

N-Channel Enhancement Mode MOSFET

1. Product Information

Features

Advanced planar process technology
Excellent $R_{DS(ON)}$ and low gate charge

Applications

Load Switch
PWM Application
Power Management

Quick reference

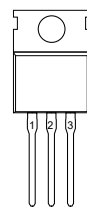
$V_{DS} = 200\text{ V}$
 $I_D = 60\text{ A}$
 $R_{DS(ON)} \leq 55\text{ m}\Omega @ V_{GS}=10\text{ V (Type: 42 m}\Omega)$

Pin Description

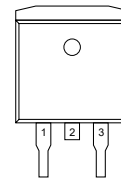
Pin	Description
1	Gate(G)
2	Drain(D)
3	Source(S)

Simplified Outline

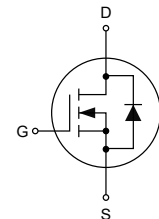
Symbol



TO-220



TO-263



Package Marking and Ordering Information

Product Name	Package	Marking	Reel size	Tape width	Quantity (pcs)
KJ60N20C	TO-220	KJ60N20C	N/A	N/A	1000
KJ60N20D	TO-263	KJ60N20D	13"	24 mm	800

2. Absolute Maximum Ratings ($T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Values	Unit
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Continuous Drain Current, $V_{GS}@10\text{V}$, $T_C=25^\circ\text{C}$	60	A
	Continuous Drain Current, $V_{GS}@10\text{V}$, $T_C=100^\circ\text{C}$	42	A
I_{DM}	Pulsed Drain Current	240	A
P_D	Power Dissipation, $T_C=25^\circ\text{C}$	278	W
E_{AS}	Single Pulse Avalanche Energy	400	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	$-55\sim 150$	$^\circ\text{C}$
T_L	Maximum Temperature for Soldering	260	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction-Case	0.45	$^\circ\text{C/W}$

3. Electrical Characteristics (T_C=25°C, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _D =250 μA	200	-	-	V
V _{GS(TH)}	Gate-Threshold Voltage	V _{DS} =V _{GS} , I _D =250 μA	2	-	4	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} =200 V, V _{GS} =0 V,	-	-	1	μA
I _{GSS}	Gate-body Leakage current	V _{DS} =0 V, V _{GS} =±30 V	-	-	±100	nA
R _{DS(ON)}	Drain-Source on-Resistance	V _{GS} =10 V, I _D =20 A	-	42	55	mΩ
C _{iss}	Input Capacitance	V _{DS} =25 V, V _{GS} =0 V, f=1 MHz	-	3290	-	pF
C _{oss}	Output Capacitance		-	506	-	
C _{rss}	Reverse Transfer Capacitance		-	45	-	
t _{d(on)}	Turn-on Delay Time	V _{GS} =10 V, V _{DS} =100 V, R _G =10 Ω, I _D =20 A	-	37	-	ns
t _r	Turn-on Rise Time		-	121	-	
t _{d(off)}	Turn-off Delay Time		-	74	-	
t _f	Turn-off Fall Time		-	59	-	
Q _g	Total Gate Charge	V _{GS} =10 V, V _{DD} =200 V, I _D =20 A	-	59	-	nC
Q _{gs}	Gate-Source Charge		-	21	-	
Q _{gd}	Gate-Drain Charge		-	27	-	
I _{SD}	Continuous Source Current (Body Diode)		-	-	60	A
I _{SM}	Maximum Pulsed Current (Body Diode)		-	-	240	A
V _{SD}	Diode Forward Voltage	I _S =20 A, V _{GS} =0 V	-	-	1.4	V
t _{rr}	Reverse Recovery Time	I _S =20 A, V _{DD} =100 V, V _{GS} =0 V, dI _F /dt=100 A/μs	-	168	-	ns
Q _{rr}	Reverse Recovery Charge		-	1232	-	nC

Notes:

1. Surface mounted on a 1 inch² FR-4 board with 2 OZ copper.
2. EAS test condition: I_{AS}=20 A, L=0.5 mH, R_G=25 Ω, V_{DD}=100 V, V_{GS}=10 V, Starting T_J=25°C.
3. Pulse width ≤ 300 μs, Duty Cycle ≤ 1%.
4. P_D is limited by 150°C junction temperature.

4. Typical Characteristics

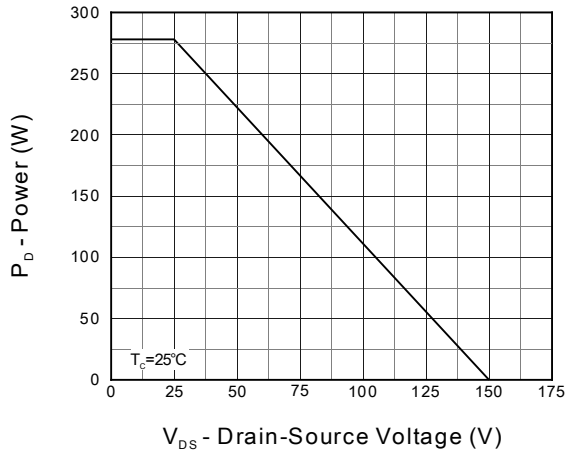


Figure 1. Output Characteristics

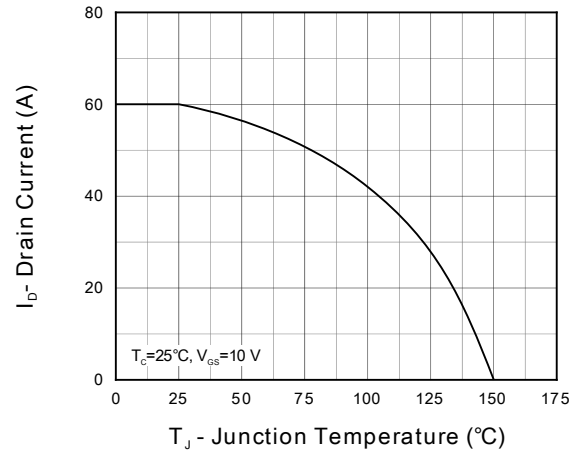


Figure 2. Current Capability

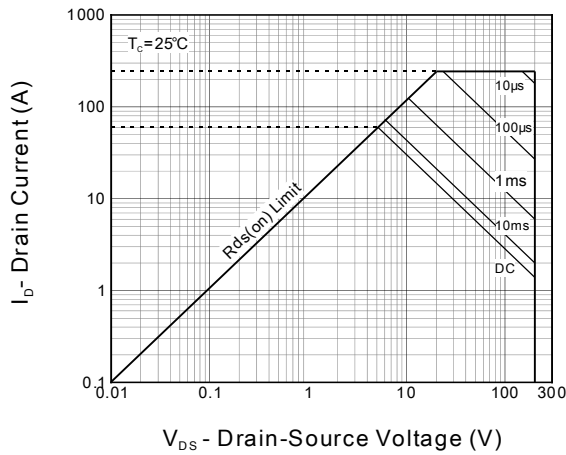


Figure 3. Safe Operation Area

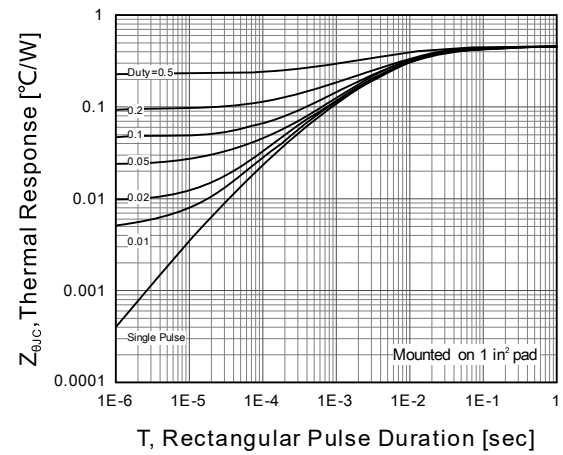


Figure 4. Transient Thermal Impedance

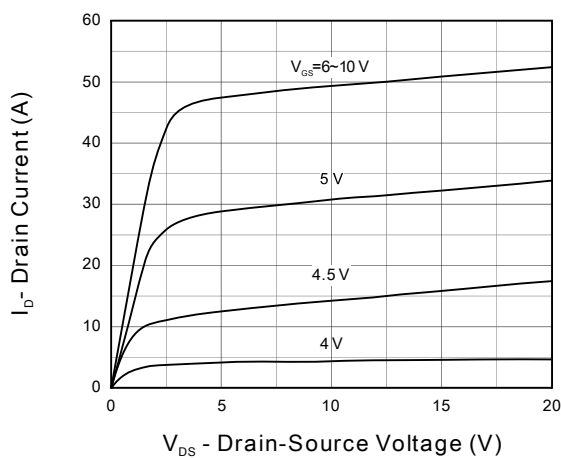


Figure 5. Output Characteristics

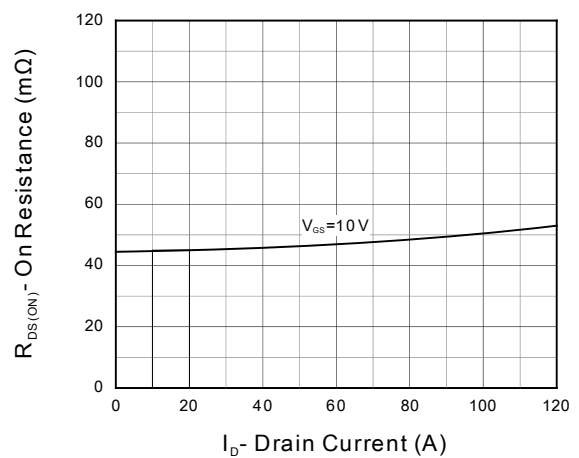


Figure 6. On Resistance

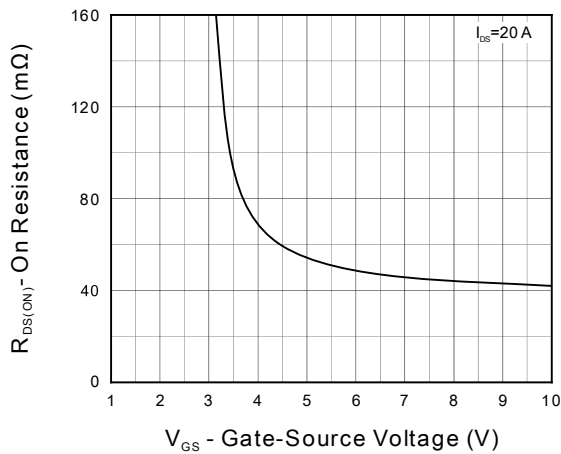


Figure 7. Transfer Characteristics

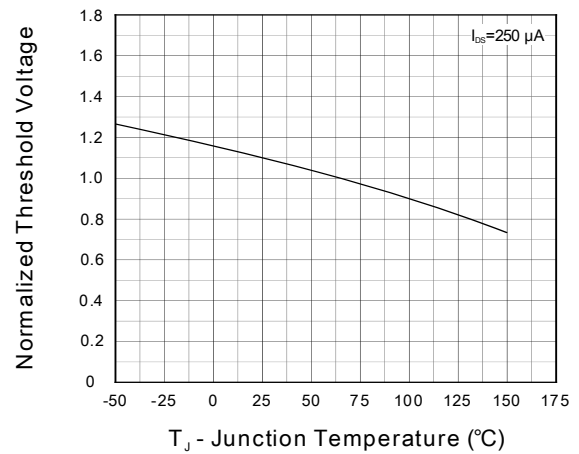


Figure 8. Normalized Threshold Voltage

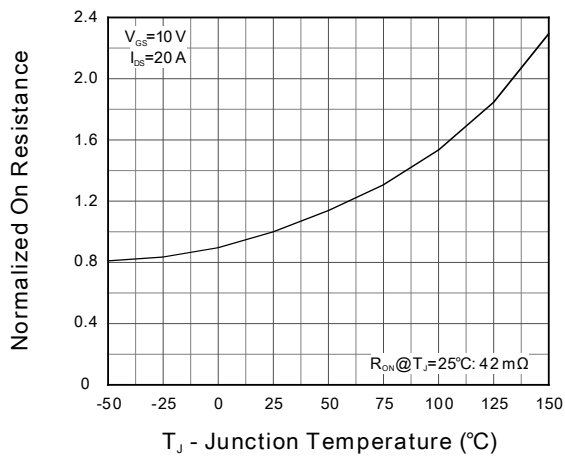


Figure 9. Normalized On Resistance

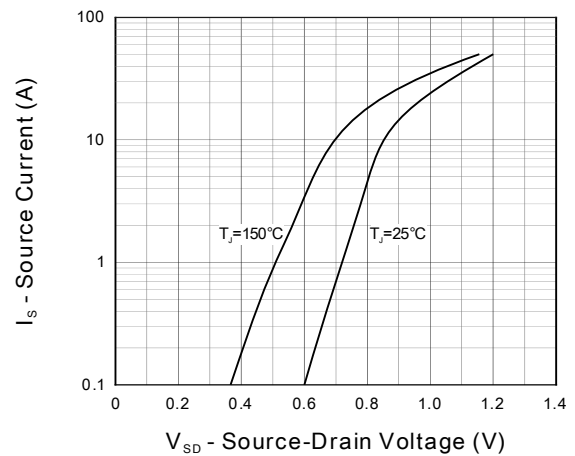


Figure 10. Diode Forward Current

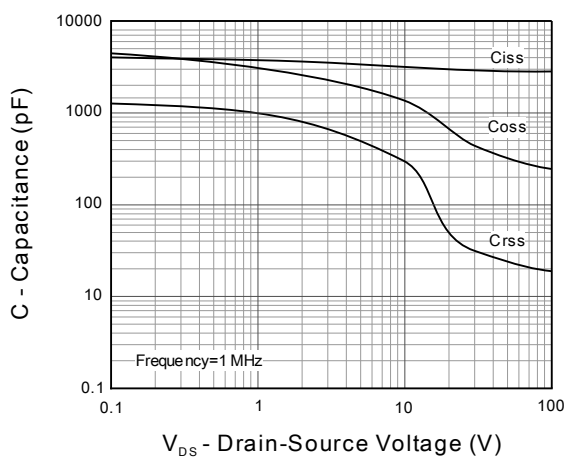


Figure 11. Capacitance

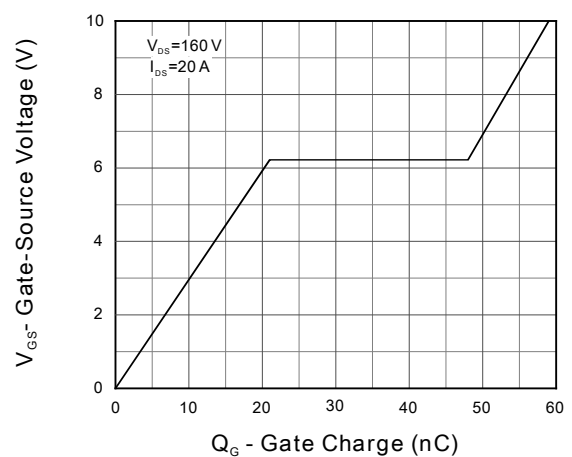
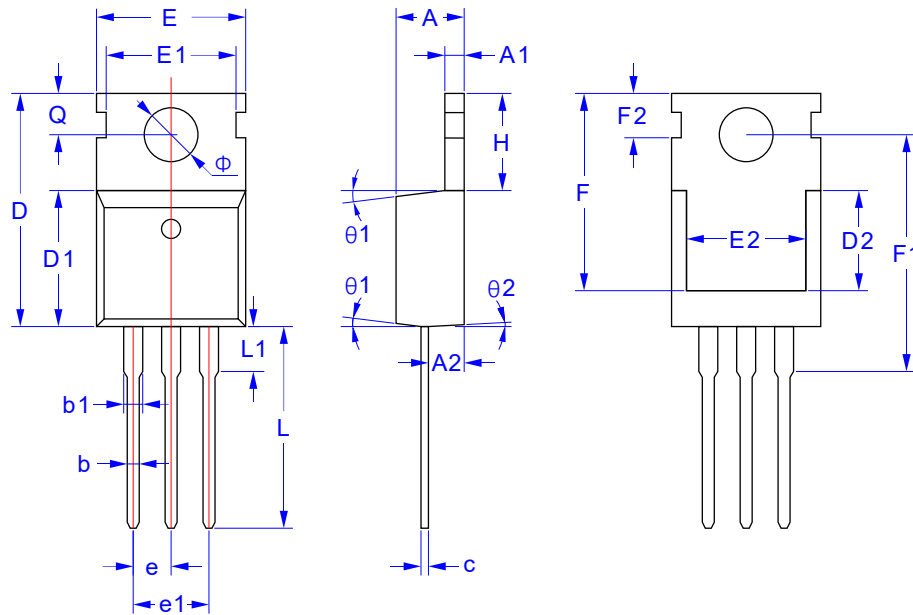


Figure 12. Gate Charge

5. Package Mechanical Data

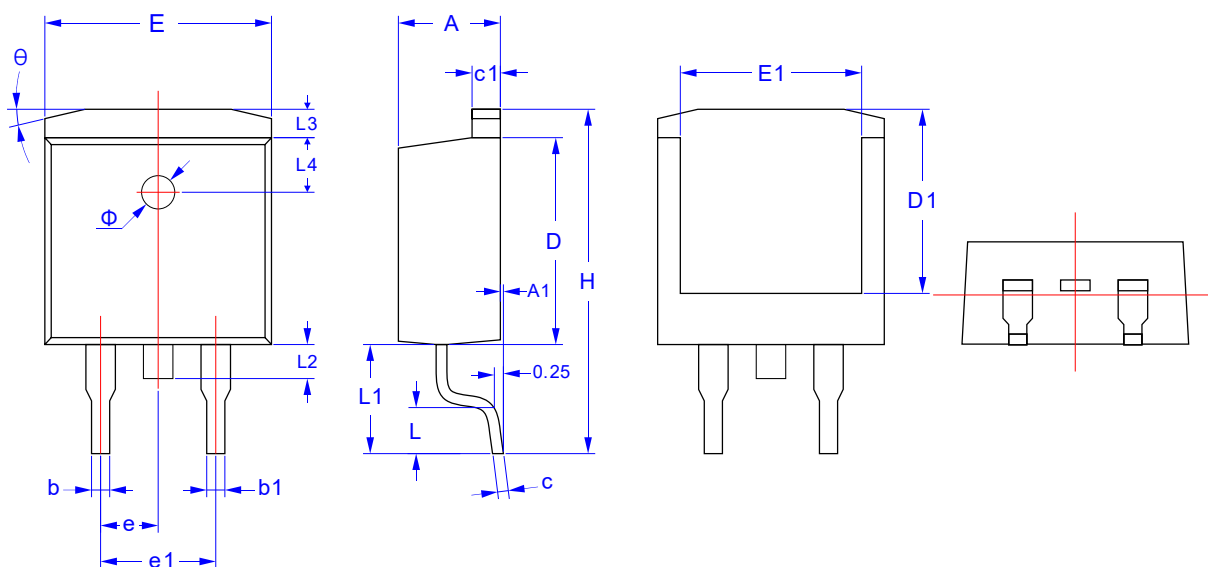
TO-220 Package



Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
A	4.27	4.57	4.87
A1	1.15	1.30	1.45
A2	2.10	2.40	2.70
b	0.70	0.80	1.00
b1	1.17	1.27	1.50
c	0.40	0.50	0.65
D	15.50	15.80	16.10
D1	8.80	9.10	9.40
D2	5.70	6.70	7.00
E	9.70	10.00	10.30
E1	-	8.70	-
E2	7.00	8.00	8.40
e	2.54		
e1	5.08		
F	13.30	13.50	13.70
F1	15.50	15.90	16.30
F2	2.80	3.00	3.20
H	6.00	6.50	6.85
L	12.75	13.50	13.90
L1	-	3.10	3.40
Q	2.60	2.80	3.00
Φ	3.45	3.60	3.75
θ1	4°	7°	10°
θ2	0°	3°	6°

5. Package Mechanical Data

TO-263 Package



TOP VIEW

SIDE VIEW

BOTTOM VIEW

SIDE VIEW

Symbol	Dimensions in Millimeters	
	MIN	MAX
A	4.30	4.70
A1	0.00	0.25
b	0.70	0.90
b1	1.20	1.40
c	0.40	0.55
c1	1.25	1.35
D	9.00	9.20
D1	8.00	8.20
E	9.80	10.20
E1	7.85	8.15

Symbol	Dimensions in Millimeters	
	MIN	MAX
e	2.54 BSC	
e1	4.93	5.23
H	14.90	15.20
L	2.00	2.45
L1	4.60	5.00
L2	1.30	1.70
L3	1.15	1.35
L4	2.40	2.60
Φ	1.50 REF	
θ	13° TYP	