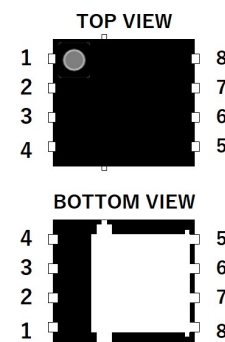
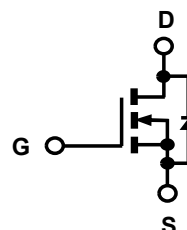


ICEK004GL2LK N-Channel Enhancement Mode MOSFET

Features

- Ultra Low $r_{DS(on)}$
- Superior switching performance
- Optimized design for Motor Drivers and DC-DC Converter

Product Summary			
I_D	$T_A=25^\circ\text{C}$	521A	Max
$V_{(BR)DSS}$	$I_D=1\text{mA}$	25V	Min
$r_{DS(on)}$	$V_{GS}=10\text{V}$	0.4m Ω	Typ
Q_g	$V_{DS}=12.5\text{V}$	239nC	Typ



DFN5x6

1-3=Source

4=Gate, 5-8=Drain



Maximum ratings^a at $T_j=25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current ^b	I_D	$T_c=25^\circ\text{C}$	521	A
		$T_c=100^\circ\text{C}$	368	
Pulsed drain current ^b	$I_{D, \text{pulse}}$	$T_c=25^\circ\text{C}$	2060	A
Avalanche energy, single pulse	E_{AS}	$L=0.1\text{mH}$, $V_{DD}=25\text{V}$, $I_D=48\text{A}$, $R_G=25\Omega$	576	mJ
Avalanche current, repetitive ^b	I_{AR}	limited by $T_j\text{max}$	48	A
Gate source voltage	V_{GS}	Static	± 20	V
		AC ($f>1\text{Hz}$)		
Power dissipation	P_{tot}	$T_c=25^\circ\text{C}$	192.3	W
Operating and storage temperature	T_j, T_{stg}		-55 to +175	$^\circ\text{C}$

a Preliminary data sheet - Specifications subject to change.

b limited by $T_{j\text{max}}$

c when mounted on 1-inch square 2oz copper-clad FR-4

Parameter	Symbol	Conditions	Values			Unit
			Min	Typ	Max	

Thermal characteristics

Thermal resistance, junction-case	R_{thJC}		-	-	0.78	°C/W
Thermal resistance, junction-ambient °	R_{thJA}	lead	-	-	45	
Soldering temperature, wave soldering only allowed at leads	T_{solder}	1.6mm (0.063in.) from case for 10 s	-	-	260	°C

Electrical characteristics at $T_j=25^{\circ}\text{C}$, unless otherwise specified

Static characteristics

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=1mA$	25	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.7	3	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=25V, V_{GS}=0V$	-	-	1	μA
Gate source leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=30A$	-	0.30	0.40	m Ω
Gate resistance	R_G	$f=1\text{ MHz}$, open drain	-	3	-	Ω

Dynamic characteristics

Input capacitance	C_{iss}	$V_{DS}=12.5V, V_{GS}=0V, f=1\text{ MHz}$	-	13125	-	pF
Output capacitance	C_{oss}		-	7185	-	
Reverse transfer capacitance	C_{rss}		-	1820	-	
Turn-on delay time	$t_{d(on)}$	$V_{DS}=12.5V, I_D=30A, V_{GS}=5V, R_G=1.1\Omega$ (External)	-	37	-	ns
Rise time	t_r		-	131	-	
Turn-off delay time	$t_{d(off)}$		-	97	-	
Fall time	t_f		-	124	-	

Parameter	Symbol	Conditions	Values			Unit
			Min	Typ	Max	

Gate charge characteristics

Gate to source charge	Q_{gs}	$V_{DS}=12.5V, I_D=30A,$ $V_{GS}=0 \text{ to } 10V$	-	33	-	nC
Gate to drain charge	Q_{gd}		-	69	-	
Gate charge total	Q_g		-	239	-	

Reverse Diode

Continuous forward current	I_S	$V_{GS}=0V$	-	-	521	A
Diode forward voltage	V_{SD}	$V_{GS}=0V, I_S=30A$	-	0.72	-	V
Reverse recovery time	t_{rr}	$V_{RR}=20V, I_S=20A,$ $d_{iF}/d_t=100 \text{ A}/\mu\text{S}$	-	128	-	ns
Reverse recovery charge	Q_{rr}		-	261	-	nC
Peak reverse recovery current	I_{rm}		-	3	-	A

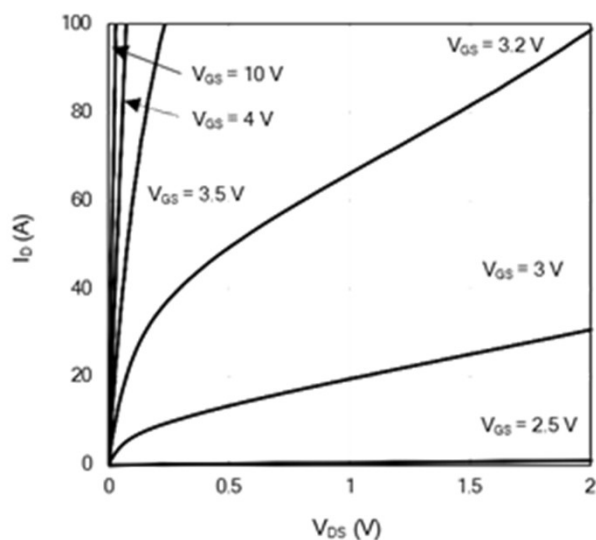


Figure 1: On-Region Characteristics

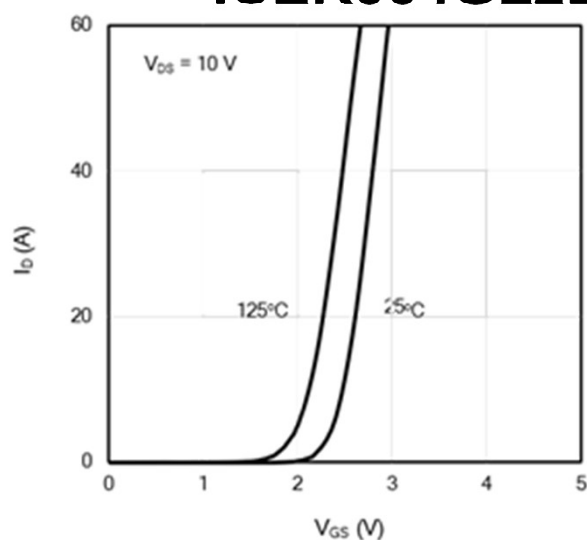


Figure 2: Transfer Characteristics

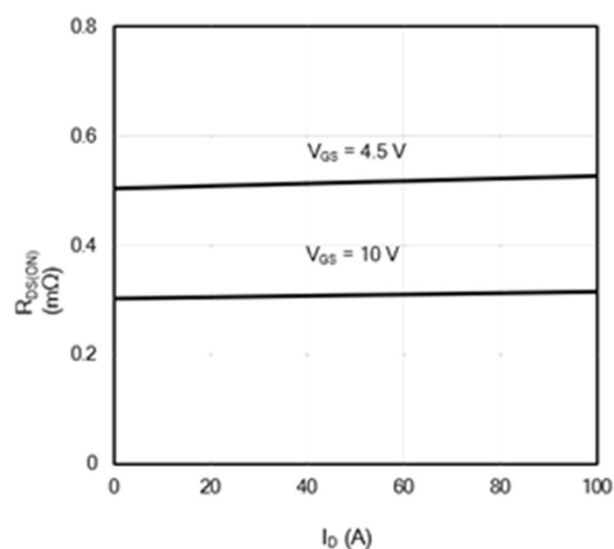


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

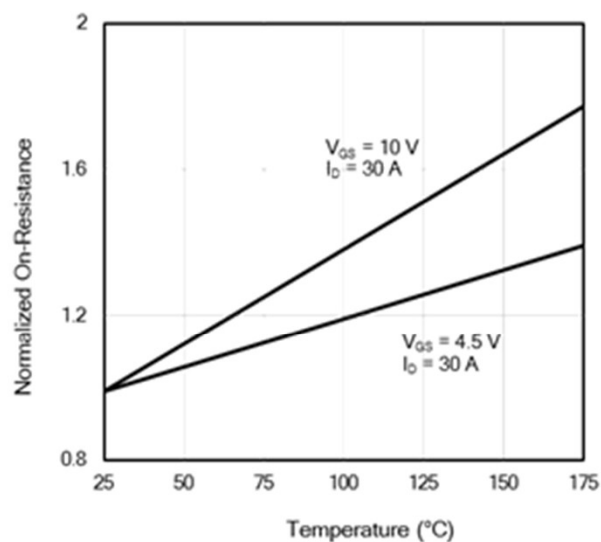


Figure 4: On-Resistance vs. Junction Temperature

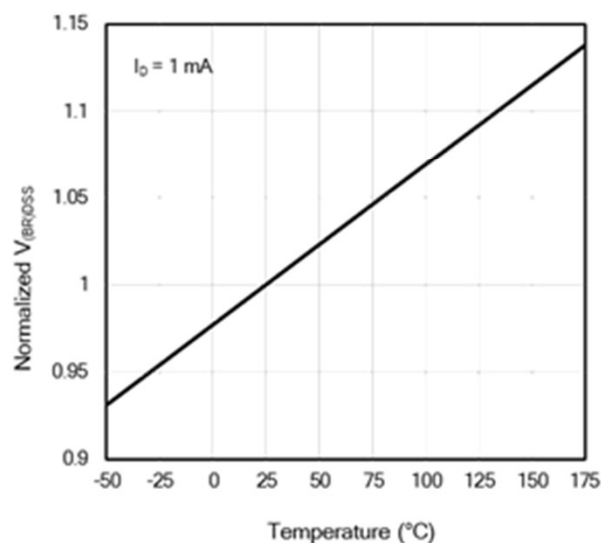


Figure 5: Breakdown Voltage vs. Junction Temperature

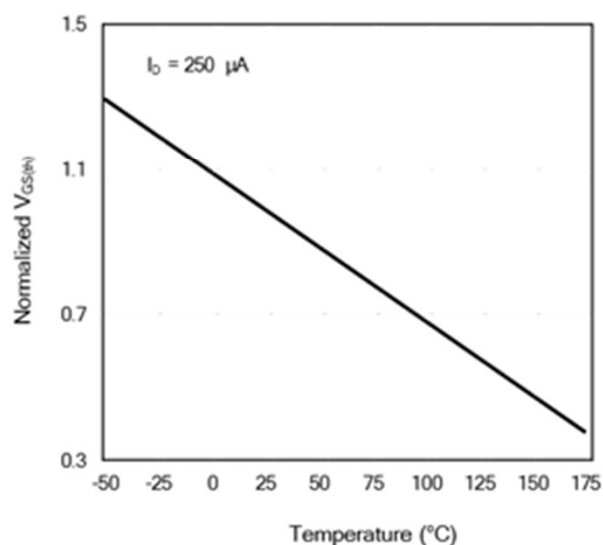


Figure 6: Threshold Voltage vs. Junction Temperature

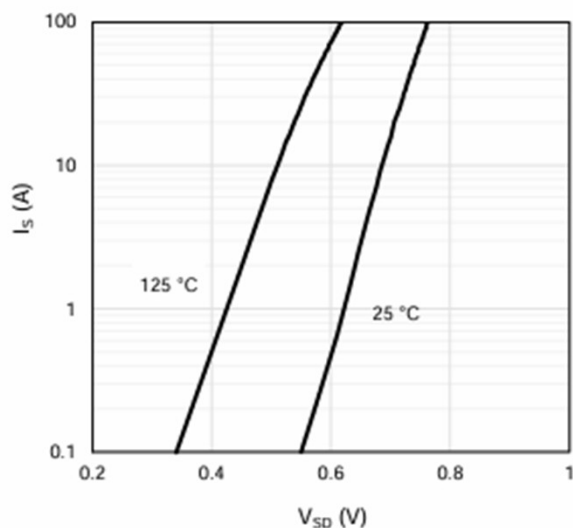


Figure 7: Body-Diode Characteristics

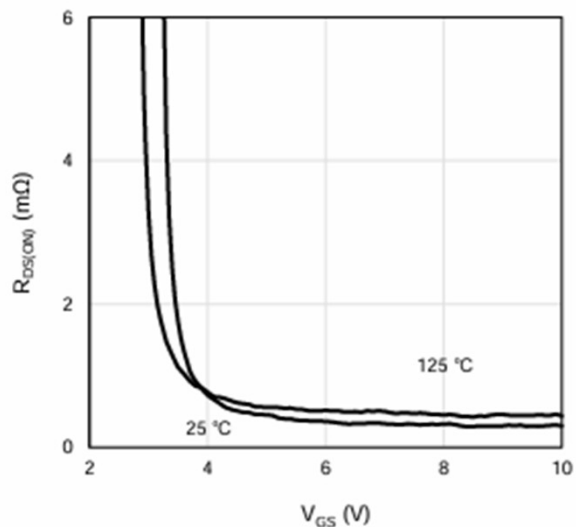


Figure 8: On-Resistance vs. Gate-Source Voltage

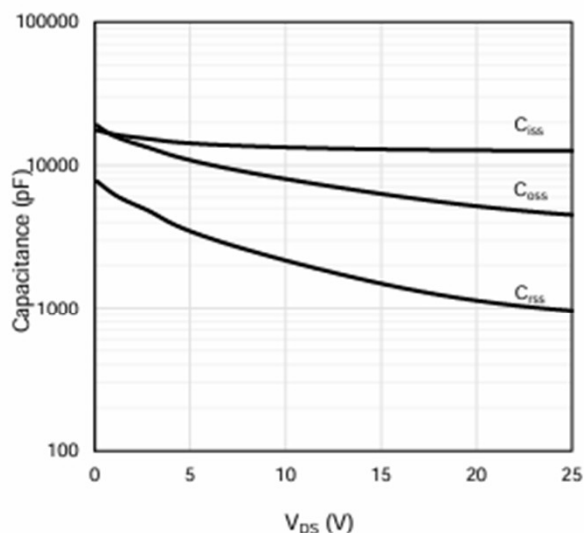


Figure 9: Capacitance Characteristics

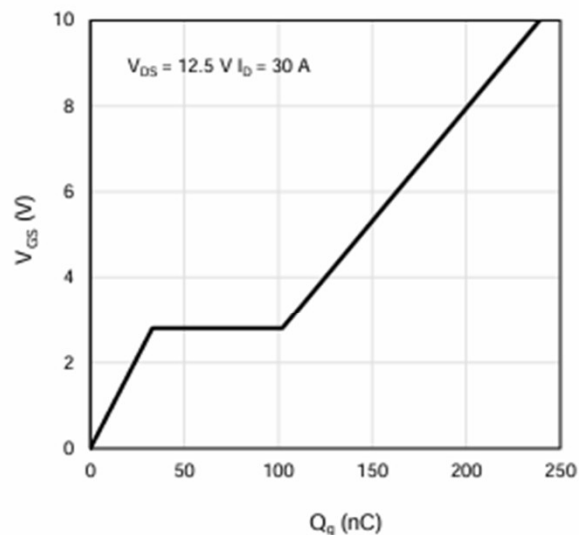


Figure 10: Gate-Charge Characteristics

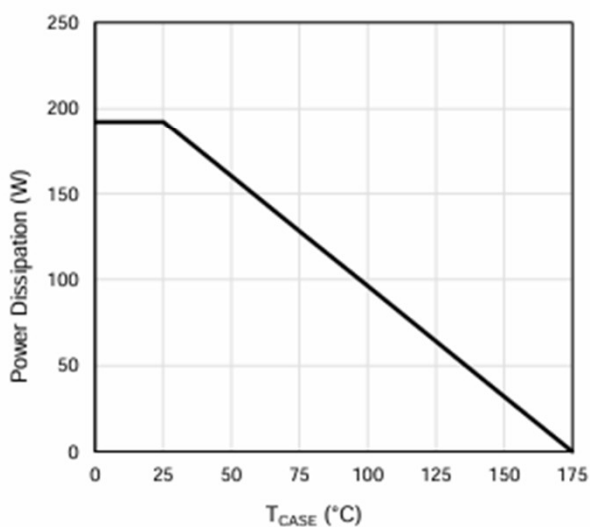


Figure 11: Power De-rating

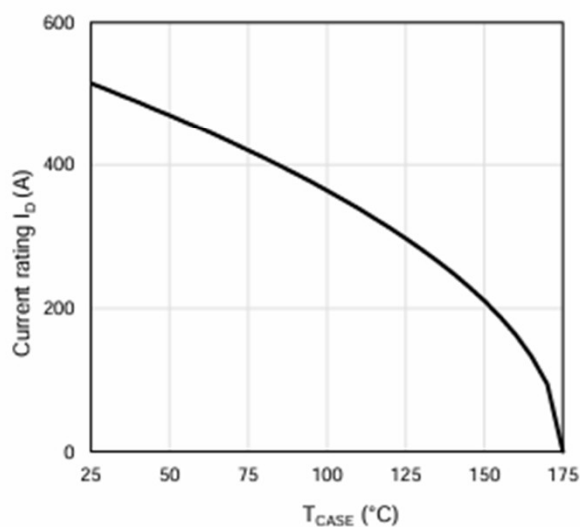


Figure 12: Current De-rating

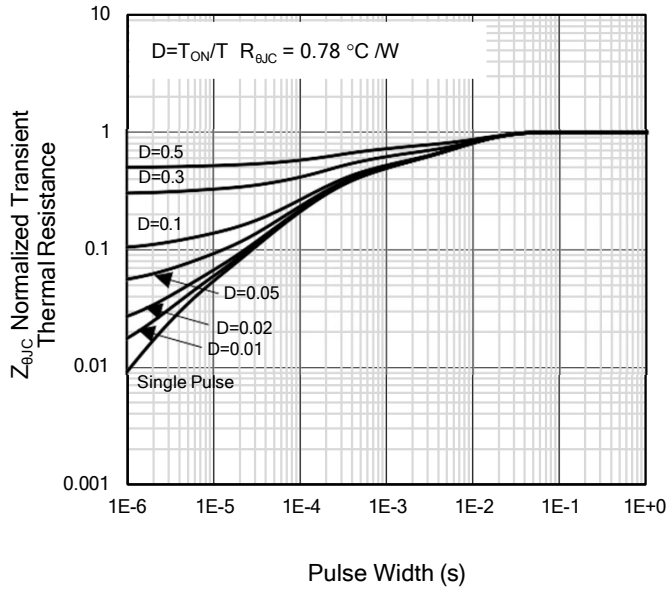


Figure 13: Normalized Maximum Transient Thermal Impedance

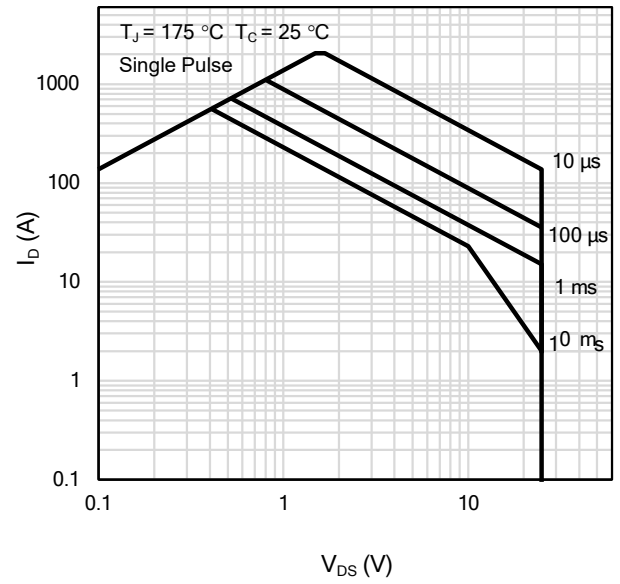


Figure 14: Maximum Forward Biased Safe Operating Area

Symbol	Min	Nom	Max
A	0.95		1.05
A1	0.00		0.05

Symbol	Min	Nom	Max
A	0.95		1.05
A1	0.00		0.05
A3		0.25 REF	
b	0.31		0.51
b1	0.03		0.13
b2	0.21		0.41
D		5.15 BSC	
D1		5.00 BSC	
D2	3.7		3.9
E		6.15 BSC	
E1		6.00 BSC	
E2	3.56		3.76
e		1.27 BSC	
L	0.51		0.71
M	0.51		0.71
P	10°		12°

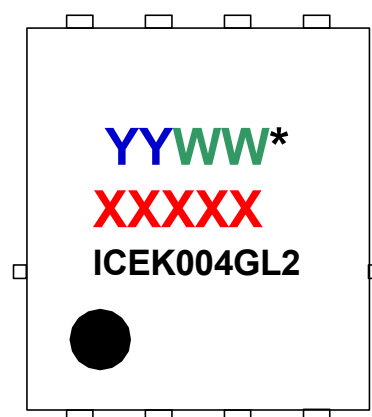
Marking Information

YY = Last two digits of the year

WW = Work week

***** = Site ID

XXXXXX = Lot ID



ICEK004GL2 = ICE is IceMOS logo and
K004GL2 is a designated device part
number

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