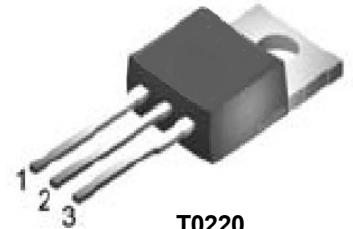
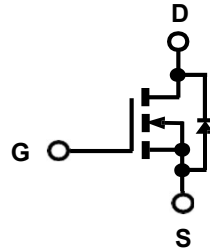


## ICEK11NF65 N-Channel Enhancement Mode MOSFET

### Features

- Low  $r_{DS(on)}$
- Ultra Low Gate Charge
- High  $dv/dt$  capability
- High Unclamped Inductive Switching (UIS) capability
- High peak current capability
- Increased transconductance performance
- Optimized design for high performance power systems

Product Summary			
$I_D$	$T_A=25^\circ\text{C}$	10.5A	Max
$V_{(BR)DSS}$	$I_D=250\mu\text{A}$	650V	Min
$r_{DS(on)}$	$V_{GS}=10\text{V}$	0.26	Typ
$Q_g$	$V_{DS}=400\text{V}$	22nC	Typ



T0220

Standard Metal  
Heatsink

1=Gate, 2=Drain,  
3=Source.



Lead Free

**Maximum ratings**<sup>a</sup>, at  $T_j=25^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current <sup>b</sup>	$I_D$	$T_c=25^\circ\text{C}$	10.5	A
		$T_c=100^\circ\text{C}$	6.6	
Pulsed drain current <sup>b</sup>	$I_{D, pulse}$	$T_c=25^\circ\text{C}$	45	A
Avalanche energy, single pulse	$E_{AS}$	$L = 75 \text{ mH}, V_{DD} = 100 \text{ V}, I_D=1.5\text{A}, R_G = 25 \Omega$	84	mJ
Avalanche current, repetitive <sup>b</sup>	$I_{AR}$	limited by $T_{jmax}$	1.5	A
MOSFET $dv/dt$ ruggedness	$dv/dt$	$V_{DS}=480\text{V}$	50	V/ns
Reverse diode $dv/dt$ ruggedness			15	
Gate source voltage	$V_{GS}$	Static	$\pm 30$	V
		AC ( $f>1\text{Hz}$ )		
Power dissipation	$P_{tot}$	$T_c=25^\circ\text{C}$	83.3	W
Operating and storage temperature	$T_j, T_{stg}$		-55 to +150	$^\circ\text{C}$

<sup>a</sup> Preliminary data sheet - Specifications subject to change.

<sup>b</sup> limited by  $T_{jmax}$

<sup>c</sup> 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	$R_{thJC}$		-	-	1.5	°C/W
Thermal resistance, junction-ambient °	$R_{thJA}$	leaded	-	-	55	
Soldering temperature, wave soldering only allowed at leads	$T_{sold}$	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	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=250\mu\text{A}$	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	2.6	3.6	4.6	
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=650\text{V}, V_{GS}=0\text{V}$	-	-	10	$\mu\text{A}$
Gate source leakage current	$I_{GSS}$	$V_{GS}=\pm 30\text{ V}, V_{DS}=0\text{V}$	-	-	$\pm 100$	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}, I_D=7.5\text{A}$	-	0.26	0.29	$\Omega$
Gate resistance	$R_G$	$f=1\text{ MHz}, \text{open drain}$	-	20	-	$\Omega$

#### Dynamic characteristics

Input capacitance	$C_{iss}$	$V_{DS}=400\text{ V}, V_{GS}=0\text{ V}, f=1\text{ MHz}$	-	647	-	pF
Output capacitance	$C_{oss}$		-	20	-	
Reverse transfer capacitance	$C_{rss}$		-	7	-	
Turn-on delay time	$t_{d(on)}$	$V_{DS}=400\text{V}, V_{GS}=10\text{V}, I_D=8\text{A}, R_G=2\Omega \text{ (External)}$	-	77	-	ns
Rise time	$t_r$		-	7	-	
Turn-off delay time	$t_{d(off)}$		-	35	-	
Fall time	$t_f$		-	6	-	

Parameter	Symbol	Conditions	Values			Unit
			Min	Typ	Max	

### Gate charge characteristics

Gate to source charge	$Q_{gs}$	$V_{DS}=400\text{ V}, I_D=8\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	4	-	nC
Gate to drain charge	$Q_{gd}$		-	12	-	
Gate charge total	$Q_g$		-	22	-	

### Reverse Diode

Continuous forward current	$I_S$	$V_{GS}=0\text{ V}$	-	-	10.5	A
Diode forward voltage	$V_{SD}$	$V_{GS}=0\text{ V}, I_S=I_F$	-	1.28	-	V
Reverse recovery time	$t_{rr}$	$V_{RR}=400\text{ V}, I_S=8\text{ A},$ $d_{iF}/d_t=100\text{ A}/\mu\text{S}$	-	71.5	-	ns
Reverse recovery charge	$Q_{rr}$		-	0.29	-	$\mu\text{C}$
Peak reverse recovery current	$I_{rm}$		-	8	-	A

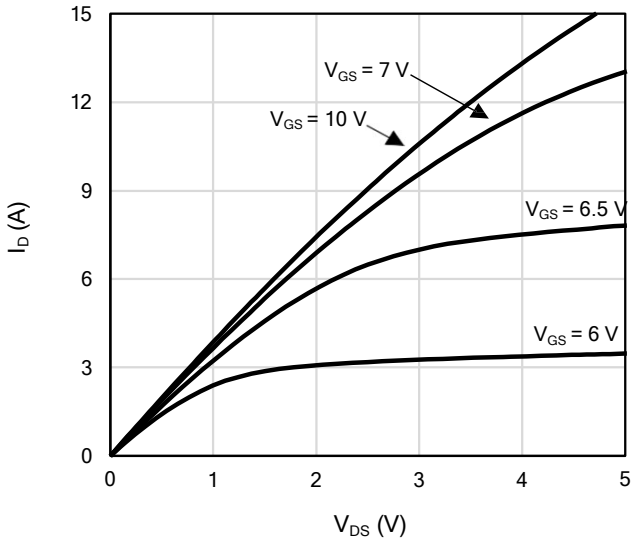


Figure 1: On-Region Characteristics

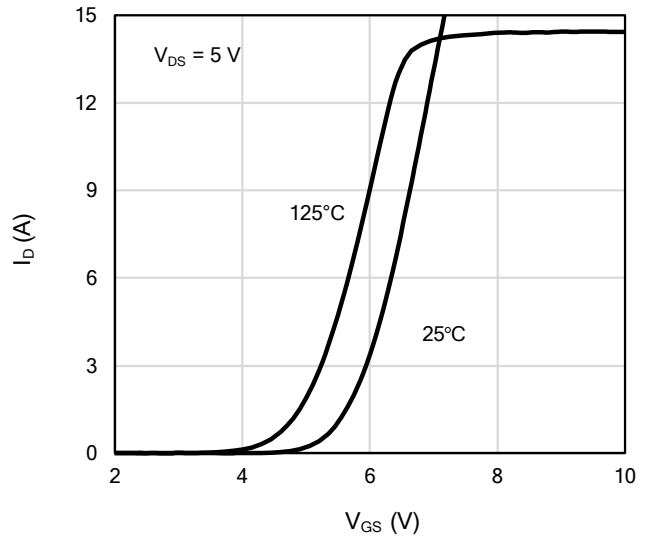


Figure 2: Transfer Characteristics

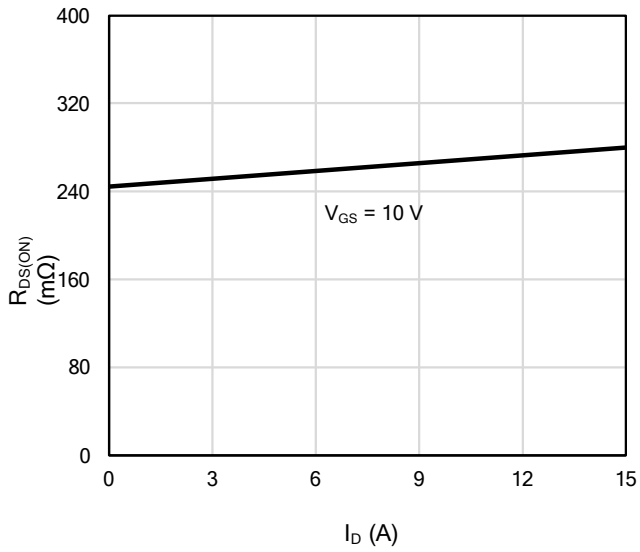


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

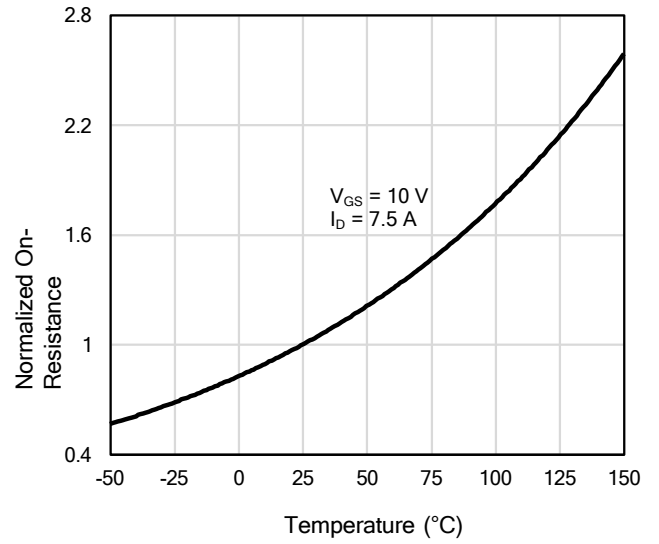


Figure 4: On-Resistance vs. Junction Temperature

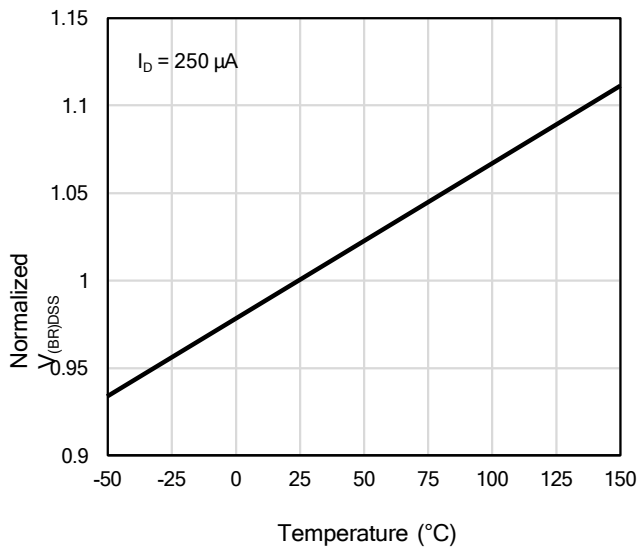


Figure 5: Breakdown Voltage vs. Junction Temperature

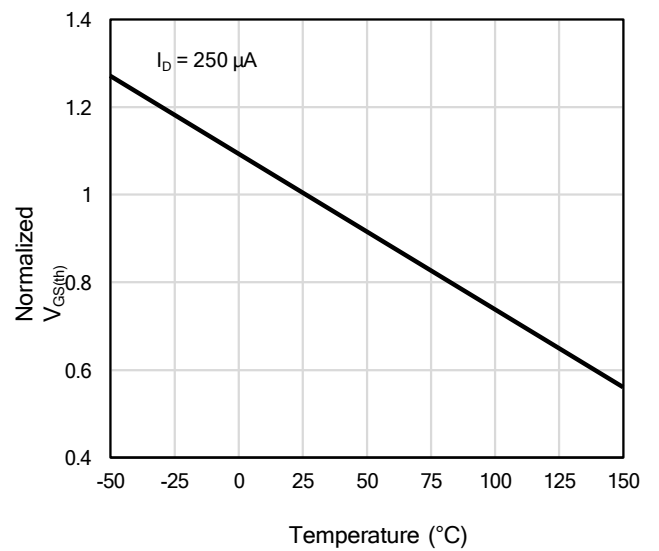


Figure 6: Threshold Voltage vs. Junction Temperature

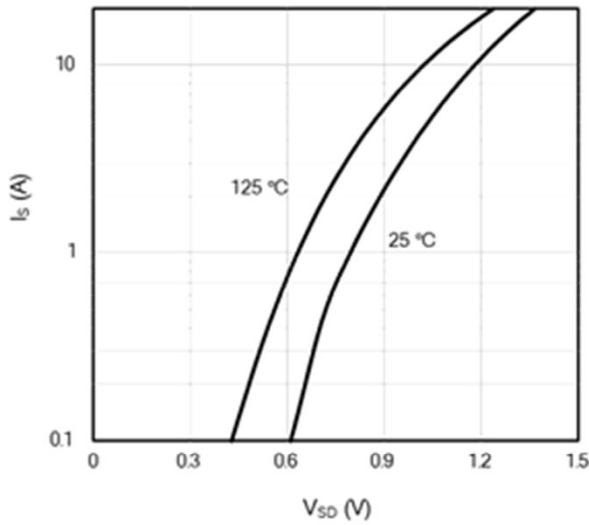


Figure 7: Body-Diode Characteristics

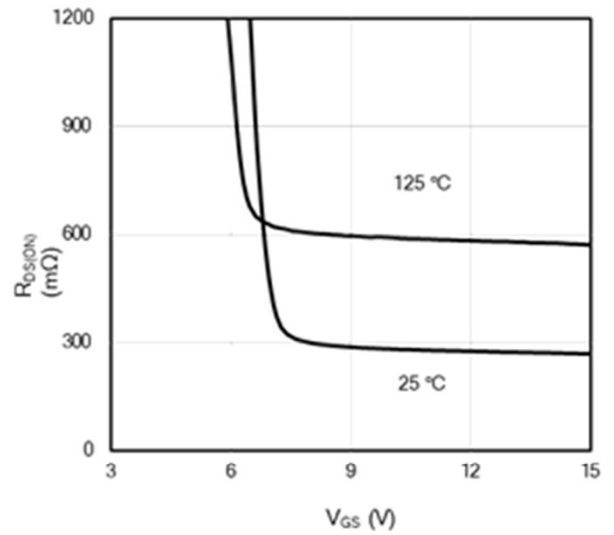


Figure 8: On-Resistance vs. Gate-Source Voltage

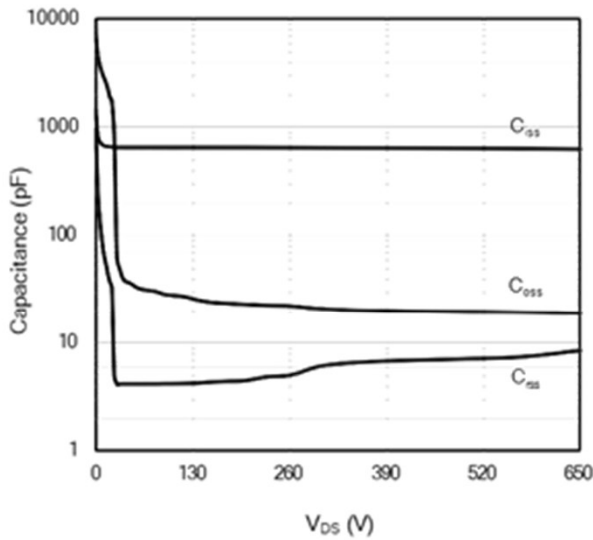


Figure 9: Capacitance Characteristics

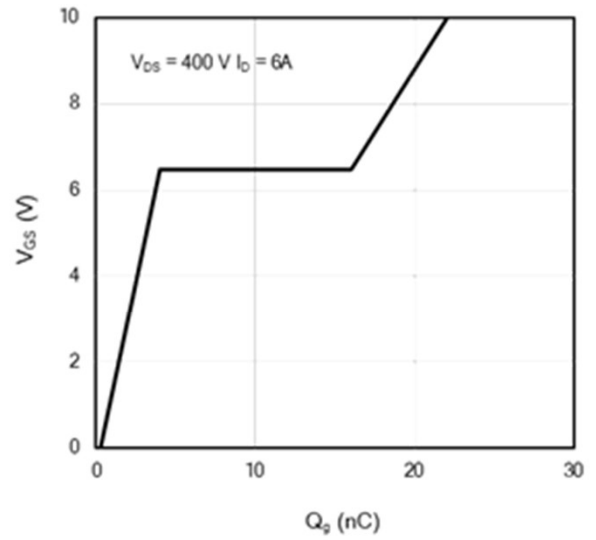


Figure 10: Gate-Charge Characteristics

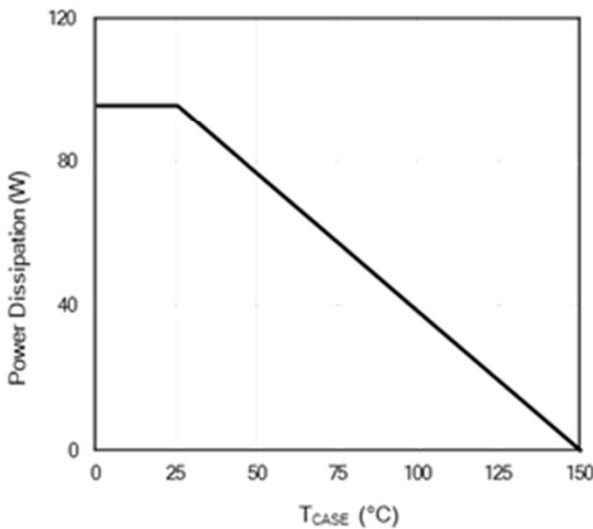


Figure 11: Power De-rating

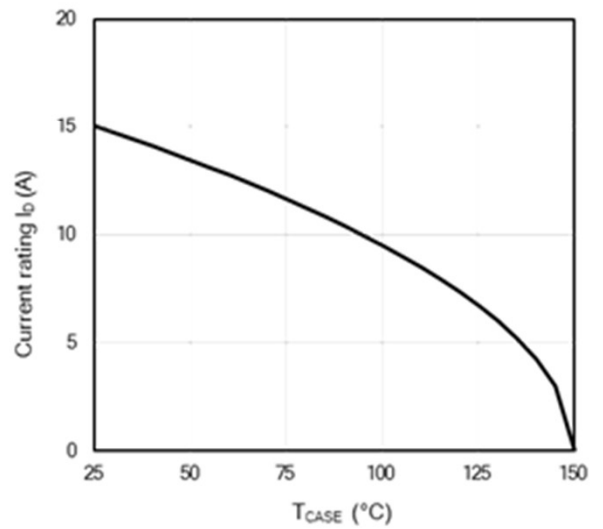


Figure 12: Current De-rating

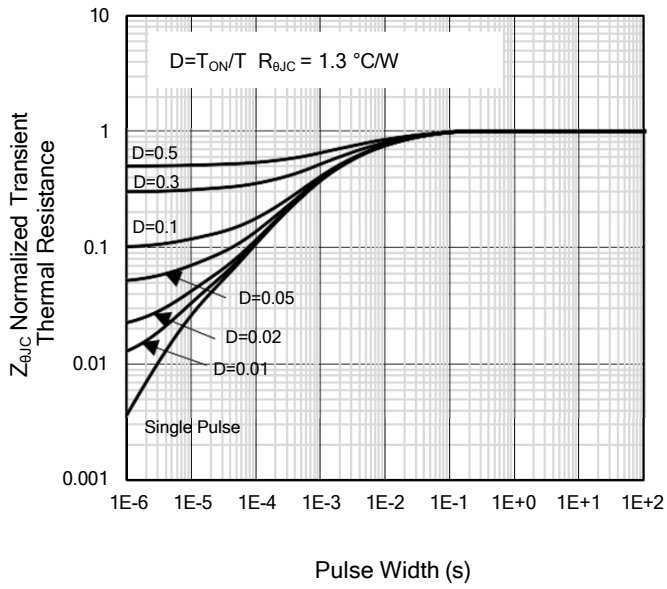


Figure 13: Normalized Maximum Transient Thermal Impedance

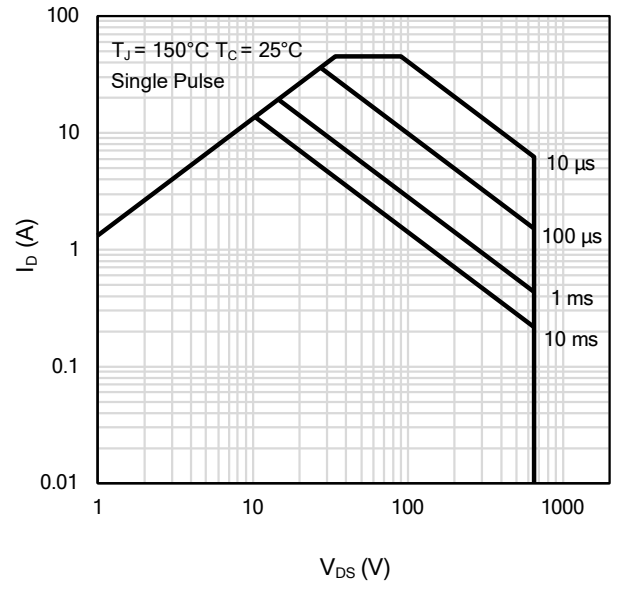


Figure 14: Maximum Forward Biased Safe Operating Area

## Marking Information

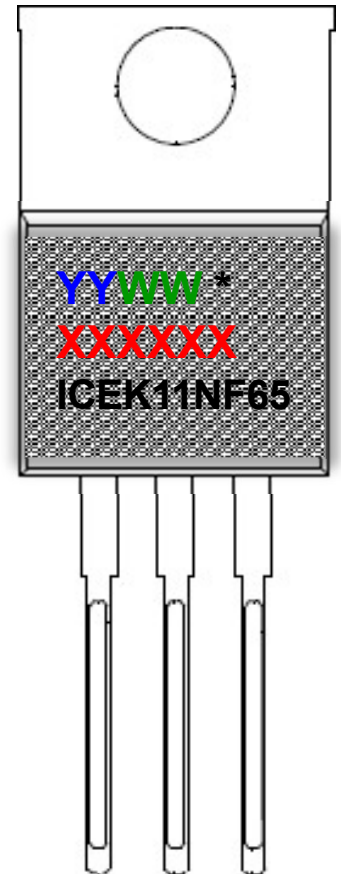
**YY** = Last two digits of the year

**WW** = Work week

**\*** = Site ID

**XXXXXX** = Lot ID

**ICEK11NF65** = ICE is IceMOS logo and  
K11NF65 is a designated device part  
number



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