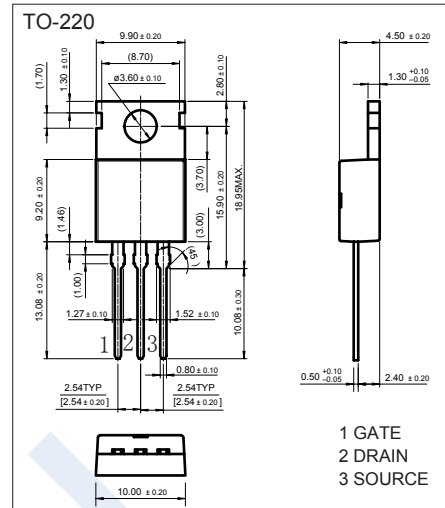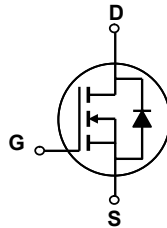# N-Channel MOSFET
KX3N80

■ Features

● $V_{DS(V)}$ = 800V

● I_D = 3 A (V_{GS} = 10V)

● $R_{DS(ON)} < 5\,\Omega$ (V_{GS} = 10V)

● Low gate charge (typical 15 nC)

● Low Crss (typical 7.0 pF)

● Fast switching

TO-220

1 GATE
2 DRAIN
3 SOURCE

■ Absolute Maximum Ratings Ta = 25℃

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	800	V
Gate-Source Voltage		V_{GS}	±30	
Continuous Drain Current	Tc=25℃	I_D	3	A
	Tc=100℃		1.9	
Pulsed Drain Current		I_{DM}	12	
Avalanche Current		I_{AR}	3	
Power Dissipation	Tc=25℃	P_D	75	W
Derate above 25°C			0.6	W/℃
Single Pulsed Avalanche Energy (Note.1)		E_{AS}	120	mJ
Repetitive Avalanche Energy		E_{AR}	12	
Peak Diode Recovery dv/dt (Note.2)		dv/dt	5	V/ns
Thermal Resistance.Junction- to-Ambient		R_{thJA}	62	℃/W
Thermal Resistance.Junction- to-Case		R_{thJC}	1.67	
Thermal Resistance, Case-to-Sink		R_{thJCS}	0.5 (typ)	
Junction Temperature		T_J	150	℃
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		T_L	300	
Storage Temperature Range		T_{stg}	-55 to 150	

Note.1: L = 67mH, I_{AS} = 3A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C

Note.2: $I_{SD} \leqslant$ 3A, di/dt $\leqslant$ 200A/μs, $V_{DD} \leqslant$ BV$_{DSS}$, Starting T_J = 25°C

N-Channel MOSFET

KX3N80

■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V$_{DSS}$	I$_D$=250μA, V$_{GS}$=0V	800			V
Zero Gate Voltage Drain Current	I$_{DSS}$	V$_{DS}$=800V, V$_{GS}$=0V			10	μA
		V$_{DS}$=640V, V$_{GS}$=0V, T$_J$=125℃			100	
Gate-Body Leakage Current	I$_{GSS}$	V$_{DS}$=0V, V$_{GS}$=±30V			±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$_D$=1.5A			5	Ω
Forward Transconductance	g$_{FS}$	V$_{DS}$=50V, I$_D$=1.5A (Note.1)		3		S
Input Capacitance	C$_{iss}$	V$_{GS}$=0V, V$_{DS}$=25V, f=1MHz			690	pF
Output Capacitance	C$_{oss}$				75	
Reverse Transfer Capacitance	C$_{rss}$				9	
Total Gate Charge	Q$_g$	V$_{GS}$=10V, V$_{DS}$=640V, I$_D$=3A (Note.1)			19	nC
Gate Source Charge	Q$_{gs}$			3.5		
Gate Drain Charge	Q$_{gd}$			7.7		
Turn-On DelayTime	t$_{d(on)}$	V$_{DS}$=400V, I$_D$=3A,R$_G$=25Ω (Note.1)			40	ns
Turn-On Rise Time	t$_r$				90	
Turn-Off DelayTime	t$_{d(off)}$				70	
Turn-Off Fall Time	t$_f$				70	
Body Diode Reverse Recovery Time	t$_{rr}$	I$_F$= 3A, V$_{GS}$=0, dI/dt= 100A/μs (Note.1)			810	ns
Body Diode Reverse Recovery Charge	Q$_{rr}$				6.1	uC
Maximum Body-Diode Continuous Current	I$_s$				3	A
Pulsed Drain-Source Diode Forward Current	I$_{SM}$				12	
Diode Forward Voltage	V$_{SD}$	I$_s$=3A,V$_{GS}$=0V			1.4	V

Note.1: Pulse Test : Pulse width ≤300us, Duty cycle ≤ 2%

N-Channel MOSFET
KX3N80

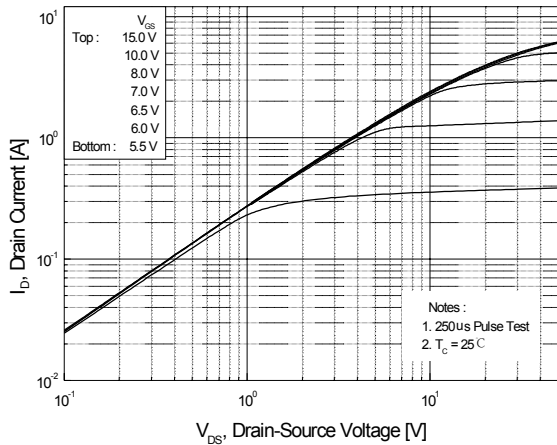■ Typical Characterisitics

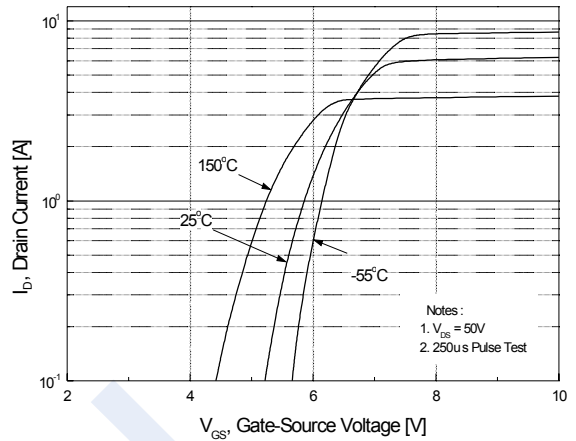**Figure 1. On-Region Characteristics**
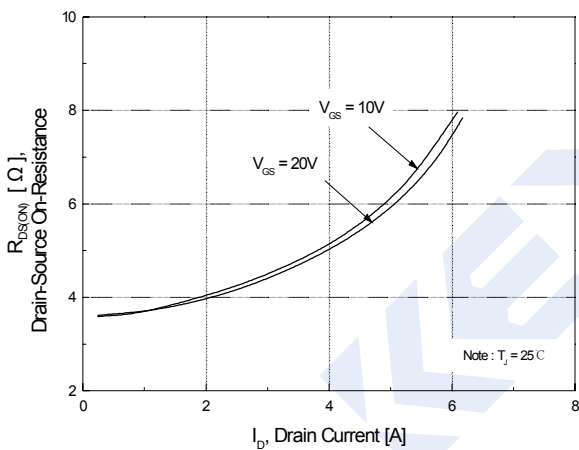

Figure 2. Transfer Characteristics

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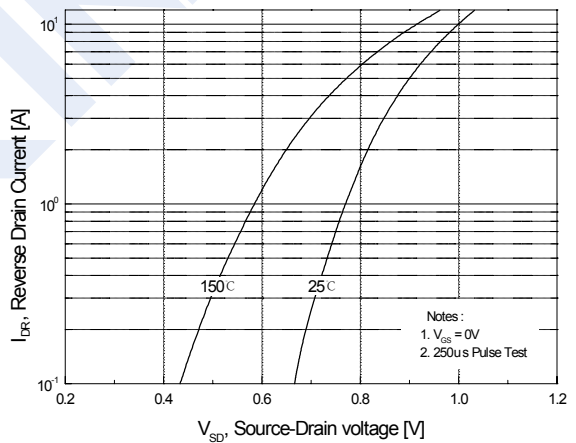

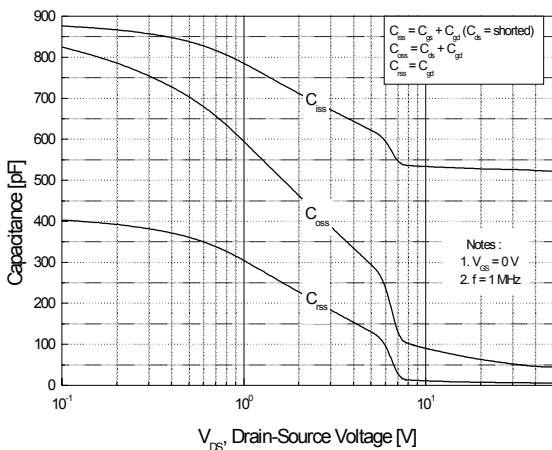**Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature**
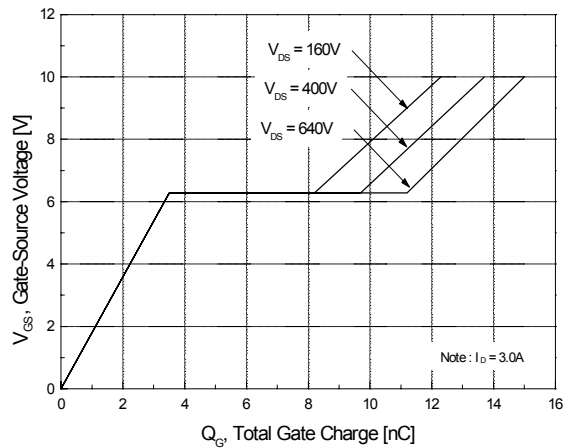

Figure 5. Capacitance Characteristics

Figure 6. Gate Charge Characteristics
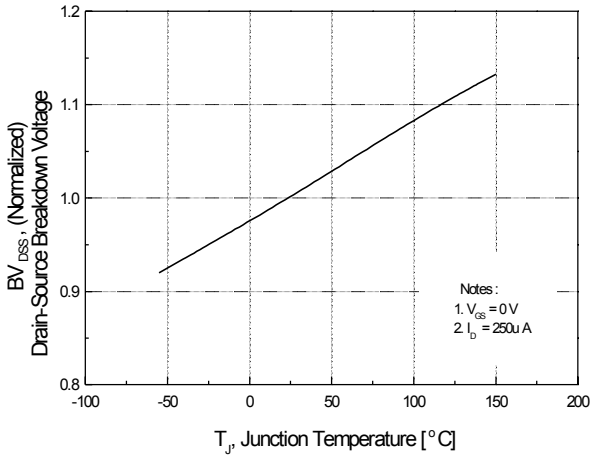
N-Channel MOSFET
KX3N80

■ Typical Characterisitics
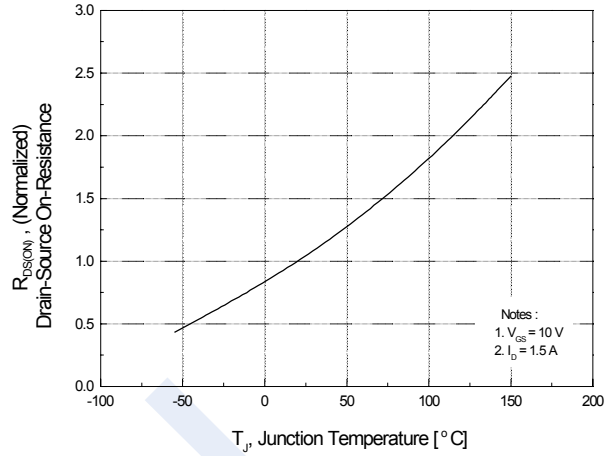

Figure 7. Breakdown Voltage Variation vs Temperature

Notes :
1. V_{GS} = 0 V
2. I_D = 250u A

Figure 8. On-Resistance Variation vs Temperature

Notes :
1. V_{GS} = 10 V
2. I_D = 1.5 A

Figure 9. Maximum Safe Operating Area

Operation in This Area is Limited by $R_{DS(on)}$

100us
1 ms
10 ms
DC

Notes :
1. T_C = 25 °C
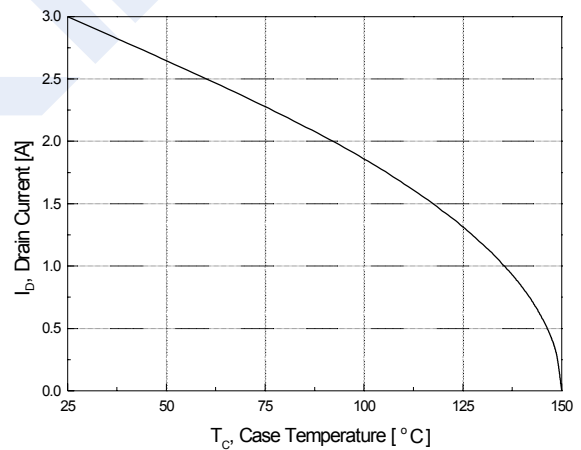2. T_J = 150 °C
3. Single Pulse

Figure 10. Maximum Drain Current vs Case Temperature

Figure 11. Transient Thermal Response Curve

D = 0.5
0.2
0.1
0.05
0.02
0.01
single pulse

Notes :
1. $Z_{\theta JC}$ (t) = 1.17 ℃/W Max.
2. Duty Factor, D = t_1/t_2
3. $T_{JM} - T_C = P_{DM} * Z_{\theta JC}$ (t)