

N-Channel Enhancement Mode MOSFET

Pin Description

Feature

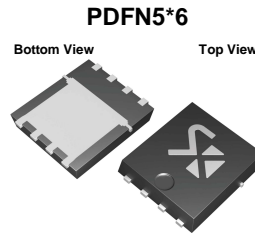
- Very Low RDS(on) at 4.5V_{GS}
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested

Applications

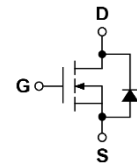
- Power Load Switch
- Motor Control

Product Summary

Symbol	N-Channel	Unit
V _{DSS}	30	V
R _{DS(ON)-Max}	1	mΩ
ID	254	A



Symbol



Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
SK254N03AD	PDFN5*6	Tape & Reel	5000 / Tape & Reel	254N03

Note :

Absolute Maximum Ratings (T_J=25°C Unless Otherwise Noted)

Symbol	Parameter	N-Channel	Unit	
V _{DSS}	Drain-Source Voltage	30	V	
V _{GSS}	Gate-Source Voltage	±20		
T _J	Maximum Junction Temperature	150	°C	
T _{STG}	Storage Temperature Range	-55 to 150	°C	
I _S	Diode Continuous Forward Current	87	A	
I _{DM} ^①	Pulse Drain Current Tested	T _C =25°C	400	A
I _D	Continuous Drain Current	T _C =25°C	254	A
		T _C =100°C	160	
P _D	Maximum Power Dissipation	T _C =25°C	96	W
		T _C =100°C	39	
I _D	Continuous Drain Current	T _A =25°C	42	A
		T _A =70°C	33	
P _D	Maximum Power Dissipation	T _A =25°C	2.5	W
		T _A =70°C	1.6	
I _{AS} ^②	Avalanche Current, Single pulse	L=0.3mH	50	A
E _{AS} ^②	Avalanche Energy, Single pulse	L=0.3mH	375	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	1.3	°C/W
R _{θJA} ^③	Thermal Resistance-Junction to Ambient	Steady State	50	°C/W

Note ① : Max. current is limited by bonding wire

Note ② : UIS tested and pulse width are limited by maximum junction temperature 150°C

Note ③ : Surface Mounted on 1in² FR-4 board with 1oz.

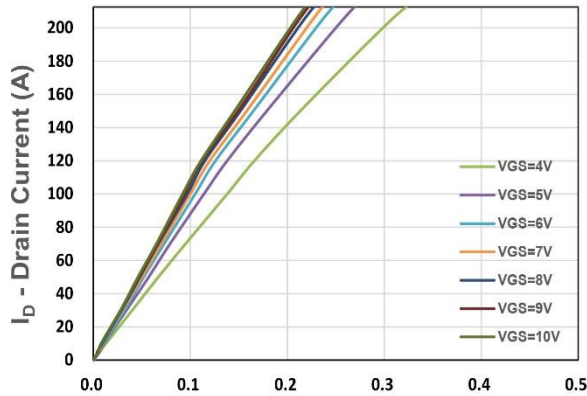
N-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V	-	-	1	uA
V_{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	1	1.5	2	V
I_{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R_{DS(ON)}^④	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =20A	-	0.85	1	mΩ
		V _{GS} =4.5V, I _{DS} =15A	-	1.1	1.4	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =10A	-	54	-	S
Dynamic Characteristics^⑤						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	4	-	Ω
C_{iSS}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Freq.=1MHz	-	6545	-	pF
C_{oss}	Output Capacitance		-	996	-	
C_{rSS}	Reverse Transfer Capacitance		-	772	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =15V, I _D =1A, R _{GEN} =6Ω	-	14	-	nS
t_r	Turn-on Rise Time		-	24.1	-	
t_{d(OFF)}	Turn-off Delay Time		-	330	-	
t_f	Turn-off Fall Time		-	133.5	-	
Q_g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =15V I _D =20A	-	84	-	nC
Q_g	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =20A	-	175.7	-	
Q_{gs}	Gate-Source Charge		-	30.6	-	
Q_{gd}	Gate-Drain Charge		-	30	-	
Source-Drain Characteristics						
V_{SD}^④	Diode Forward Voltage	I _{SD} =10A, V _{GS} =0V	-	0.7	1.1	V
t_{rr}	Reverse Recovery Time	I _F =10A, V _R =15V	-	36.9	-	nS
Q_{rr}	Reverse Recovery Charge	di _F /dt=100A/μs	-	35.6	-	nC

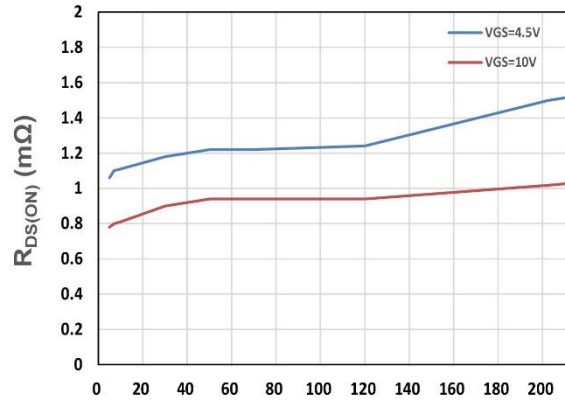
Note ④ : Pulse test (pulse width≤300us, duty cycle≤2%).

Note ⑤ : Guaranteed by design, not subject to production testing.

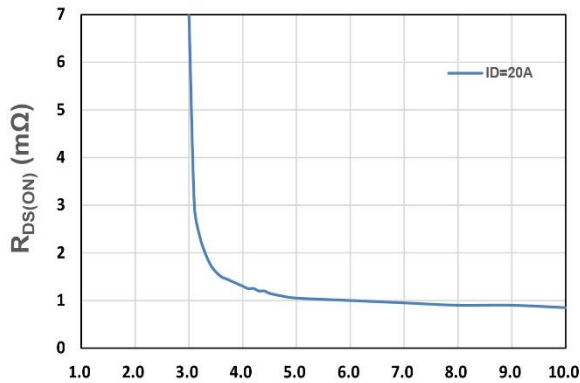
N-Channel Typical Characteristics



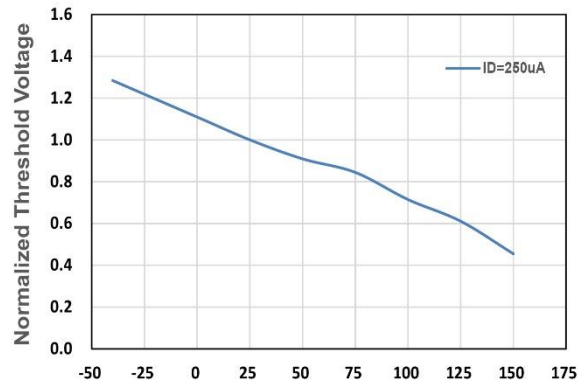
V_{DS} - Drain - Source Voltage (V)
Figure 1. Output Characteristics



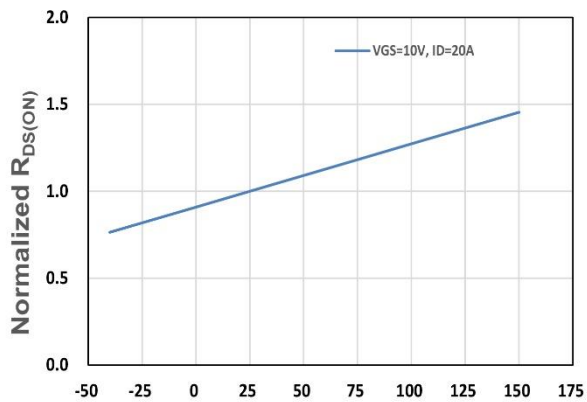
I_D - Drain Current (A)
Figure 2. On-Resistance vs. I_D



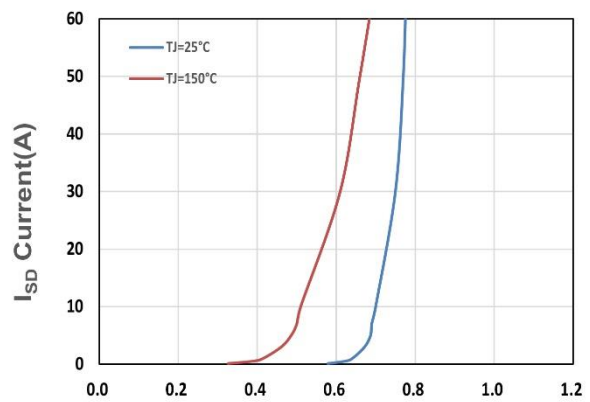
V_{GS} - Gate - Source Voltage (V)
Figure 3. On-Resistance vs. V_{GS}



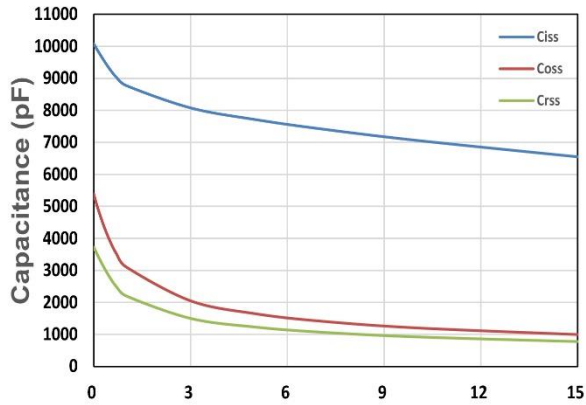
T_j , Junction Temperature ($^{\circ}C$)
Figure 4. Gate Threshold Voltage



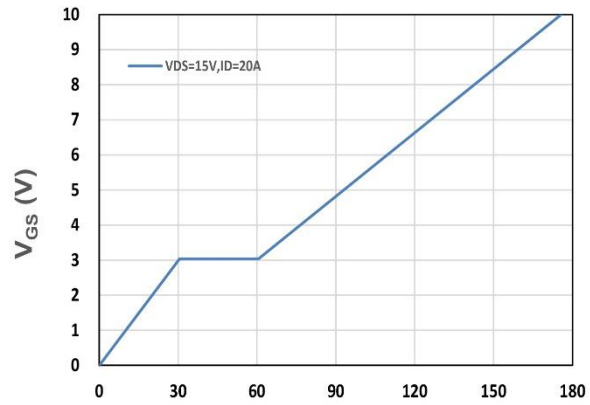
T_j , Junction Temperature ($^{\circ}C$)
Figure 5. Drain-Source On Resistance



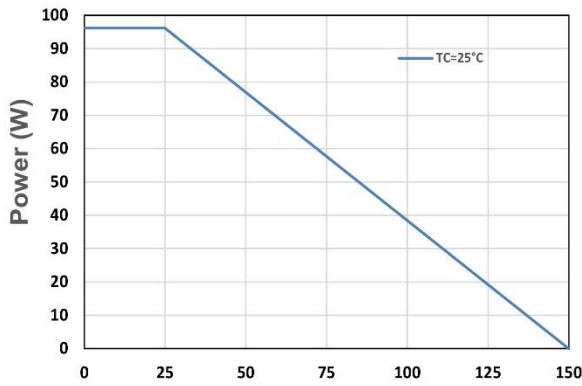
V_{SD} , Source-Drain Voltage (V)
Figure 6. Source-Drain Diode Forward



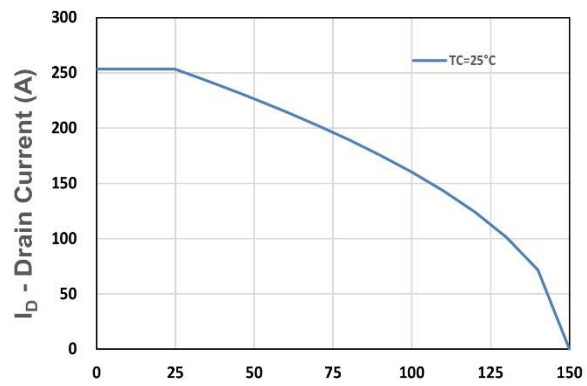
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



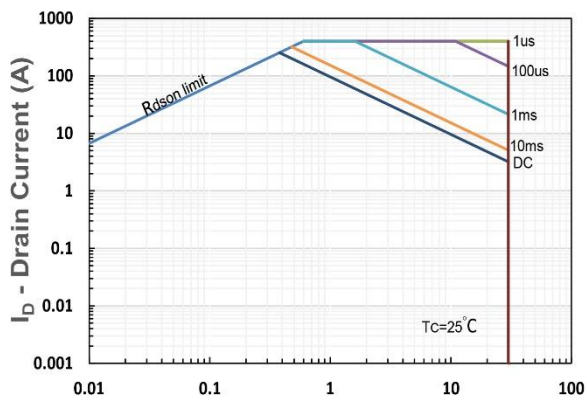
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



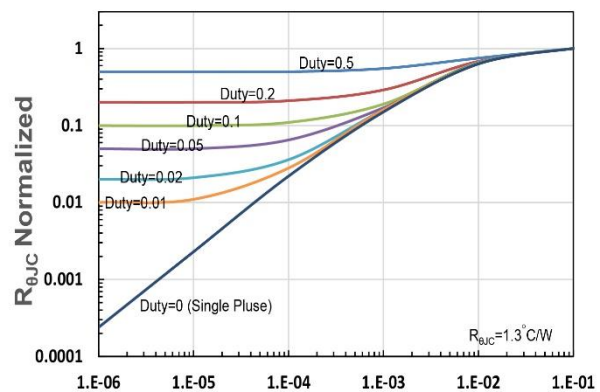
T_c - Case Temperature (°C)
Figure 9. Power Dissipation



T_c - Case Temperature (°C)
Figure 10. Drain Current



V_{DS} - Drain-Source Voltage (V)
Figure 11. Safe Operating Area



t_1 , Square Wave Pulse Duration(s)
Figure 12. $R_{\theta JC}$ Transient Thermal Impedance