

RoHS Compliant Product
A suffix of "-C" specifies halogen free

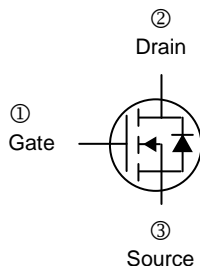
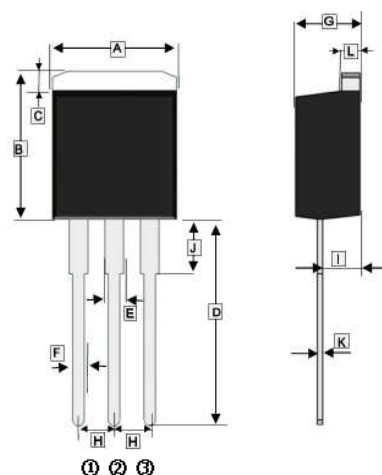
DESCRIPTION

The SIK04N60SL is the highest performance trench N-ch MOSFETs with extreme high cell density , which provide excellent $R_{DS(on)}$ and gate charge for most of the synchronous buck converter applications .

FEATURES

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

TO-262



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	9.80	10.40	G	4.40	4.85
B	9.60	10.50	H	2.54 BSC	
C	1.19	1.40	I	2.70 BSC	
D	12.3	14.3	J	4.00 BSC	
E	1.10	1.50	K	0.25	0.56
F	0.68	1.00	L	1.10	1.45

ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current	I_D	$T_C=25^\circ\text{C}$	4
		$T_C=100^\circ\text{C}$	2.5
Pulsed Drain Current	I_{DM}	16	A
Total Power Dissipation	P_D	$T_C=25^\circ\text{C}$	95
		Derate above 25°C	0.76
Single Pulse Avalanche Energy ¹	E_{AS}	217	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55~150	$^\circ\text{C}$
Thermal Resistance Rating			
Maximum Thermal Resistance Junction-Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C} / \text{W}$
Maximum Thermal Resistance Junction-Case	$R_{\theta JC}$	1.32	$^\circ\text{C} / \text{W}$

Notes:

1. $L=30\text{mH}, I_{AS}=3.45\text{A}, V_{DD}=155\text{V}, R_G=25\Omega$, Starting $T_J = 25^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Teat Conditions
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	600	-	-	V	$V_{GS}=0, I_D=250\mu\text{A}$
Gate-Threshold Voltage	$V_{GS(th)}$	2	-	4	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
Gate-Source Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS}= \pm 30\text{V}$
Drain-Source Leakage Current	I_{DSS}	-	-	1	μA	$V_{DS}=600\text{V}, V_{GS}=0$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	2.0	2.4	Ω	$V_{GS}=10\text{V}, I_D=2\text{A}$
Total Gate Charge ^{1,2}	Q_g	-	8.16	-	nC	$I_D=4\text{A}$ $V_{DS}=480\text{V}$ $V_{GS}=10\text{V}$
Gate-Source Charge ^{1,2}	Q_{gs}	-	2.63	-		
Gate-Drain Change ^{1,2}	Q_{gd}	-	3.01	-		
Turn-on Delay Time ^{1,2}	$T_{d(on)}$	-	16.8	-	nS	$V_{DD}=300\text{V}$ $I_D=4\text{A}$ $R_G=25\Omega$
Rise Time ^{1,2}	T_r	-	26.2	-		
Turn-off Delay Time ^{1,2}	$T_{d(off)}$	-	37.4	-		
Fall Time ^{1,2}	T_f	-	20.2	-		
Input Capacitance	C_{iss}	-	449.7	-	pF	$V_{GS}=0$ $V_{DS}=25\text{V}$ $f=1.0\text{MHz}$
Output Capacitance	C_{oss}	-	57	-		
Reverse Transfer Capacitance	C_{rss}	-	2	-		
Source-Drain Diode						
Diode Forward Voltage	V_{SD}	-	-	1.4	V	$I_S=4\text{A}, V_{GS}=0$
Continuous Source Current	I_S	-	-	4	A	Integral Reverse P-N Junction Diode in the MOSFET
Pulsed Source Current	I_{SM}	-	-	16	A	
Reverse Recovery Time ¹	T_{rr}	-	441.53	-	ns	$I_S=4\text{A}, V_{GS}=0,$ $di_f/dt=100\text{A}/\mu\text{S}$
Reverse Recovery Charge ¹	Q_{rr}	-	1.98	-	μC	

Notes:

1. Pulse Test: Pulse width $\leq 300\mu\text{S}$, Duty cycle $\leq 2\%$
2. Essentially independent of operating temperature.

CHARACTERISTIC CURVES

Figure 1. On-Region Characteristics

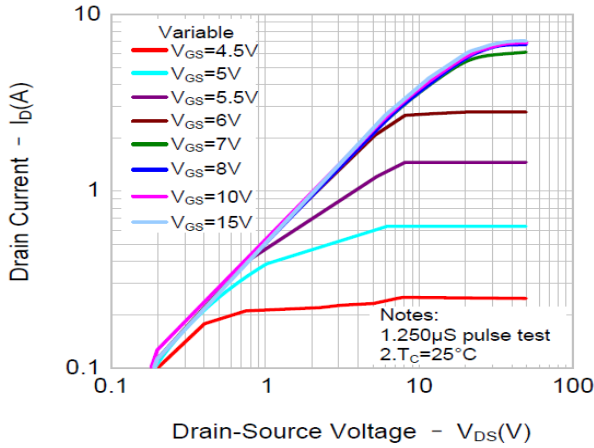


Figure 2. Transfer Characteristics

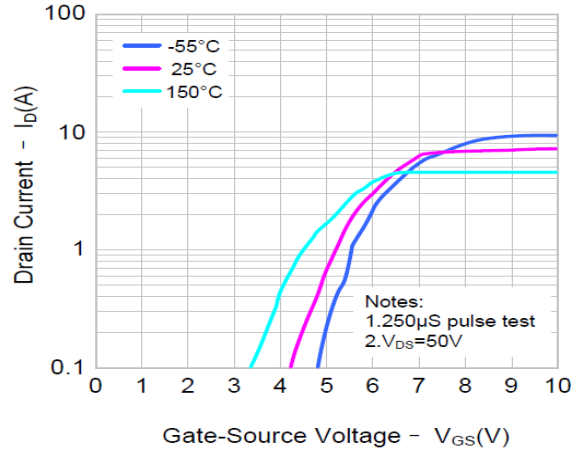


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

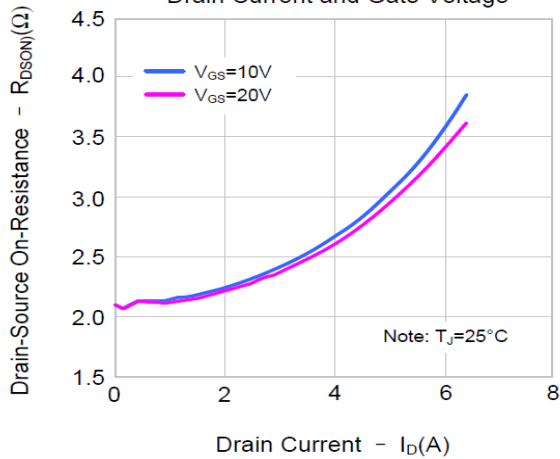


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

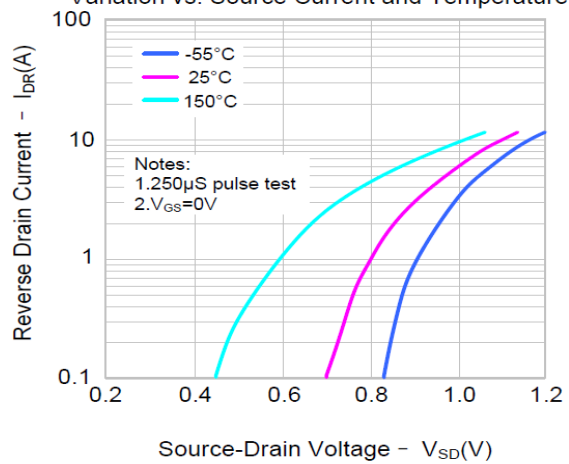


Figure 5. Capacitance Characteristics

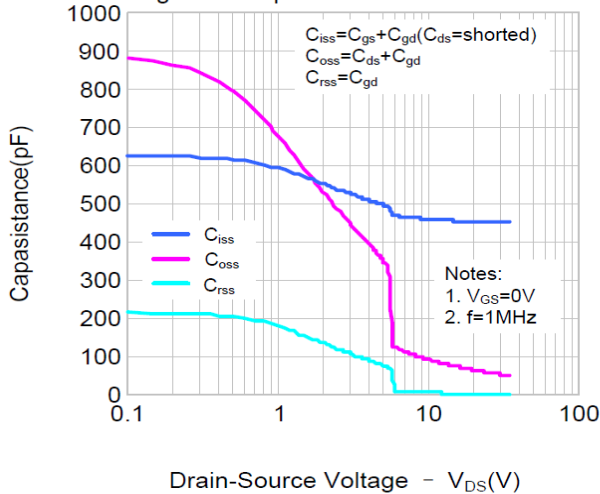
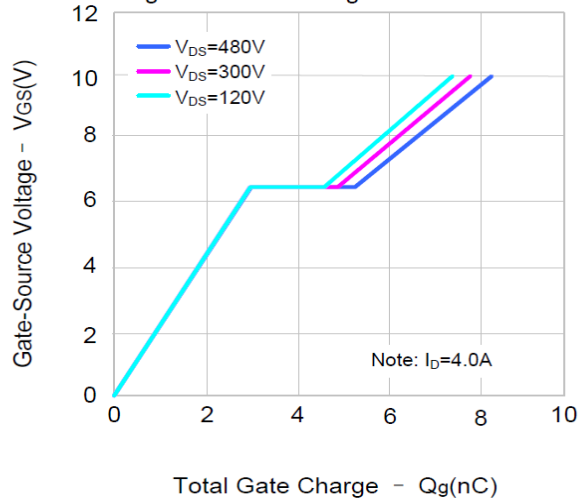


Figure 6. Gate Charge Characteristics



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Figure 7. Breakdown Voltage Variation vs. Temperature

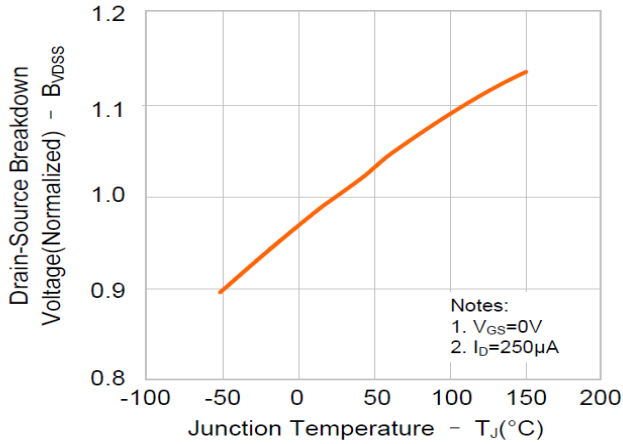


Figure 8. On-resistance Variation vs. Temperature

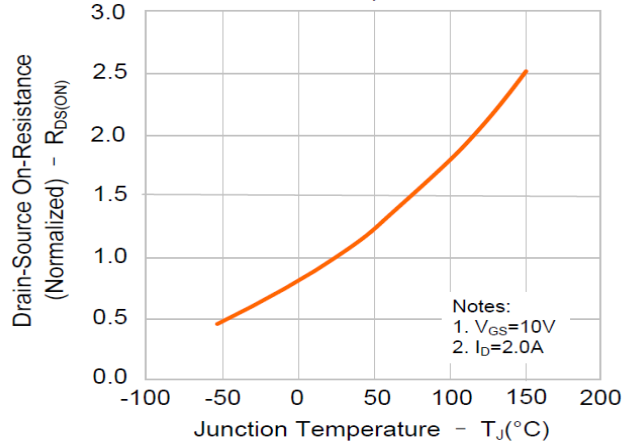


Figure 9 . Max. Safe Operating Area

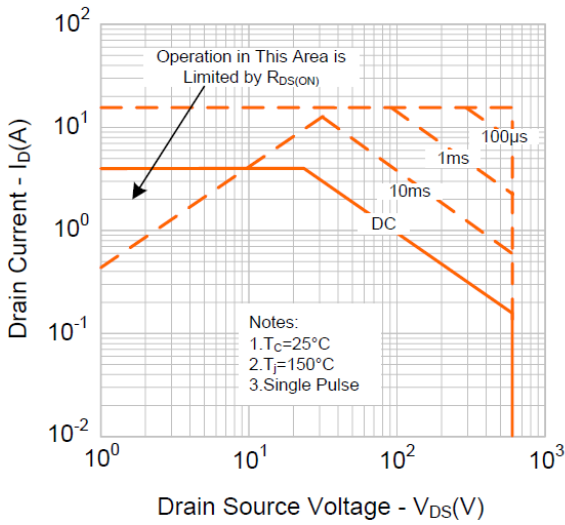
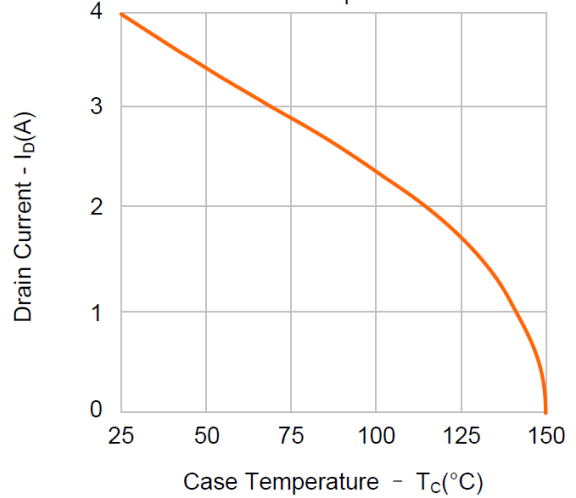
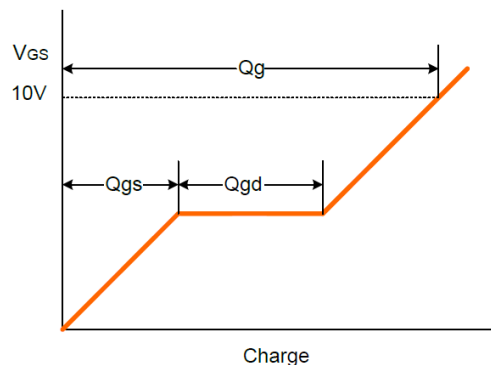
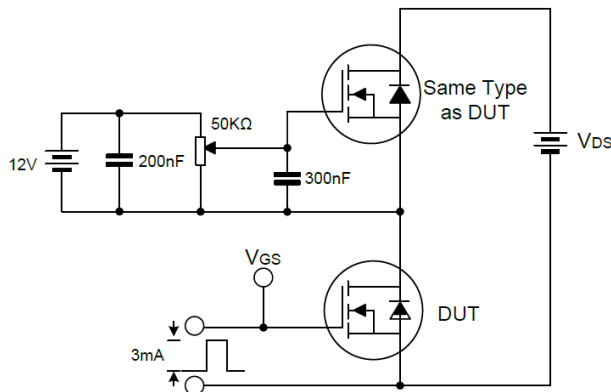


Figure 10. Maximum Drain Current vs. Case Temperature

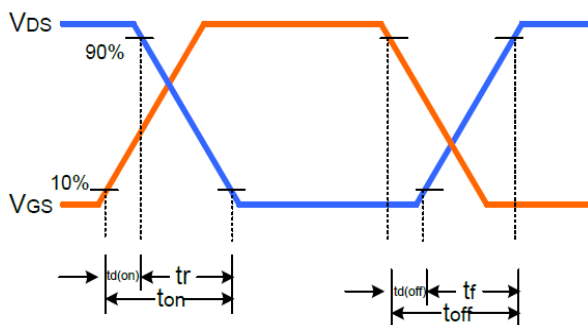
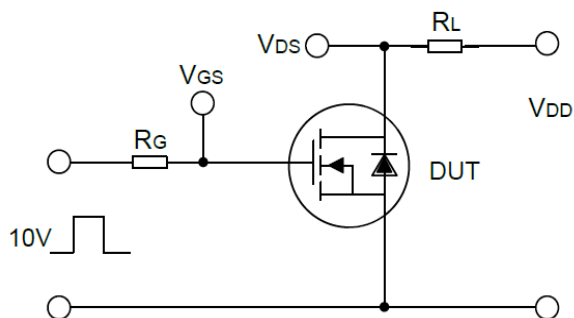


Gate Charge Test Circuit & Waveform



CHARACTERISTIC CURVES

Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform

