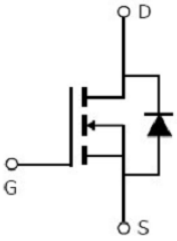
Main Product Characteristics

V_{DSS}	200V
R_{DS}(on)	0.13Ω(typ.)
I_D	18A ①

TO-252

Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced Process Technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery

Description

These N-Channel enhancement mode power field effect transistors are produced using silikron proprietary MOSFET technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switch mode power supplies.

Absolute Max Rating

Symbol	Parameter	Max.	Units
I_D @ TC = 25°C	Continuous Drain Current, V_{GS} @ 10V	18 ①	A
I_D @ TC = 100°C	Continuous Drain Current, V_{GS} @ 10V	13 ①	
I_{DM}	Pulsed Drain Current ②	72	
P_D @TC = 25°C	Power Dissipation ③	150	W
	Linear Derating Factor	1.0	W/°C
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy @ L=1.58mH	348	mJ
I_{AS}	Avalanche Current @ L=1.58mH	21	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

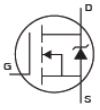
Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ③	—	1.0	°C/W
$R_{\theta JA}$	Junction-to-ambient (t ≤ 10s) ④	—	62	°C/W
	Junction-to-Ambient (PCB mounted, steady-state) ④	—	40	°C/W

Electrical Characteristics @T_A=25℃ unless otherwise specified

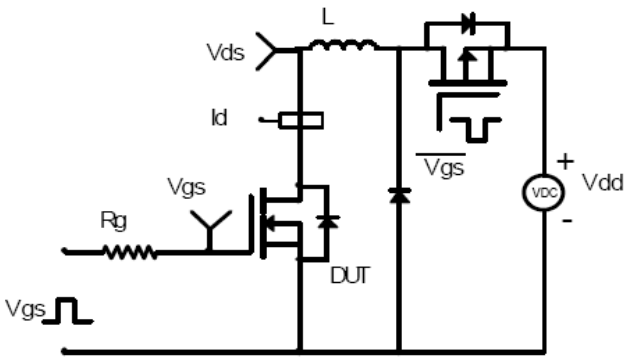
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	200	—	—	V	V_{GS} = 0V, I_D= 250μA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	0.13	0.15	Ω	V_{GS}=10V,I_D =7.5A
		—	0.27	—		T_J = 125°C
$V_{GS(th)}$	Gate threshold voltage	2	—	4	V	V_{DS} = V_{GS}, I_D = 250μA
		—	2.26	—		T_J = 125°C
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	V_{DS} =200V,V_{GS} = 0V
		—	—	50		T_J = 125°C
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V_{GS} =20V
		—	—	-100		V_{GS} = -20V
Q_g	Total gate charge	—	27	—	nC	I_D = 18A,
Q_{gs}	Gate-to-Source charge	—	6	—		V_{DS}=160V,
Q_{gd}	Gate-to-Drain("Miller") charge	—	12	—		V_{GS} = 10V
$t_{d(on)}$	Turn-on delay time	—	15	—	nS	V_{GS}=10V, V_{DD} =100V,
t_r	Rise time	—	65	—		R_L=5.55Ω,R_{GEN}=25Ω
$t_{d(off)}$	Turn-Off delay time	—	64	—		I_D =18A
t_f	Fall time	—	57	—		
C_{iss}	Input capacitance	—	1030	—	pF	V_{GS} = 0V
C_{oss}	Output capacitance	—	244	—		V_{DS} = 25V
C_{rss}	Reverse transfer capacitance	—	57	—		f = 1MHz

Source-Drain Ratings and Characteristics

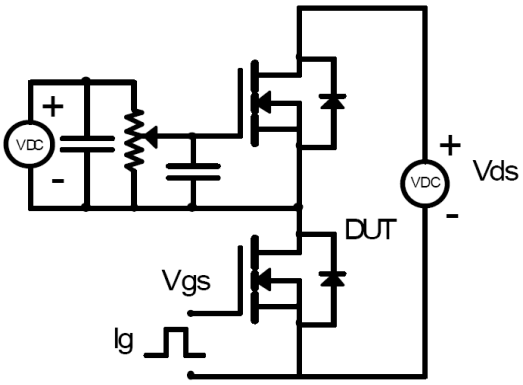
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	18 ①	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	72	A	
V_{sd}	Diode Forward Voltage	—	0.9	1.3	V	I_S=15A, V_{GS}=0V, T_J = 25°C
t_{rr}	Reverse Recovery Time	—	154	—	nS	T_J = 25°C, I_F =18A, di/dt = 100A/μs
Q_{rr}	Reverse Recovery Charge	—	965	—	nC	

Test circuits and Waveforms

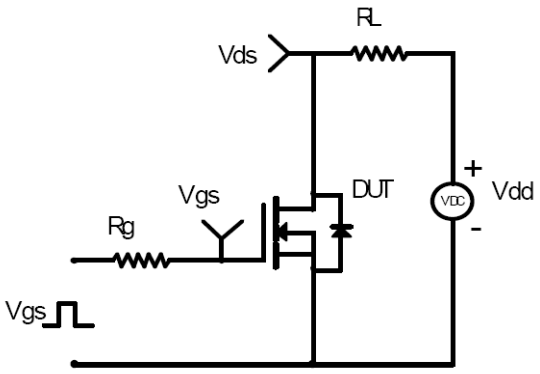
EAS Test Circuit



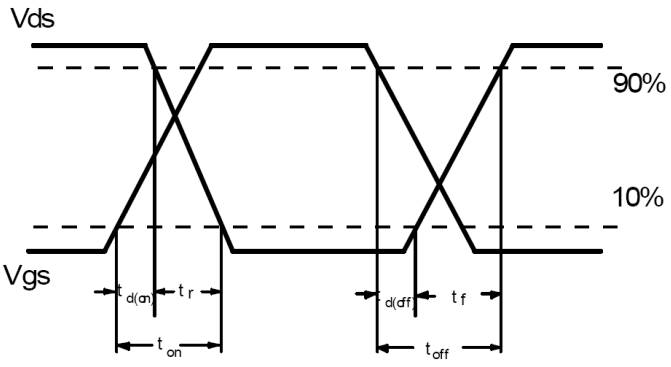
Gate charge test circuit



Switching Time Test Circuit



Switching Waveforms



Notes:

①Calculated continuous current based on maximum allowable junction temperature.

②Repetitive rating; pulse width limited by max. junction temperature.

③The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.

④The 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 TA =25°C

Typical electrical and thermal characteristics

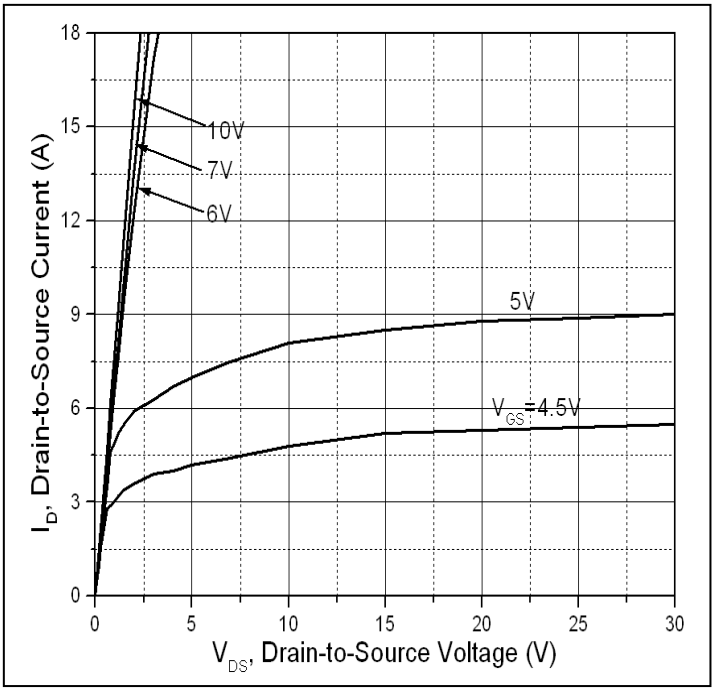


Figure 1.Typical Output Characteristics

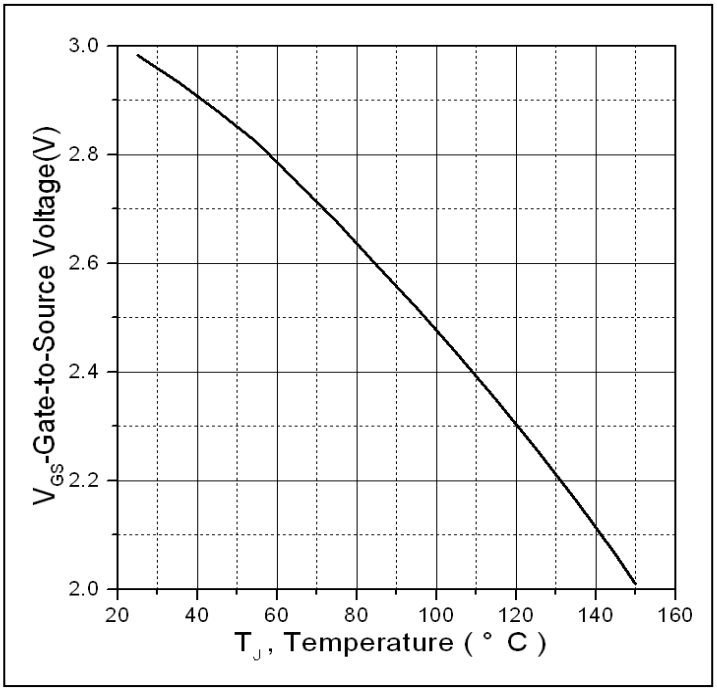


Figure 2. Gate to source cut-off voltage

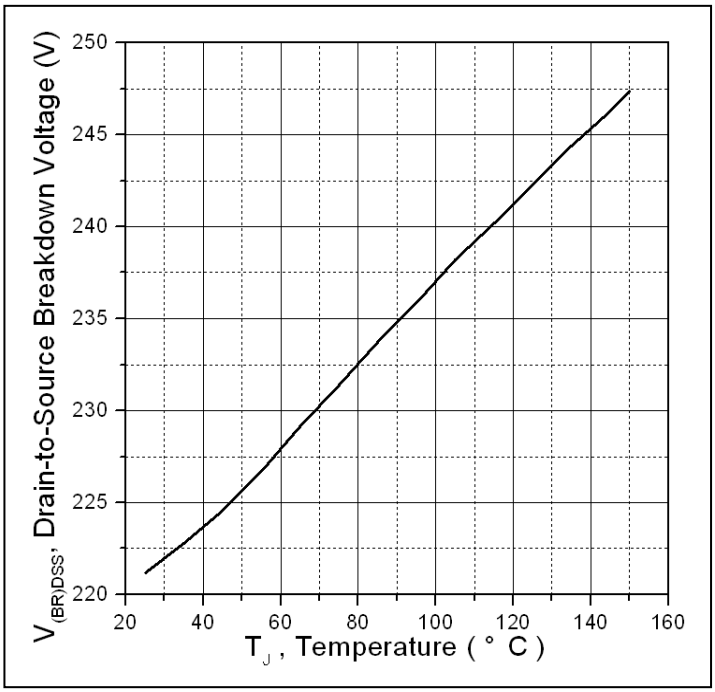


Figure 3. Drain-to-Source Breakdown Voltage vs. Temperature

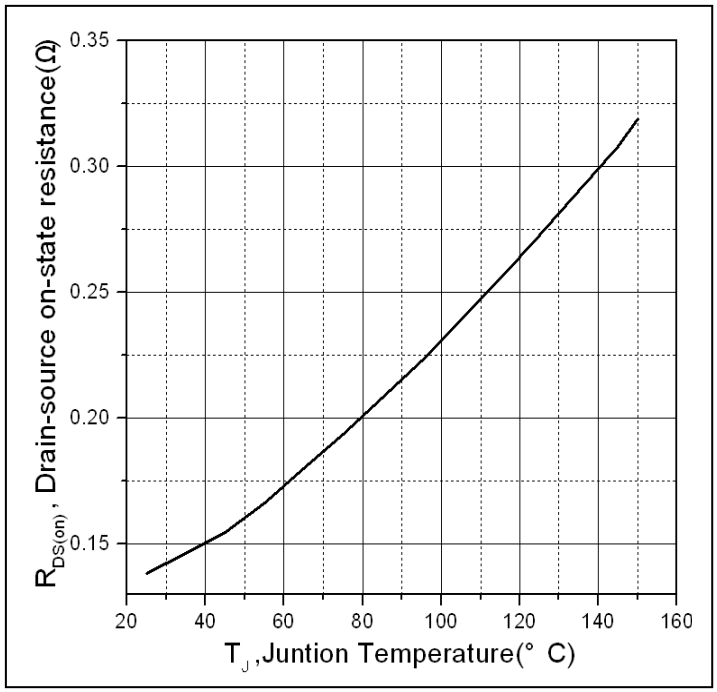


Figure 4.Normalized On-Resistance Vs. Case Temperature

Typical electrical and thermal characteristics

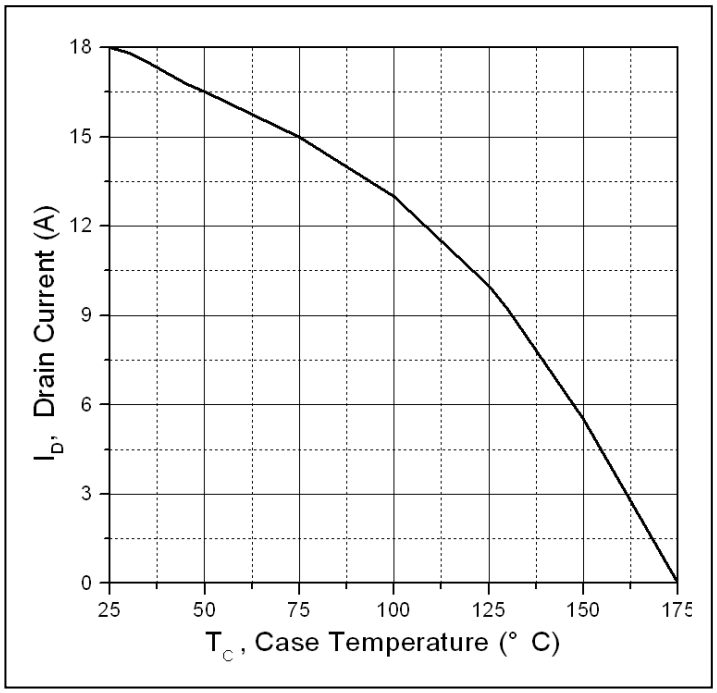


Figure 5. Maximum Drain Current Vs. Case Temperature

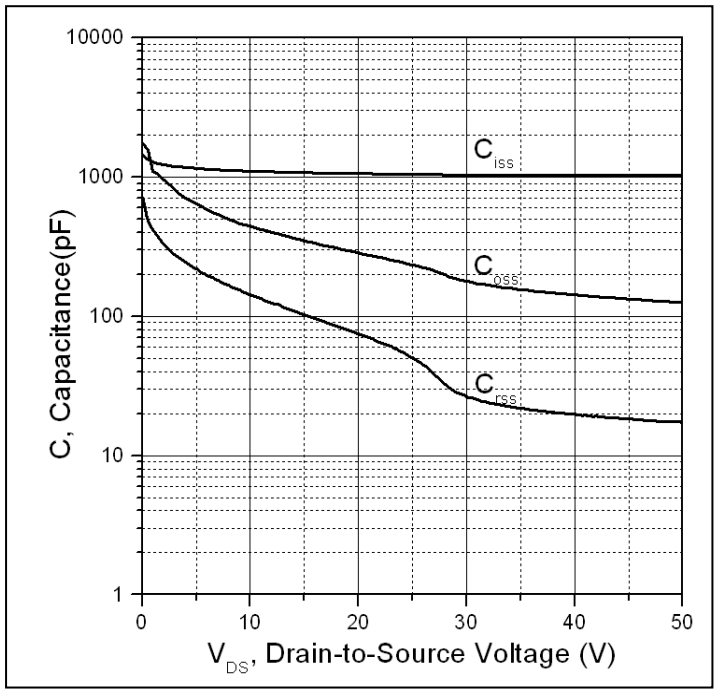


Figure 6.Typical Capacitance Vs. Drain-to-Source Voltage

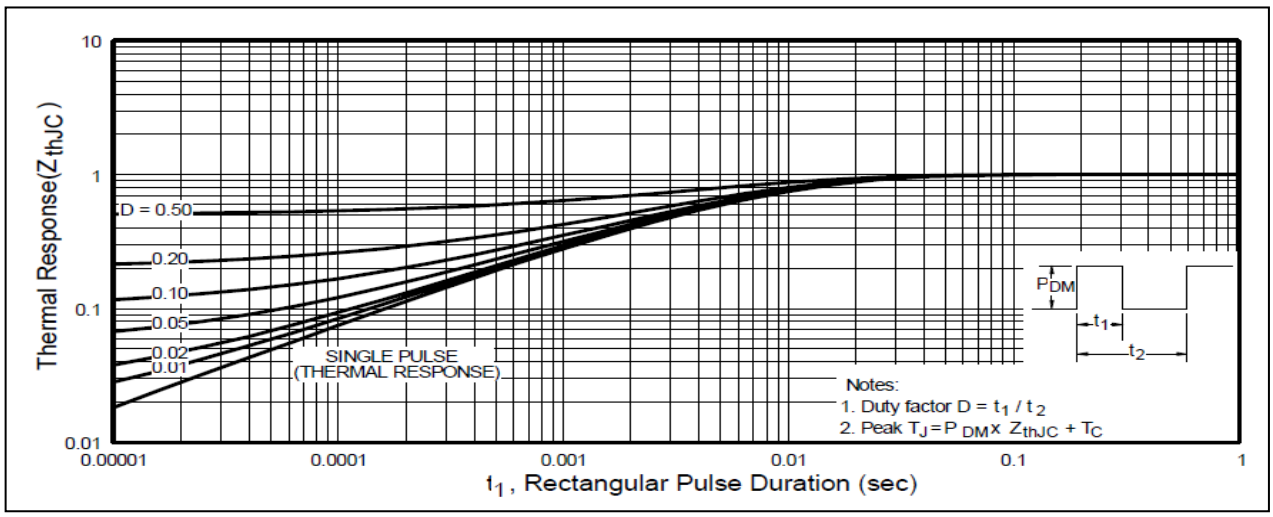
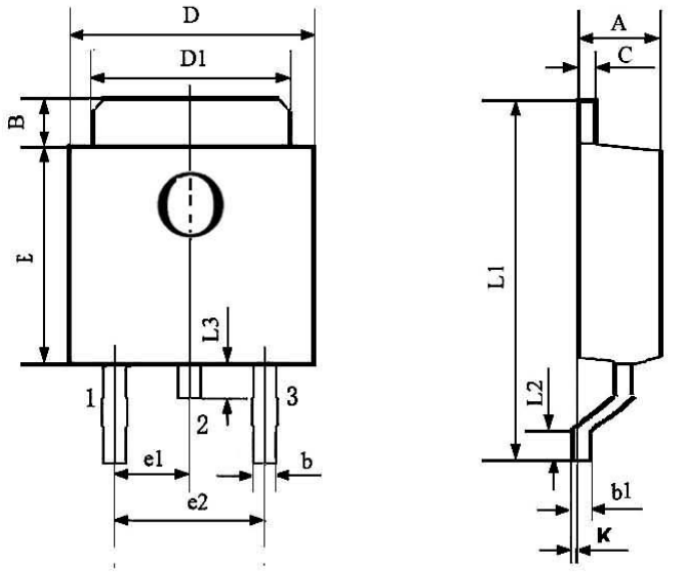


Figure7. Maximum Effective Transient Thermal Impedance, Junction-to-Case

Mechanical Data

TO-252 PACKAGE OUTLINE DIMENSION



Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	2.200	-	2.400	0.087	-	0.094
B	0.950	-	1.250	0.037	-	0.049
b	0.500	-	0.700	0.020	-	0.028
b1	0.450	-	0.550	0.018	-	0.022
C	0.450	-	0.550	0.018	-	0.022
D	6.450	-	6.750	0.254	-	0.266
D1	5.200	-	5.400	0.205	-	0.213
E	5.950	-	6.250	0.234	-	0.246
e1	2.240	-	2.340	0.088	-	0.092
e2	4.430	-	4.730	0.174	-	0.186
L1	9.450	-	9.950	0.372	-	0.392
L2	1.250	-	1.750	0.049	-	0.069
L3	0.600	-	0.900	0.024	-	0.035
K	0.000	-	0.100	0.000	-	0.004

Ordering and Marking Information

Device Marking: SSPL2015D

Package (Available)

TO-252

Operating Temperature Range

C : -55 to 150 °C

Devices per Unit（options）

Package Type	Units/Tape	Tapes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
TO-252	2500	2	5000	7	35000
TO-252	2500	1	2500	10	25000
TO-252	800	5	4000	8	32000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	T_j=125℃ to 150℃ @ 80% of Max V_{DSS}/V_{CES}/VR	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	T_j=150℃@ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices

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