

N-Channel 100V (D-S) MOSFET

General Description

The SK15N10 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for medium voltage application such as charger, adapter, notebook computer power management and other lighting dimming powered circuits, and low in-line power loss that are needed in a very small outline surface mount package.

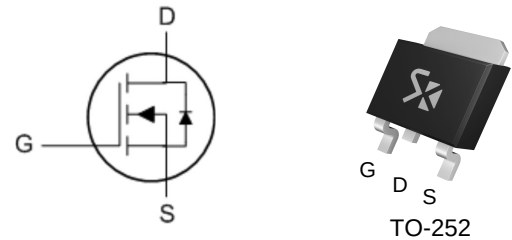
Features

- $R_{DS(ON)} \leq 100m\Omega @ V_{GS}=10V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability

Applications

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- Load Switch
- DSC

BV_{DSS}	$R_{DS(ON),typ.}$	I_D
100V	80m Ω	15.4A



Package No to Scale

Ordering Information

Part Number	Package
SK15N10	TO-252

Absolute Maximum Ratings

$T_C=25^{\circ}C$ unless otherwise specified

Symbol	Parameter		SK15N10	Unit
V_{DSS}	Drain-to-Source Voltage		100	V
V_{GSS}	Gate-to-Source Voltage		± 20	V
I_D	Continuous Drain Current		15.4	A
P_D	Power Dissipation ^[4]	$T_C= 25^{\circ}C$	40	W
	Power Dissipation	$T_A= 25^{\circ}C$	1.2	W
T_J & T_{STG}	Operating and Storage Temperature Range		-55 to +150	$^{\circ}C$

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

Thermal Characteristics

Symbol	Parameter	SK15N10	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	3.12	$^{\circ}C/W$
$R_{\theta JA}$	Junction-to-Ambient (mounted on 1 inch square PCB)	105	

Electrical Characteristics

OFF Characteristics $T_J = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	100	--	--	V	$V_{GS}=0V, I_D=250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	--	--	1	μA	$V_{DS}=80V, V_{GS}=0V$
I_{GSS}	Gate-to-Source Leakage Current	--	--	+100	nA	$V_{GS}=+20V, V_{DS}=0V$
		--	--	-100		$V_{GS}=-20V, V_{DS}=0V$

ON Characteristics $T_J = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-Source On-Resistance	--	80	100	m Ω	$V_{GS}=10V, I_D=8A$
$V_{GS(TH)}$	Gate Threshold Voltage	1.0	--	3.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
gfs	Forward Transconductance	--	15	--	S	$V_{DS}=10V, I_D=8A$

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
Rg	Gate Resistance	--	0.9	--	Ω	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$
C_{iss}	Input Capacitance	--	890	--	pF	$V_{GS}=0V, V_{DS}=15V, f=1\text{MHz}$
C_{rss}	Reverse Transfer Capacitance	--	23	--		
C_{oss}	Output Capacitance	--	58	--		
Q_g	Total Gate Charge	--	24	--	nC	$V_{DS}=80V, I_D=10A, V_{GS}=10V$
Q_g	Total Gate Charge	--	13	--	nC	$V_{DS}=80V, I_D=10A, V_{GS}=4.5V$
Q_{gs}	Gate-to-Source Charge	--	4.6	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	7.6	--		

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	14	--	ns	$V_{DS}=50V, R_L=5\Omega, V_{GEN}=10V, R_G=1\Omega$
t_{rise}	Rise Time	--	33	--		
$t_{d(OFF)}$	Turn-Off Delay Time	--	39	--		
t_{fall}	Fall Time	--	5	--		

Source-Drain Body Diode Characteristics

$T_J = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	--	0.9	1.2	V	$T_J = 25^\circ\text{C}$, $I_S = 8\text{A}$, $V_{GS} = 0\text{V}$
t_{rr}	Reverse Recovery Time	--	25	--	ns	$I_D = 7\text{A}$, $V_{GS} = 0\text{V}$, $di/dt = 100\text{A}/\mu\text{s}$
Q_{rr}	Reverse Recovery Charge	--	24	--	nC	$I_D = 7\text{A}$, $V_{GS} = 0\text{V}$, $di/dt = 100\text{A}/\mu\text{s}$

Note: [1]The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

Typical Characteristics

Figure 1. Capacitance

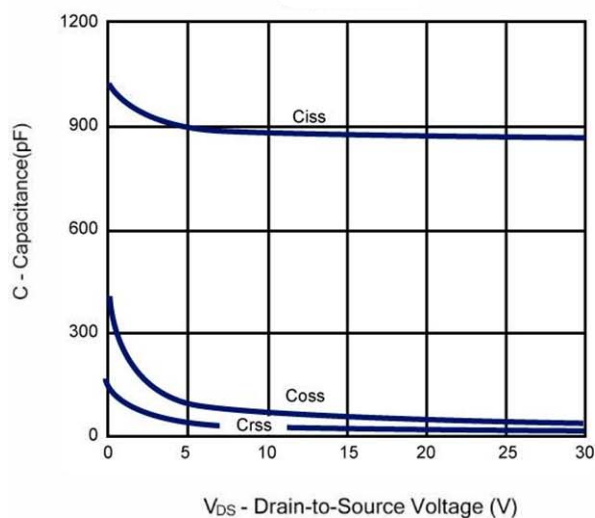


Figure 2. On-Resistance vs. Gate-to-Source Voltage

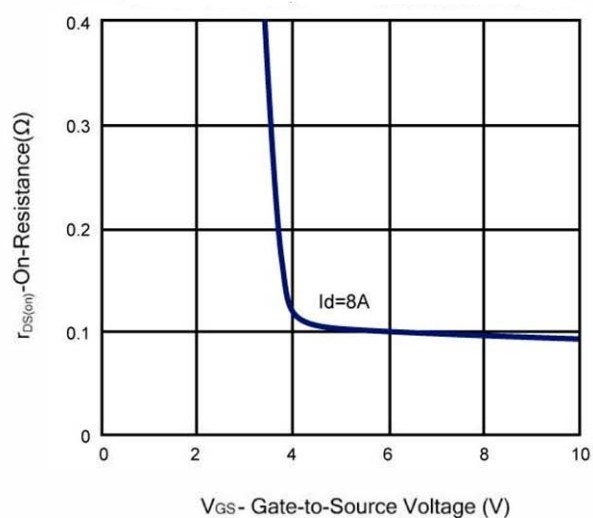


Figure 3. Threshold Voltage

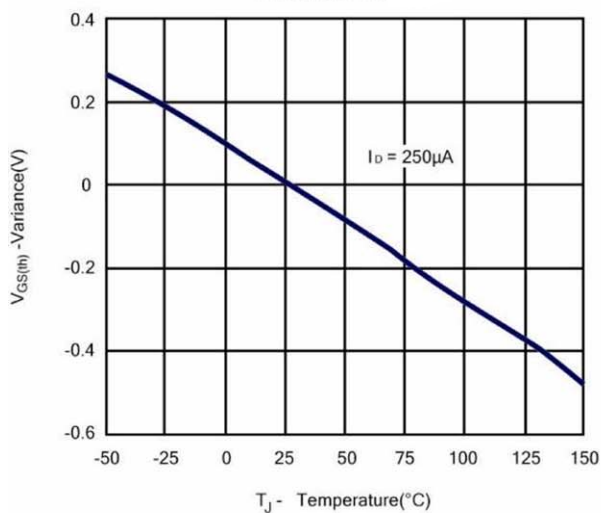
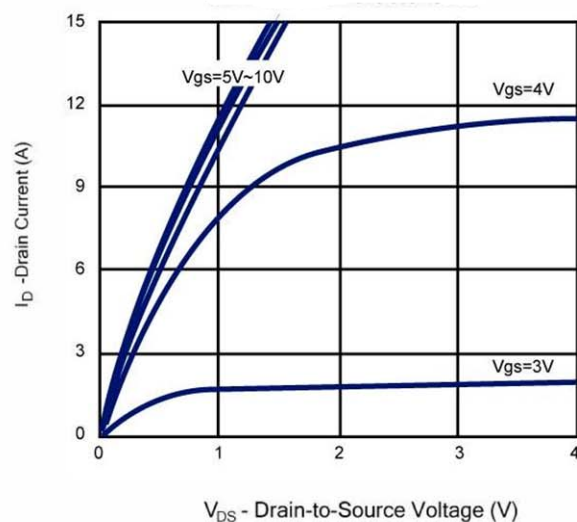


Figure 4. On-Region Characteristics



Typical Characteristics

Figure 5. Gate Charge

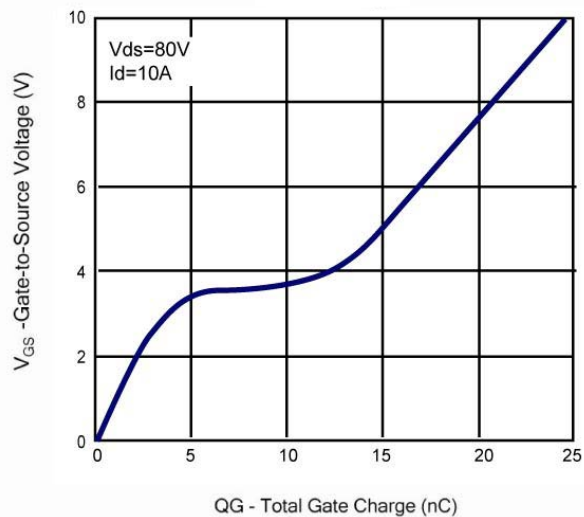


Figure 6. Body-diode characteristics

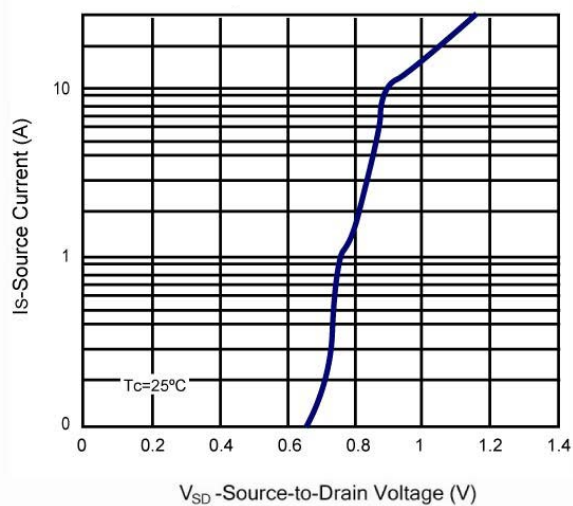
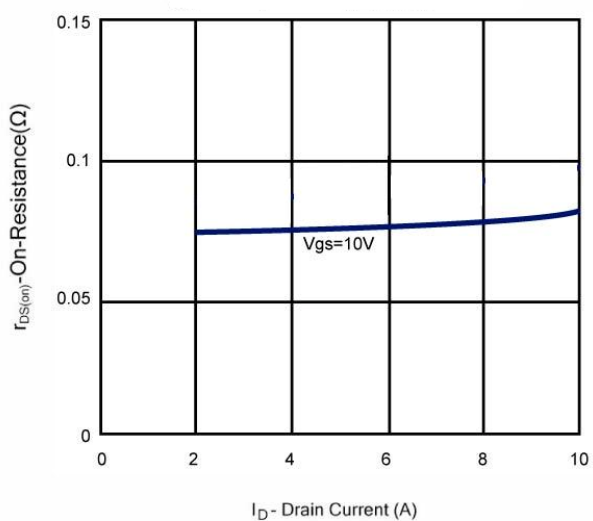
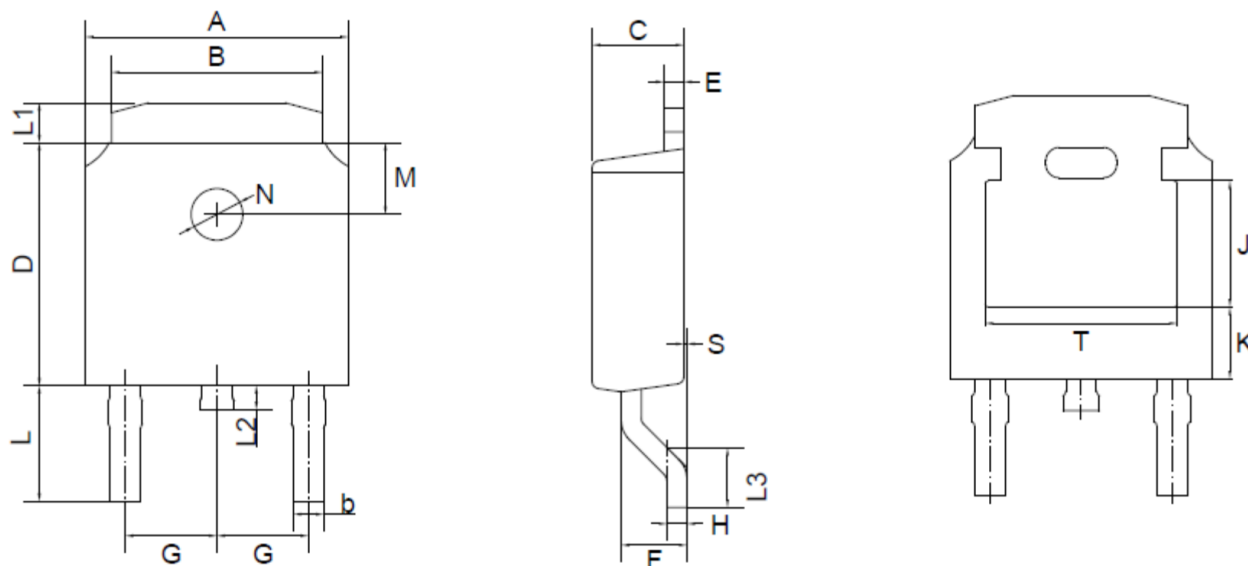


Figure 7. On-Resistance vs. Drain Current



Package Outline

TO-252(D-PAK)



TO-252(D-PAK) mechanical data

UNIT		A	B	b	C	D	E	F	G	H	L	L1	L2	L3	S	M	N	J	K	T
mm	max	6.7	5.5	0.8	2.5	6.3	0.6	1.8	2.29	0.55	3.1	1.2	1.0	1.75	0.1	1.8	1.3	3.16	1.80	4.83
	min	6.3	5.1	0.3	2.1	5.9	0.4	1.3	TYPICAL	0.45	2.7	0.8	0.6	1.40	0.0	TYPICAL	TYPICAL	ref.	ref.	ref.
mil	max	264	217	31	98	248	24	71	90	22	122	47	39	69	4	71	51	124	71	190
	min	248	201	12	83	232	16	51	TYPICAL	18	106	31	24	55	0	TYPICAL	TYPICAL	ref.	ref.	ref.