



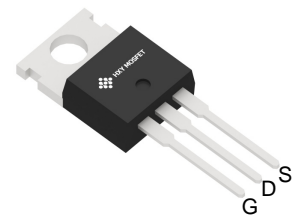
## Description

The BUK9510-100B use advanced SGT MOSFET

technology to provide low  $R_{DS(ON)}$ , low gate charge,

fast switching and excellent avalanche characteristics.

This device is specially designed to get better ruggedness and suitable.



TO-220C

## General Features

$V_{DS} = 100V$   $I_D = 70A$

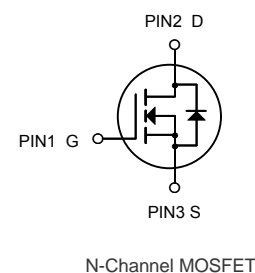
$R_{DS(ON)} < 10.5m\Omega @ V_{GS}=10V$

## Application

Battery protection

Load switch

Uninterruptible power supply



## Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
BUK9510-100B	TO-220C	HXY MOSFET	50

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current@ $T_C=25^{\circ}C$	70	A
$I_{DM}$	Puled Drain Current <sup>1</sup>	280	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	110	mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation <sup>4</sup>	100	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^{\circ}C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	64	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Ambient <sup>1</sup>	1.25	$^{\circ}C/W$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V$ , $I_D=250\mu A$	100	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to $25^{\circ}\text{C}$ , $I_D=1\text{mA}$	---	0.098	---	$V/^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V$ , $I_D=20A$	---	8.5	10.5	$m\Omega$
		$V_{GS}=4.5V$ , $I_D=15A$	---	9.5	15	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$ , $I_D=250\mu A$	1.0	---	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.57	---	$mV/^{\circ}\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=80V$ , $V_{GS}=0V$ , $T_J=25^{\circ}\text{C}$	---	---	1	$\mu A$
		$V_{DS}=80V$ , $V_{GS}=0V$ , $T_J=55^{\circ}\text{C}$	---	---	5	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V$ , $V_{DS}=0V$	---	---	$\pm 100$	nA
$R_g$	Gate Resistance	$V_{DS}=0V$ , $V_{GS}=0V$ , $f=1\text{MHz}$	---	0.48	---	$\Omega$
$Q_g$	Total Gate Charge (10V)	$V_{DS}=50V$ , $V_{GS}=50V$ , $I_D=10A$	---	31.3	---	nC
$Q_{gs}$	Gate-Source Charge		---	3.49	---	
$Q_{gd}$	Gate-Drain Charge		---	7.63	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=50V$ , $V_{GS}=10V$ , $R_G=4\Omega$ $I_D=10A$	---	16	---	ns
$T_r$	Rise Time		---	10	---	
$T_{d(off)}$	Turn-Off Delay Time		---	40	---	
$T_f$	Fall Time		---	6	---	
$C_{iss}$	Input Capacitance	$V_{DS}=50V$ , $V_{GS}=0V$ , $f=1\text{MHz}$	---	1368	---	pF
$C_{oss}$	Output Capacitance		---	451	---	
$C_{rss}$	Reverse Transfer Capacitance		---	12.9	---	
$I_S$	Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V$ , Force Current	---	---	70	A
$I_{SM}$	Pulsed Source Current <sup>2,5</sup>		---	---	280	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V$ , $I_S=1A$ , $T_J=25^{\circ}\text{C}$	---	---	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=10A$ , $dI/dt=100A/\mu s$ , $T_J=25^{\circ}\text{C}$	---	103	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	187	---	nC

**Note :**

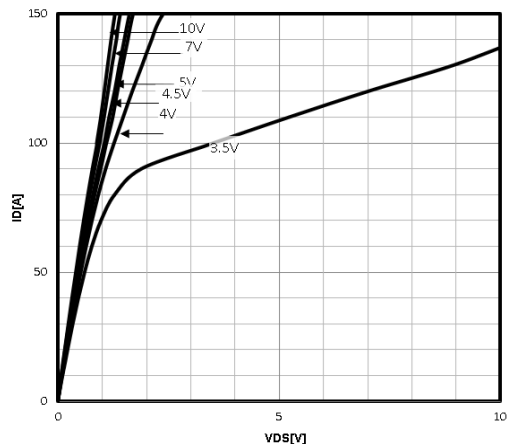
- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=25V$ ,  $V_{GS}=10V$ ,  $L=0.1\text{mH}$ ,  $I_{AS}=11A$
- 4.The power dissipation is limited by  $150^{\circ}\text{C}$  junction temperature
- 5 .The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation.



## Typical Characteristics

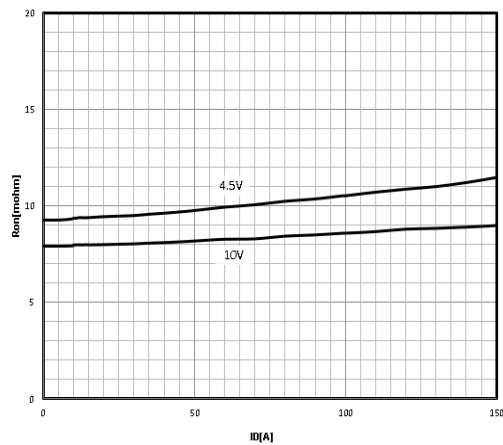
Typ. output characteristics

$$I_D = f(V_{DS})$$



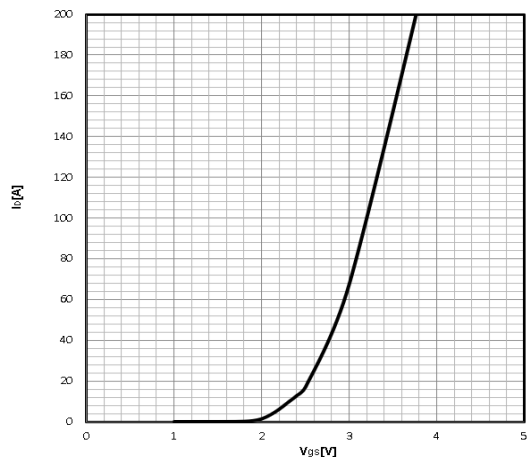
Typ. drain-source on resistance

$$R_{DS(on)} = f(I_D)$$



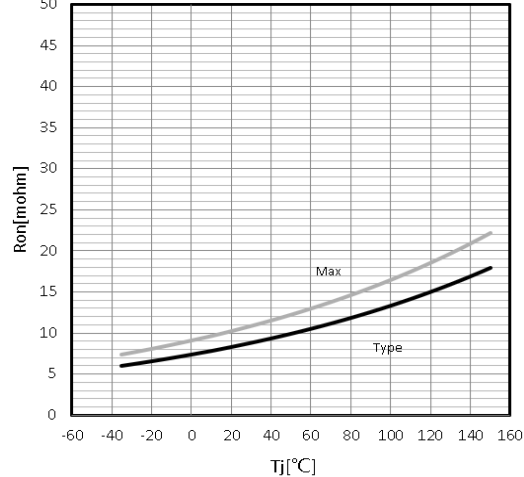
Typ. transfer characteristics

$$I_D = f(V_{GS})$$



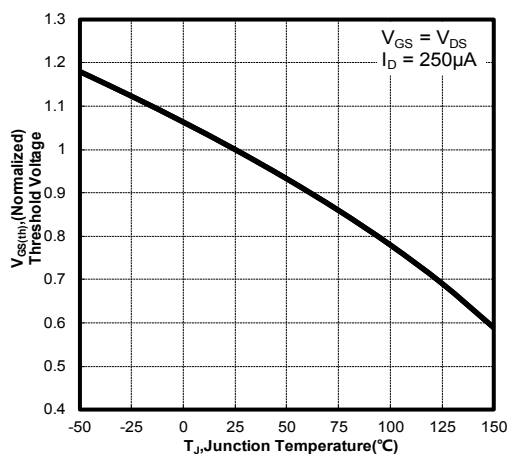
Drain-source on-state resistance

$$R_{DS(on)} = f(T_J); I_D = 20A; V_{GS} = 10V$$



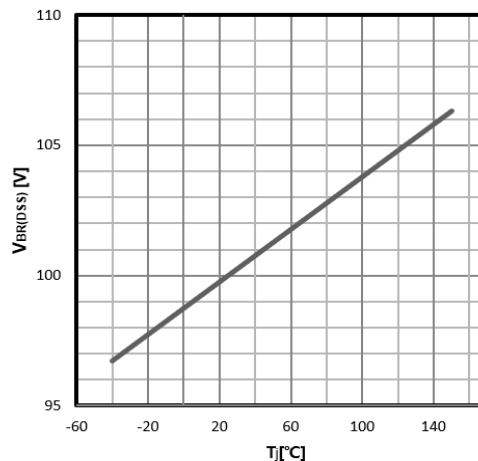
Gate Threshold Voltage

$$V_{TH} = f(T_J); I_D = 250\mu A$$



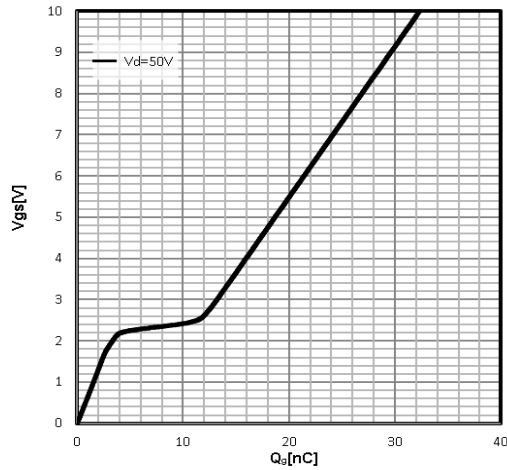
Drain-source breakdown voltage

$$V_{BR(DSS)} = f(T_J); I_D = 250\mu A$$

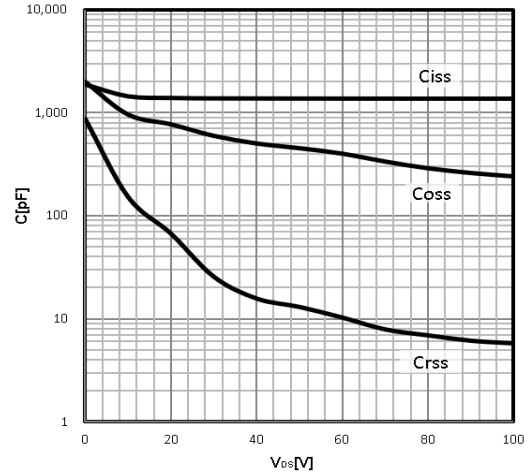




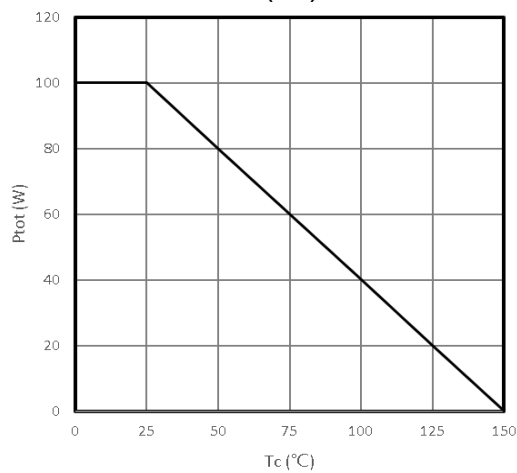
**Typ. gate charge**  
 $V_{GS}=f(Q_g)$ ;  $I_D=10A$



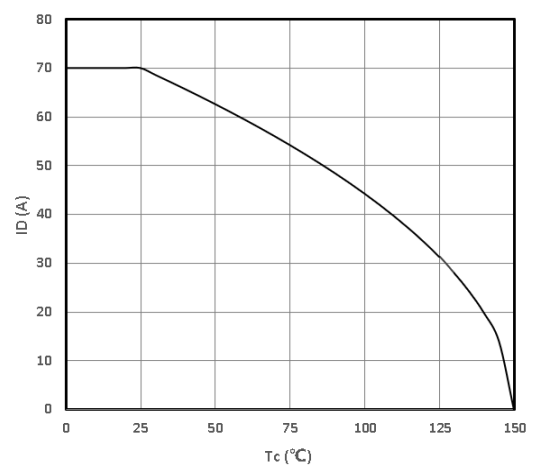
**Typ. capacitances**  
 $C=f(V_{DS})$ ;  $V_{GS}=0V$ ;  $f=1MHz$



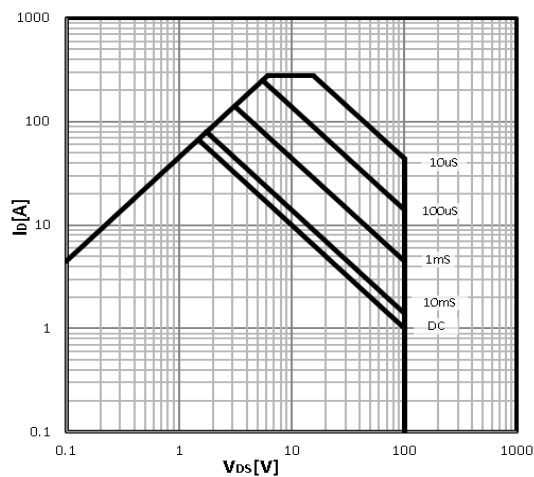
**Power Dissipation**  
 $P_{tot}=f(T_C)$



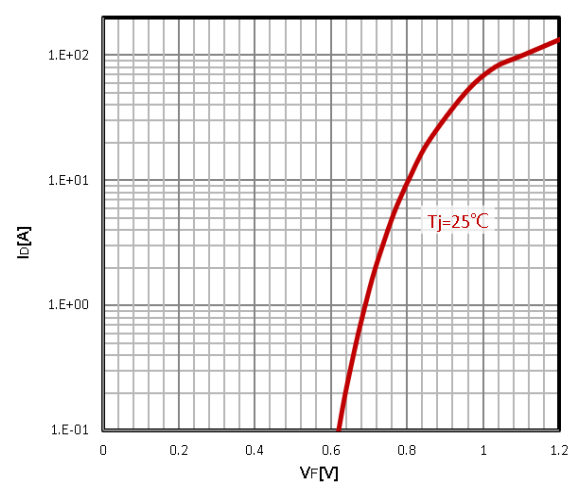
**Maximum Drain Current**  
 $I_D=f(T_C)$



**Safe operating area**  
 $I_D=f(V_{DS})$



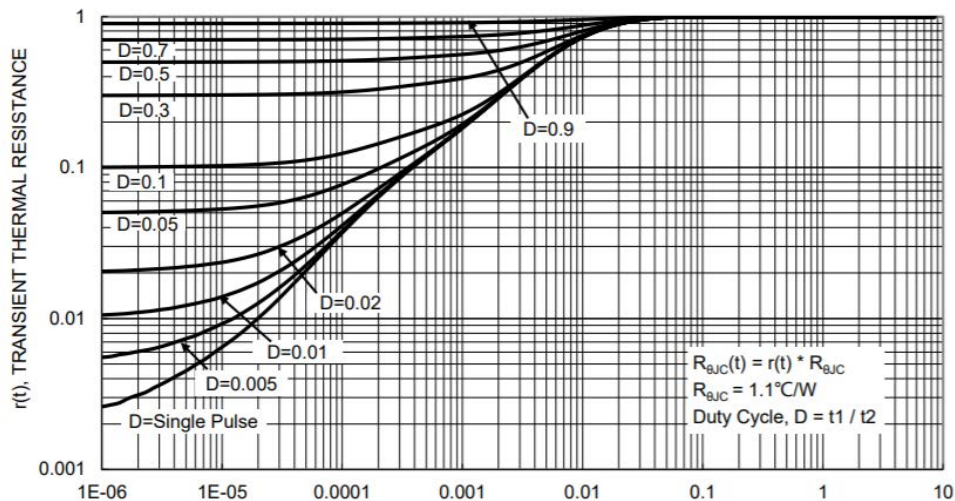
**Body Diode Forward Voltage Variation**  
 $I_F=f(V_{GS})$





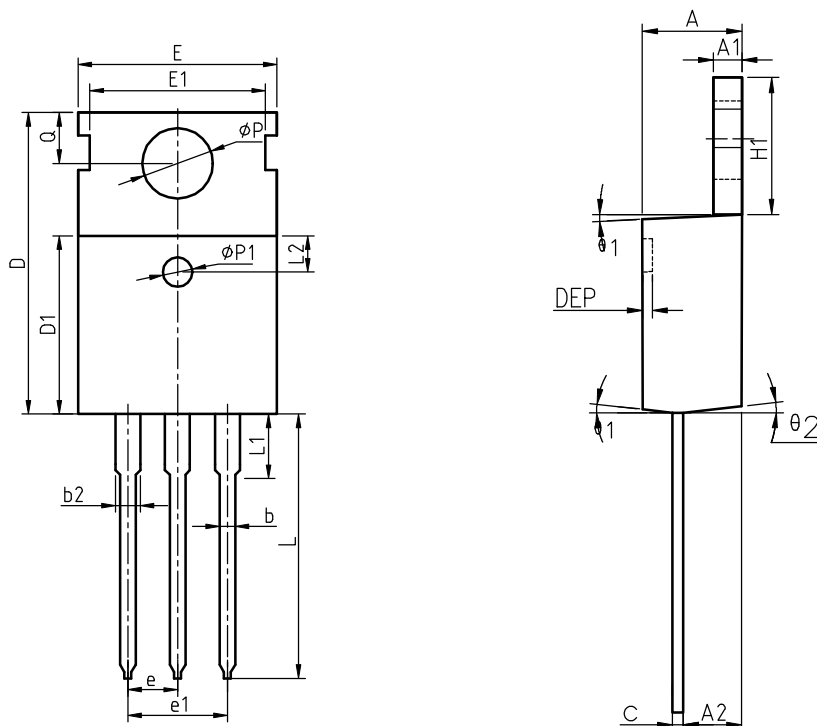
Max. transient thermal impedance

$$Z_{thJC}=f(t_p)$$





Package Information  
TO-220C



COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.27	1.30	1.33	0.050	0.051	0.052
A2	2.35	2.40	2.50	0.093	0.094	0.098
b	0.77	0.80	0.90	0.030	0.031	0.035
b2	1.17	1.27	1.36	0.046	0.050	0.054
c	0.48	0.50	0.56	0.019	0.020	0.022
D	15.40	15.60	15.80	0.606	0.614	0.622
D1	9.00	9.10	9.20	0.354	0.358	0.362
DEP	0.05	0.10	0.20	0.002	0.004	0.008
E	9.80	10.00	10.20	0.386	0.394	0.402
E1	-	8.70	-	-	0.343	-
E2	9.80	10.00	10.20	0.386	0.394	0.402
e		2.54	BSC		0.100	BSC
e1		5.08	BSC		0.200	BSC
H1	6.40	6.50	6.60	0.252	0.256	0.260
L	12.75	13.50	13.65	0.502	0.531	0.537
L1	-	3.10	3.30	-	0.122	0.130
L2		2.50	REF		0.098	REF
P	3.50	3.60	3.63	0.138	0.142	0.143
P1	3.50	3.60	3.63	0.138	0.142	0.143
Q	2.73	2.80	2.87	0.107	0.110	0.113
$\theta 1$	5°	7°	9°	5°	7°	9°
$\theta 2$	1°	3°	5°	1°	3°	5°
$\theta 3$	1°	3°	5°	1°	3°	5°



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