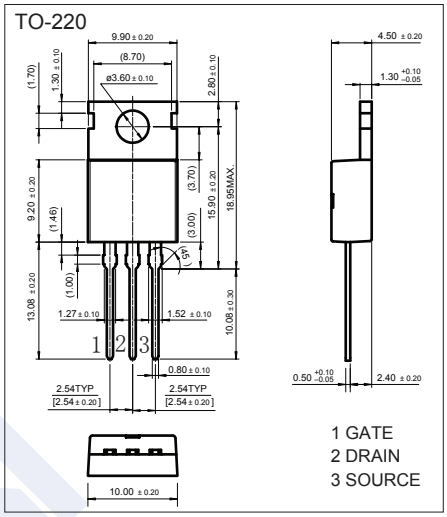
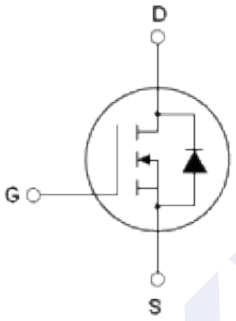
N-Channel MOSFET

KI20N65



■ Features

- $V_{DS\ (V)}$ = 650V
- I_D = 20A
- $R_{DS(ON)}$ < 190mΩ @ V_{GS}=10V



■ Absolute Maximum Ratings (T_C = 25℃)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	±30	
Continuous Drain Current	T_C = 25℃	I_D	20	A
	T_C = 100℃		12.5	
Pulsed Drain Current (Note 1)		I_{DM}	80	
Avalanche Current (Note 1)		I_{AR}	10.5	
Single Pulse Avalanche Energy (Note 2)		E_{AS}	441	mJ
Repetitive Avalanche energy, t_{AR} limited by T_{jmax} (Note 1)		E_{AR}	0.7	
Drain Source voltage slope, V_{DS} ≤480 V		dv/dt	50	V/ns
Reverse diode dv/dt, V_{DS} ≤480 V, I_{SD}<I_D		dv/dt	15	
Power Dissipation (T_C = 25℃)		P_D	188	W
Derate above 25°C			1.5	W/℃
Thermal Resistance, Junction- to-Case		R_{thJC}	0.66	℃/W
Thermal Resistance, Junction- to-Ambient		R_{thJA}	62.5	
Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{stg}	-55 to 150	

Notes: 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2. T_j=25℃, V_{DD}=50V, V_G=10V, R_G=25Ω

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■ Electrical Characteristics (T_A = 25℃, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250μA, V_{GS}=0V	650			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=650V, V_{GS}=0V, Tc=25℃			1	μA
		V_{DS}=650V, V_{GS}=0V, Tc=125℃			100	
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} , I_D=250μA	2		4	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=10A			190	mΩ
Forward Transconductance	g_{FS}	V_{DS}=20V,I_D=10A		16		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=50V, f=1MHz		2250		pF
Output Capacitance	C_{oss}			83		
Reverse Transfer Capacitance	C_{rss}			1.6		
Total Gate Charge	Q_g	V_{DS}=480V, I_D=20A, VGS=10V		36		nC
Gate Source Charge	Q_{gs}			14		
Gate Drain Charge	Q_{gd}			8.5		
Turn-On DelayTime	$t_{d(on)}$	V_{DS}=380V,I_D=11A, V_{GS}=10V,R_G=4Ω		11		ns
Turn-On Rise Time	t_r			6		
Turn-Off DelayTime	$t_{d(off)}$			61		
Turn-Off Fall Time	t_f			4.5		
Body-Diode Continuous Current	I_S	Tc=25℃			20	A
Body-Diode Pulsed Current	I_{SM}				80	
Diode Forward Voltage (Note 1)	V_{SD}	T_J=25℃,I_{SD}=20A,V_{GS}=0V			1.3	V
Reverse Recovery Time (Note 1)	trr	T_J=25℃,I_F=20A, di/dt=100A/μs		310		nS
Reverse Recovery Charge (Note 1)	Qrr			5		nC
Peak Reverse Recovery Current	I_{rrm}			28		A

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■ Typical Electrical And Thermal Characteristics

Figure1. Safe operating area

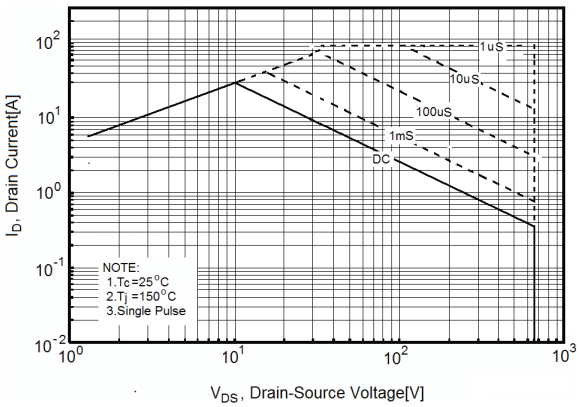

Figure2 . Capacitance

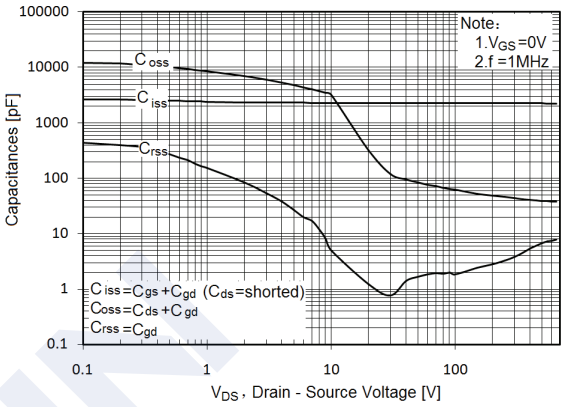

Figure3. Source-Drain Diode Forward Voltage

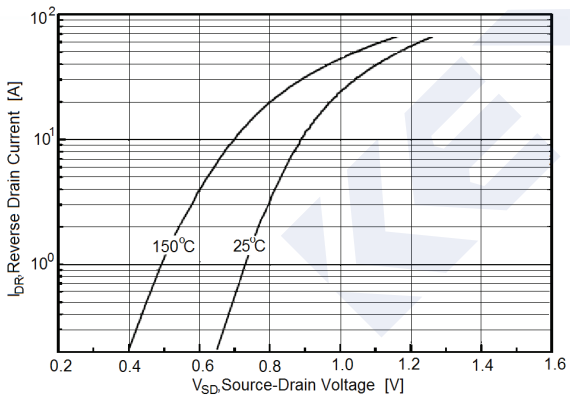

Figure4. Output characteristics

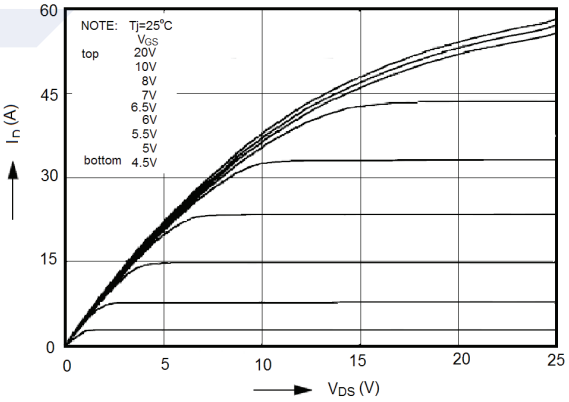

Figure5. Transfer characteristics

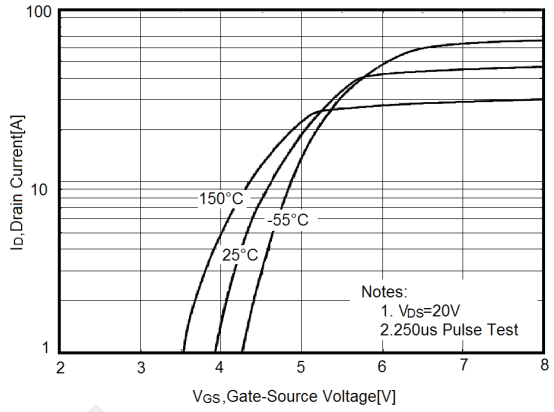

Figure6. Static drain-source on resistance

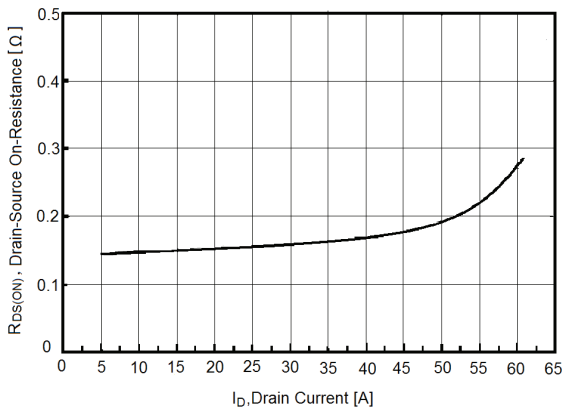

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Figure7. $R_{DS(ON)}$ vs Junction Temperature

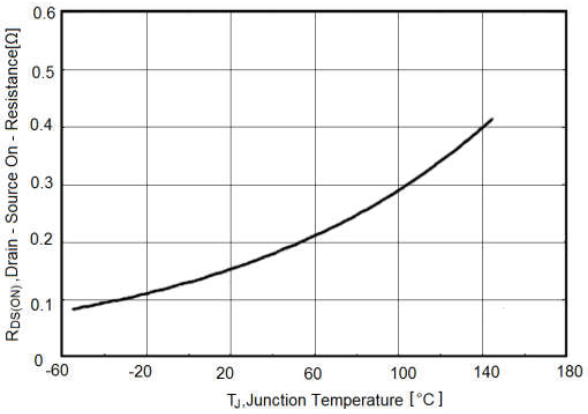


Figure8. BV_{DSS} vs Junction Temperature

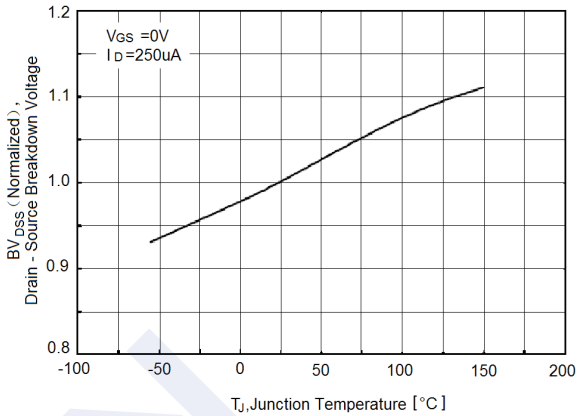


Figure9. Maximum I_D vs Junction Temperature

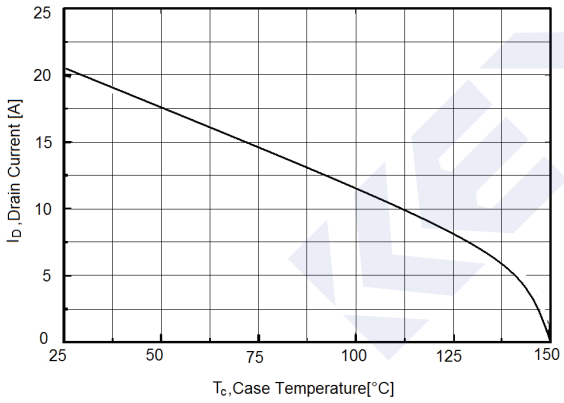


Figure10. Transient Thermal Impedance

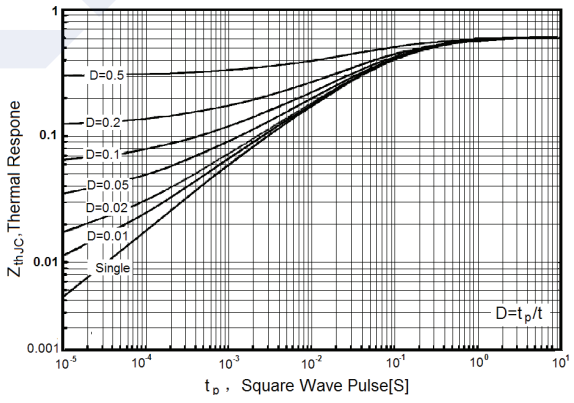
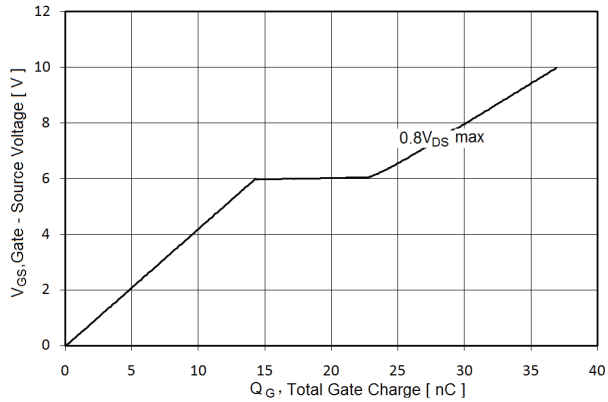


Figure11. Gate charge waveforms



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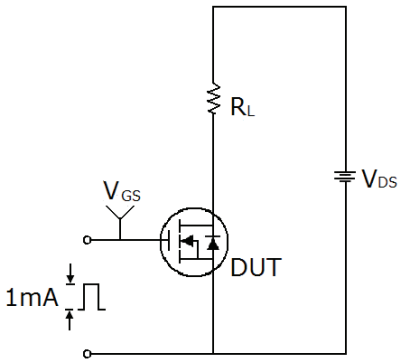
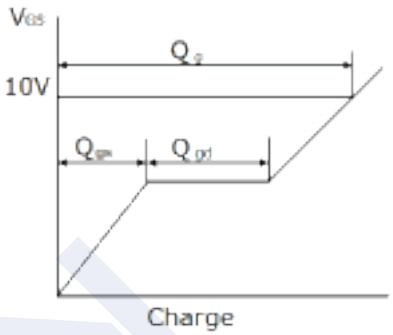
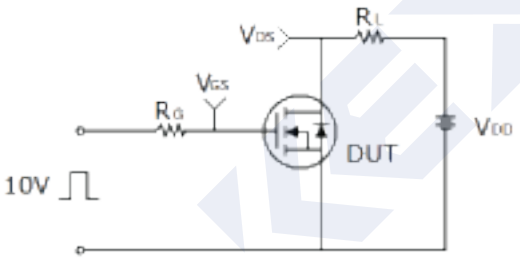
■ Test Circuit

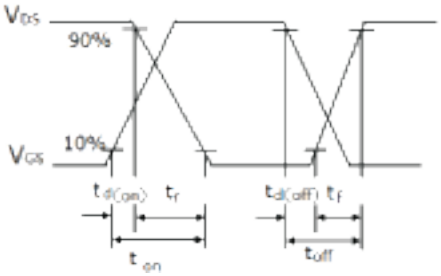
1）Gate charge test circuit & Waveform





2）Switch Time Test Circuit：





3）Unclamped Inductive Switching Test Circuit & Waveforms