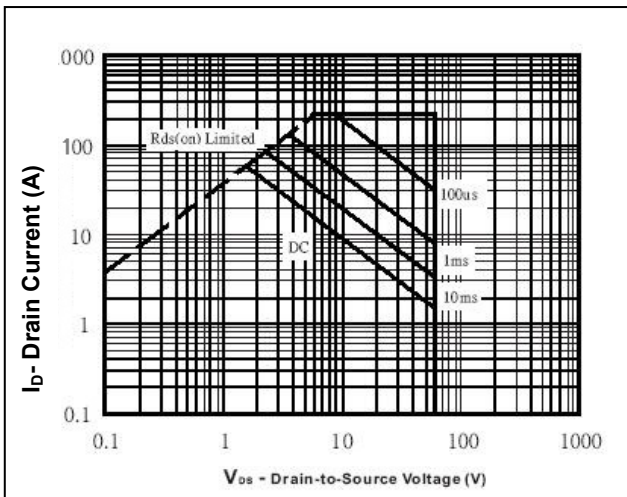


Figure 7. Safe Operation Area

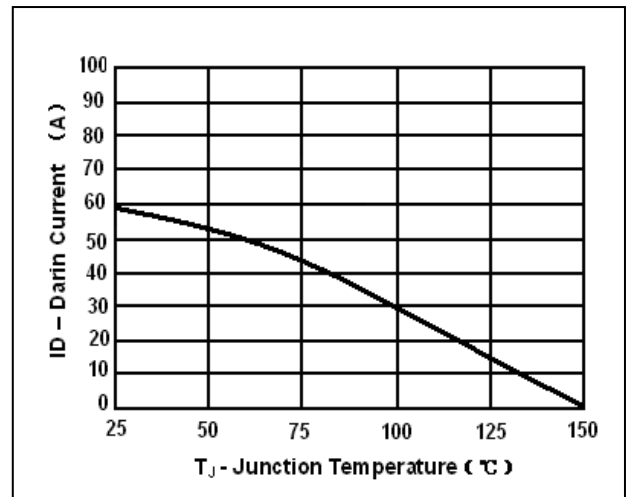


Figure 8. Max Drain Current vs. Junction Temperature

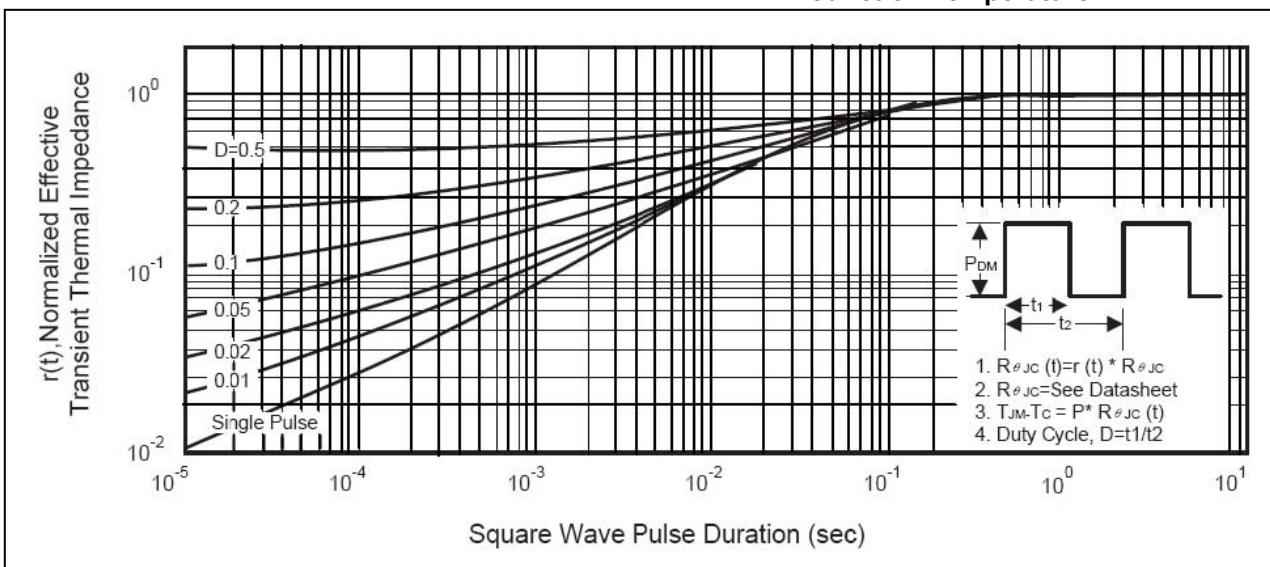
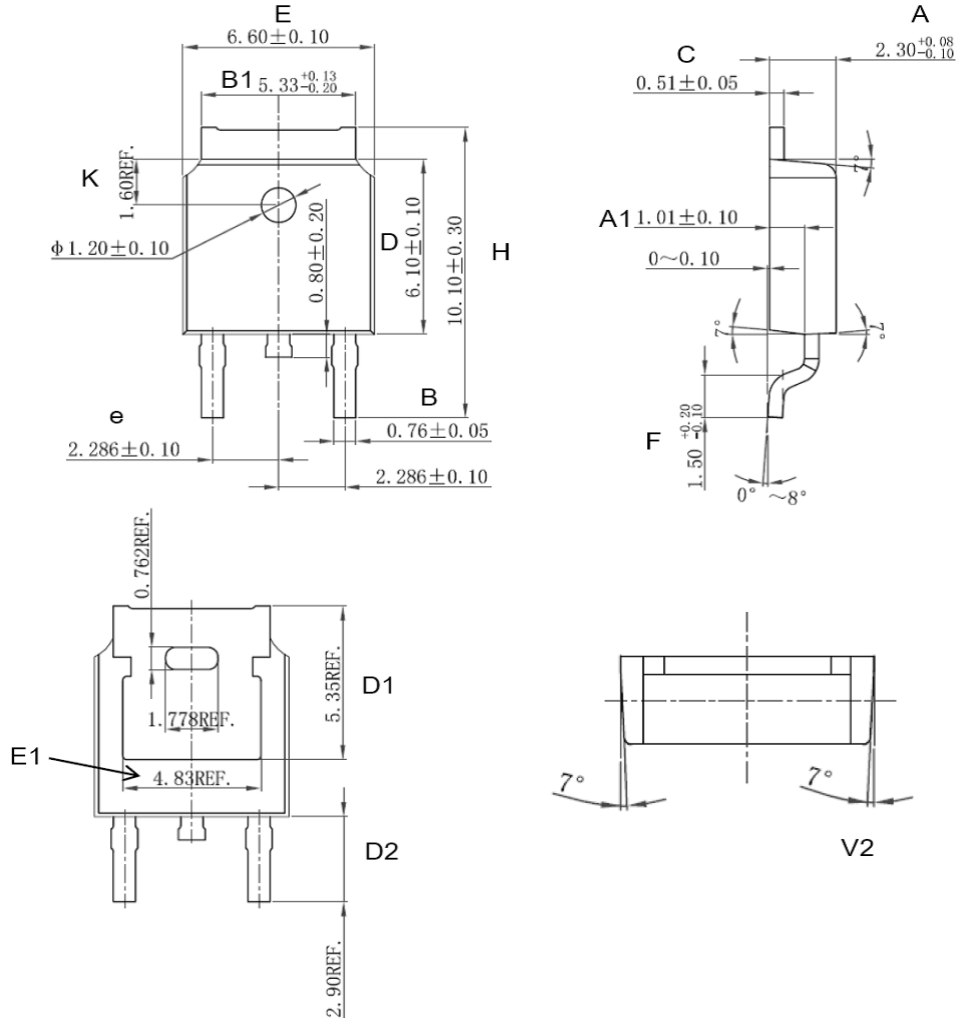


Figure 9. Transient Thermal Impedance Curve

Mechanical Data

TO252/DPAK PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min	Nom	Max	Min	Nom	Max
A	2.200	2.300	2.380	0.087	0.091	0.094
A1	0.910	1.010	1.110	0.036	0.040	0.044
B	0.710	0.760	0.810	0.028	0.030	0.032
B1	5.130	5.330	5.460	0.202	0.210	0.215
C	0.460	0.510	0.560	0.018	0.020	0.022
D	6.000	6.100	6.200	0.236	0.240	0.244
D1	5.350 (REF)			0.211 (REF)		
D2	2.900 (REF)			0.114 (REF)		
E	6.500	6.600	6.700	0.256	0.260	0.264
E1	4.83 (REF)			0.190 (REF)		
e	2.186	2.286	2.386	0.086	0.090	0.094
H	9.800	10.100	10.400	0.386	0.398	0.409
F	1.400	1.500	1.700	0.055	0.059	0.067
K	1.600 (REF)			0.063 (REF)		
V2	8° (REF)			8° (REF)		

Ordering and Marking Information

Device Marking: SSF6014D

Package (Available)
DPAK
Operating Temperature Range
C : -55 to 175 °C

Devices per Unit

Option 1

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO-252	80	50	4000	10	40000

Option 2

Package Type	Units/ Tape	Tapes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO-252	2500	2	5000	7	35000

Option 3

Package Type	Units/ Tape	Tapes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO-252	2500	1	2500	10	25000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	$T_j=125^{\circ}\text{C}$ to 175°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)	$T_j=150^{\circ}\text{C}$ or 175°C @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices