

General Features

- $V_{DS} = -60V, I_D = -1.6A$
- $R_{DS(ON)} < 200m\Omega @ V_{GS} = -10V$
- $R_{DS(ON)} < 240m\Omega @ V_{GS} = -4.5V$

Application

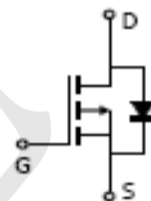
- Load/Power Switching
- Interfacing Switching
- Logic Level Shift

Package and Pin Configuration

SOT-23



Circuit diagram



Marking: N9HKT

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	-1.6	A
Pulsed Drain Current ^(Note 1)	I_{DM}	-8	A
Maximum Power Dissipation	P_D	1.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	83.3	$^\circ C/W$
---	-----------------	------	--------------

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =-250μA	-60	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-60V, V _{GS} =0V	-	-	-1	μA
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1.4	-2.0	-2.6	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-1.5A	-	150	200	mΩ
		V _{GS} =-4.5V, I _D =-1.5A	-	190	240	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-1.5A	-	3	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =-30V, V _{GS} =0V, F=1.0MHz	-	444.2	-	PF
Output Capacitance	C _{oss}		-	19.6	-	PF
Reverse Transfer Capacitance	C _{rss}		-	17.9	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-30V, I _D =-1.5A, V _{GS} =-10V, R _G =3Ω	-	40	-	nS
Turn-on Rise Time	t _r		-	35	-	nS
Turn-Off Delay Time	t _{d(off)}		-	15	-	nS
Turn-Off Fall Time	t _f		-	10	-	nS
Total Gate Charge	Q _g	V _{DS} =-30, I _D =-1.5A, V _{GS} =-10V	-	11.3	-	nC
Gate-Source Charge	Q _{gs}		-	2.7	-	nC
Gate-Drain Charge	Q _{gd}		-	1.6	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =-1.5A	-		-1.2	V
Diode Forward Current (Note 2)	I _S		-	-	-1.6	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F =- 1.5A	-	25		nS
Reverse Recovery Charge	Q _{rr}	di/dt = -100A/μs (Note3)	-	31		nC

Typical Electrical and Thermal Characteristics (Curves)

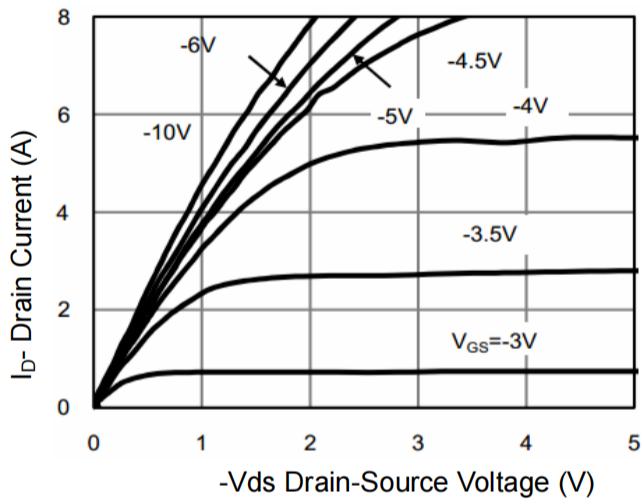


Figure 1 Output Characteristics

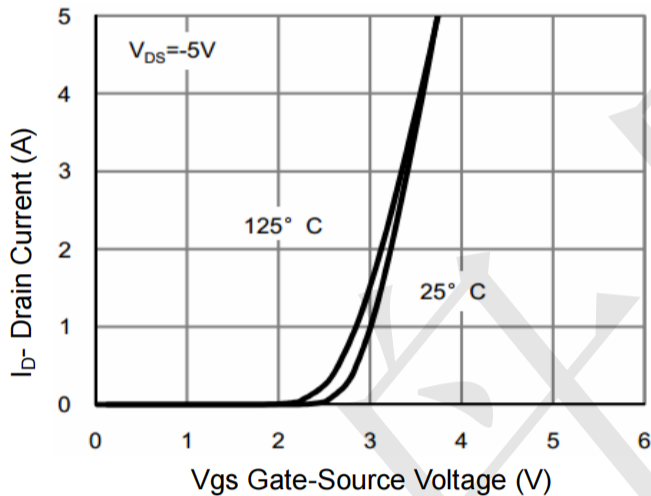


Figure 2 Transfer Characteristics

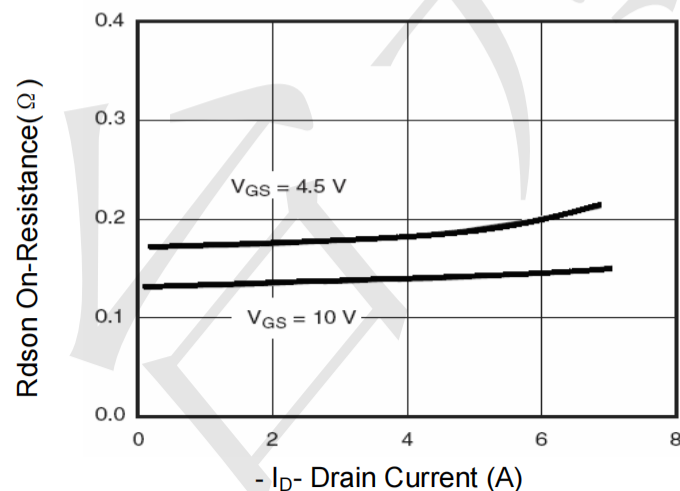


Figure 3 $R_{DS(on)}$ - Drain Current

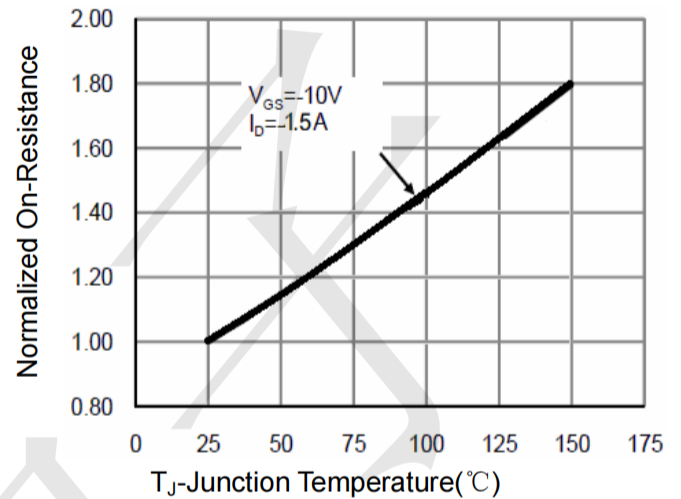


Figure 4 $R_{DS(on)}$ -Junction Temperature

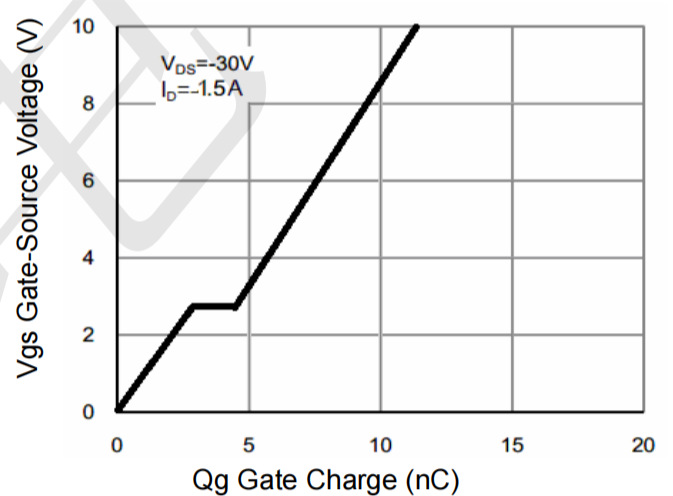


Figure 5 Gate Charge

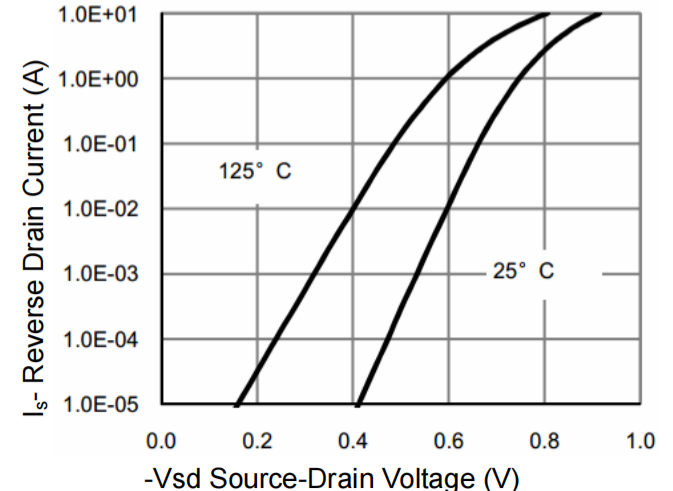


Figure 6 Source- Drain Diode Forward

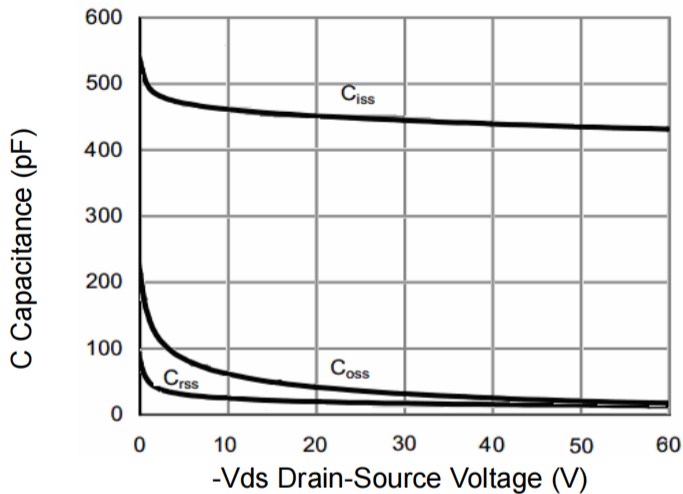


Figure 7 Capacitance vs Vds

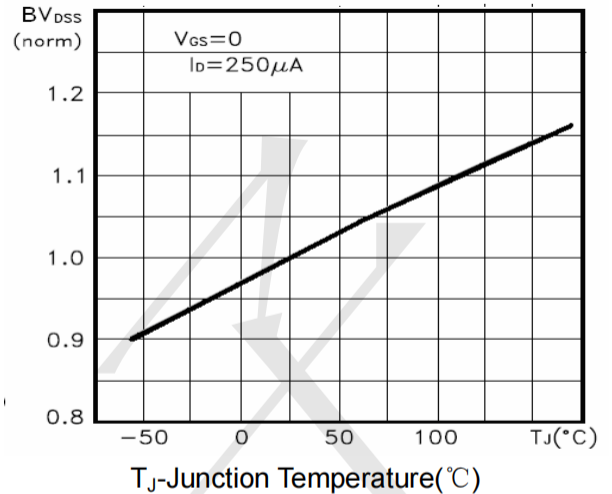


Figure 9 BV_{DSS} vs Junction Temperature

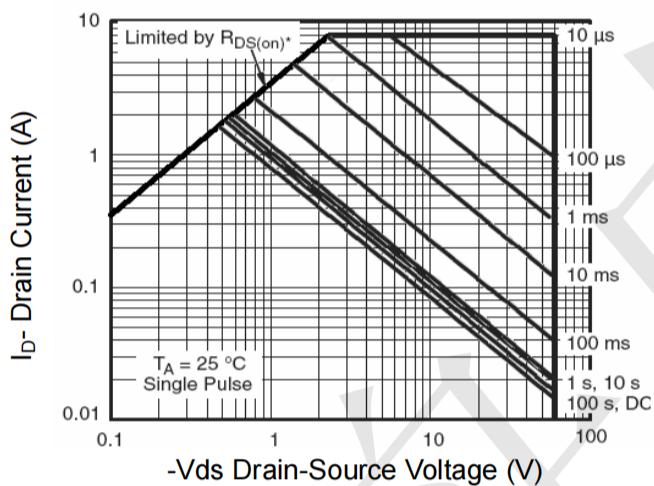


Figure 8 Safe Operation Area

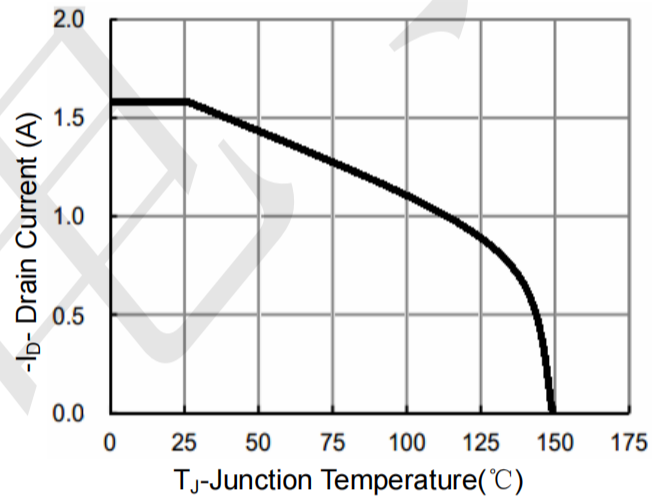


Figure 10 I_D Current De-rating

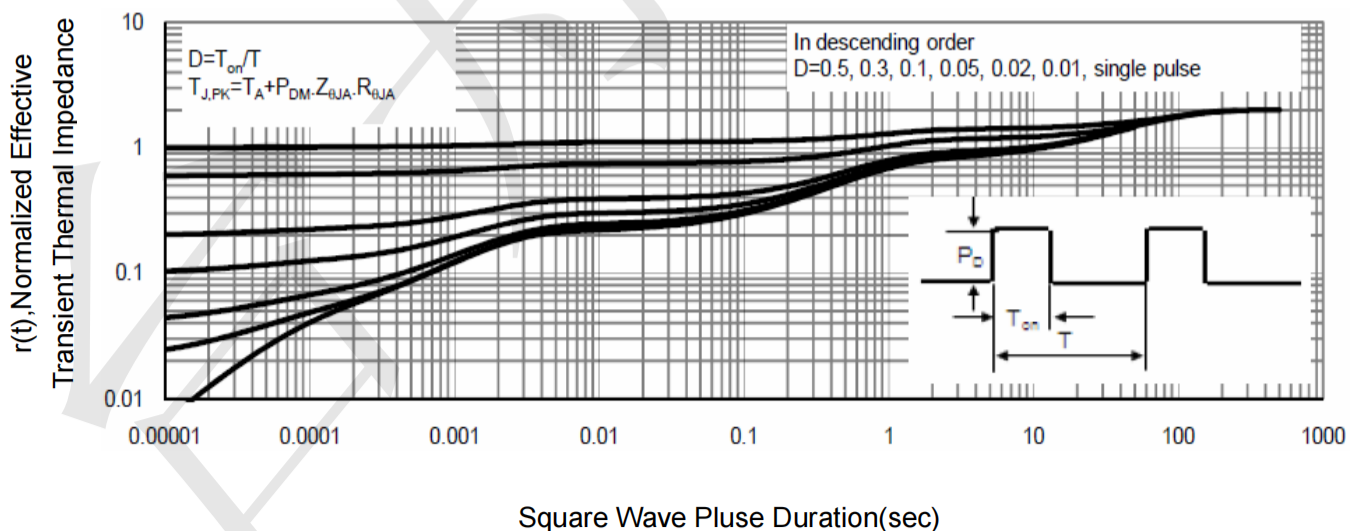
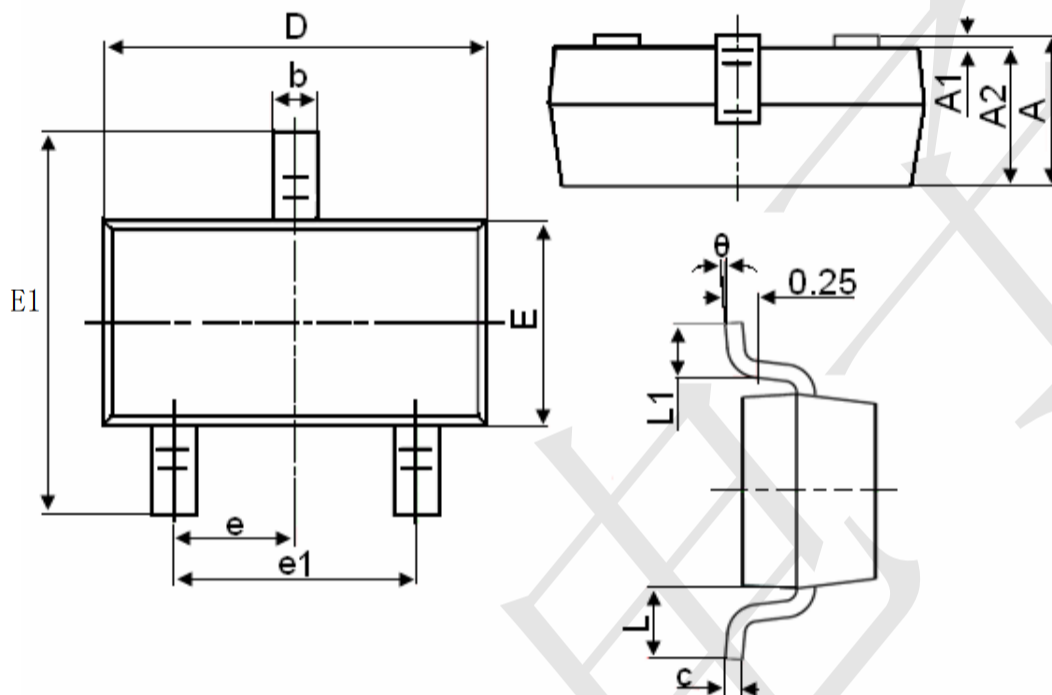


Figure 11 Normalized Maximum Transient Thermal Impedance

SOT-23 Package Information



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°