

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☒ Surface-mounted package
- ☒ Low gate charge

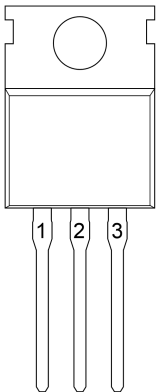
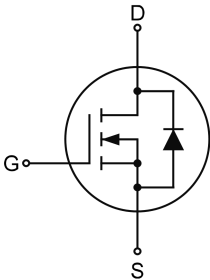
1.2 Applications

- ☒ Motor driver appliances
- ☒ High power inverter system
- ☒ Adapter appliances

1.3 Quick reference

- ☒ $BV \geq 40\text{ V}$
- ☒ $R_{DS(ON)} \leq 2.8\text{ m}\Omega @V_{GS} = 10\text{ V}$
- ☒ $P_{tot} \leq 104\text{ W}$
- ☒ $R_{DS(ON)} \leq 4.2\text{ m}\Omega @V_{GS} = 4.5\text{ V}$
- ☒ $I_D \leq 144\text{ A}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate (G)	 Top View TO-220	
2	Drain (D)		
3	Source (S)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C=25^{\circ}C$	40	-	V
V_{GS}	Gate-Source Voltage	$T_C=25^{\circ}C$	-	± 20	V
I_D	Drain Current (DC)	$T_C=25^{\circ}C, V_{GS}=10\text{ V}$	-	144	A
		$T_C=100^{\circ}C, V_{GS}=10\text{ V}$	-	91	A
I_{DM}^*	Pulsed Source Current	$T_C=25^{\circ}C, V_{GS}=10\text{ V}$	-	576	A
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}C$	-	104	W
E_{AS}	Single Pulsed Avalanche Energy	$V_{DD}=32\text{ V}, L=1\text{ mH}$	-	338	mJ
T_J, T_{stg}	Operating Junction and Storage Temperature Range		-55	150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		-	46	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance-Junction to Case		-	1.2	

Notes:

- * Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- ** Surface mounted on 1 in² pad area, $t \leq 10\text{ sec}$.
- *** Limited by bonding wire.

4. Marking Information

Product Name	Marking
KJ028N04C	KJ028N04C XXXXXX-X

5. Ordering Code

Product Name	Package	Reel size	Tape width	Quantity (pcs)
KJ028N04C	TO-220	N/A	N/A	1000

Note: KJ028N04C defines "Green" as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC/JEDEC J-STD-020C).

6. Electrical Characteristics (T_A=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _{DS} =250 μA	40	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250 μA	1.0	-	2.2	V
I _{DSS}	Zero Gate Voltage Source Current	V _{DS} =32 V, V _{GS} =0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{DS} =0 V, V _{GS} =±20 V	-	-	±100	nA
R _{DS(ON)}	On-State Resistance	V _{GS} =10 V, I _{DS} =15 A	-	2.2	2.8	mΩ
		V _{GS} =4.5 V, I _{DS} =10 A	-	3.5	4.2	
Diode Characteristics						
V _{SD}	Diode Forward Voltage	I _{SD} =15 A, V _{GS} =0 V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _{DS} =15 A, V _{GS} =0V, dI _{SD} /dt=100 A/μs	-	17	-	ns
Q _{rr}	Reverse Recovery Charge		-	22	-	nC
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} =0 V, V _{DS} =20 V, Frequency=1 MHz	-	2280	-	pF
C _{oss}	Output Capacitance		-	1210	-	
C _{rss}	Reverse Transfer Capacitance		-	60	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} =20 V, V _{GEN} =10 V, R _G =3.9 Ω, R _L =1 Ω, I _{DS} =15 A	-	10	-	ns
t _r	Turn-on Rise Time		-	57	-	
t _{d(off)}	Turn-off Delay Time		-	50	-	
t _f	Turn-off Fall Time		-	81	-	
Gate Charge Characteristics						
Q _g	Total Gate Charge	V _{DS} =20 V, V _{GS} =10 V, I _{DS} =15 A	-	48	-	nC
Q _{gs}	Gate-Source Charge		-	8	-	
Q _{gd}	Gate-Drain Charge		-	9	-	

7. Typical Characteristics

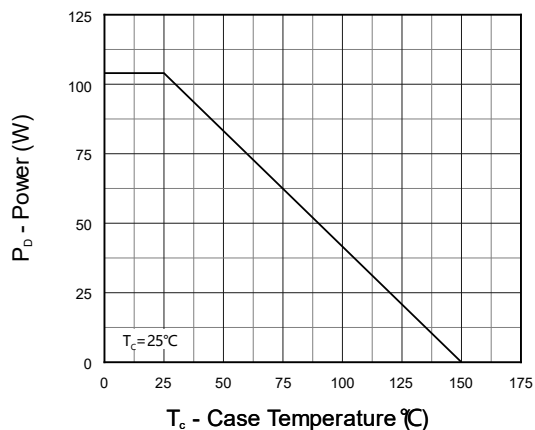


Figure 1. Power Capability

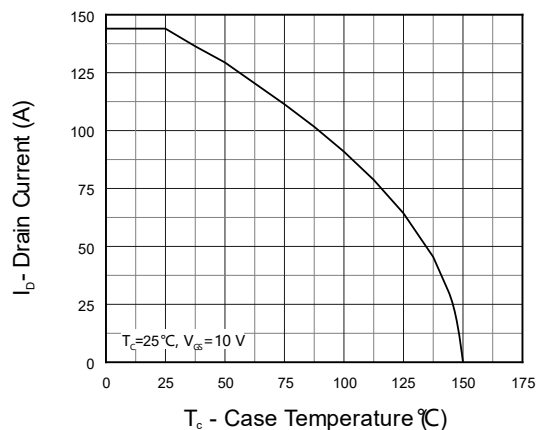


Figure 2. Current Capability

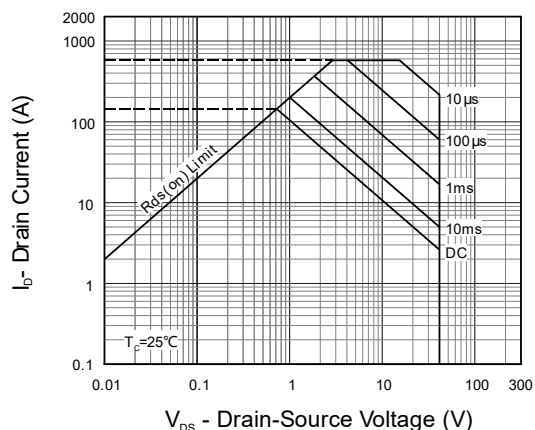


Figure 3. Safe Operation Area

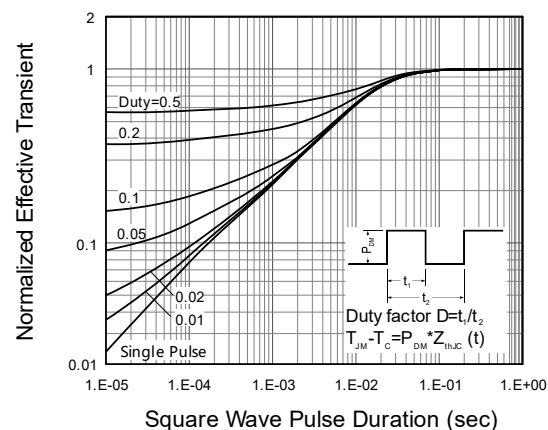


Figure 4. Transient Thermal Impedance

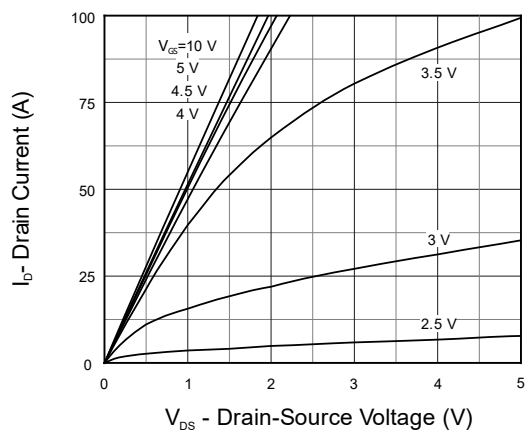


Figure 5. Output Characteristics

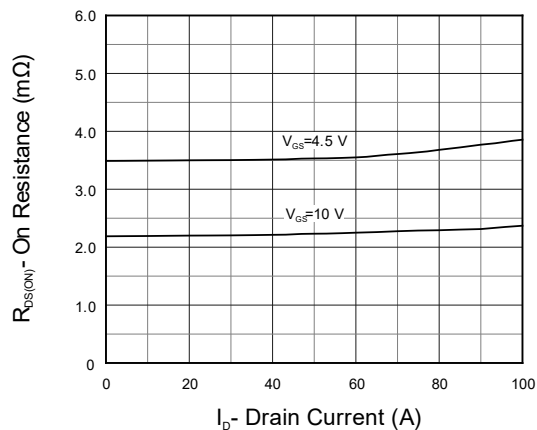


Figure 6. On Resistance

7. Typical Characteristics (cont.)

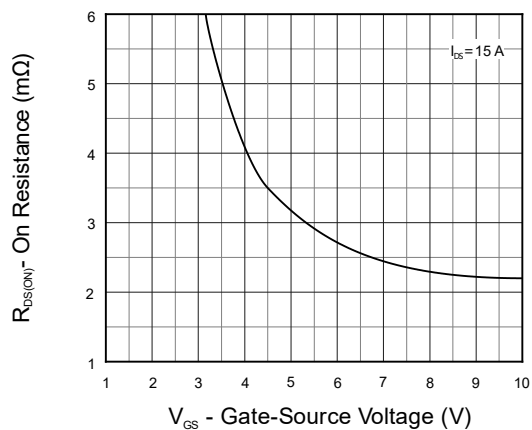


Figure 7. Transfer Characteristics

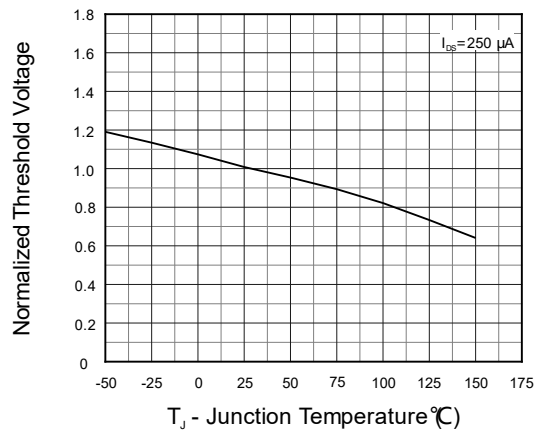


Figure 8. Normalized Threshold Voltage

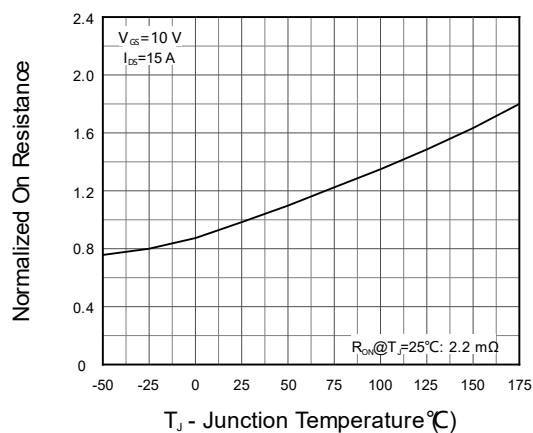


Figure 9. Normalized On Resistance

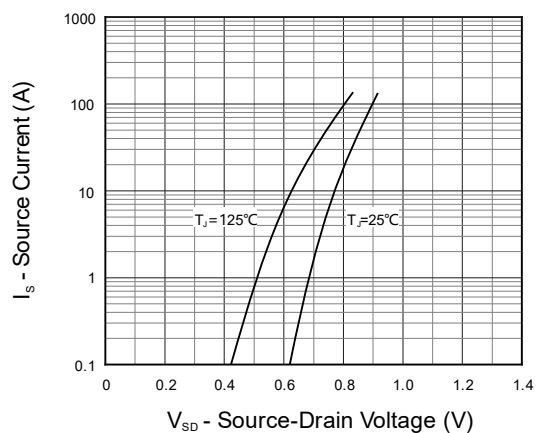


Figure 10. Diode Forward Current

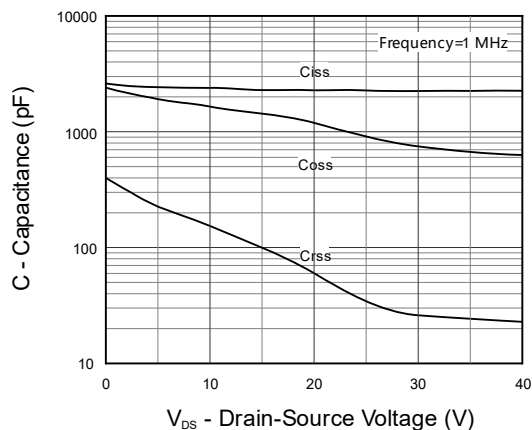


Figure 11. Capacitance

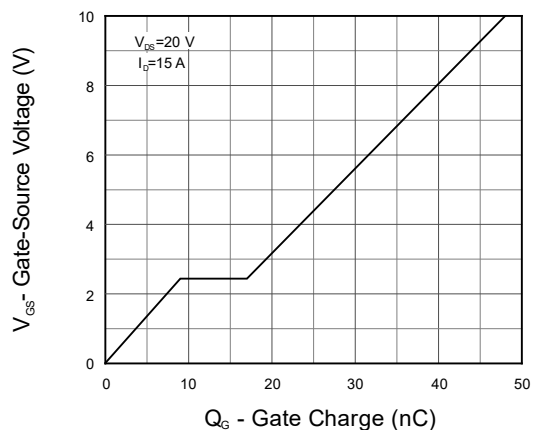
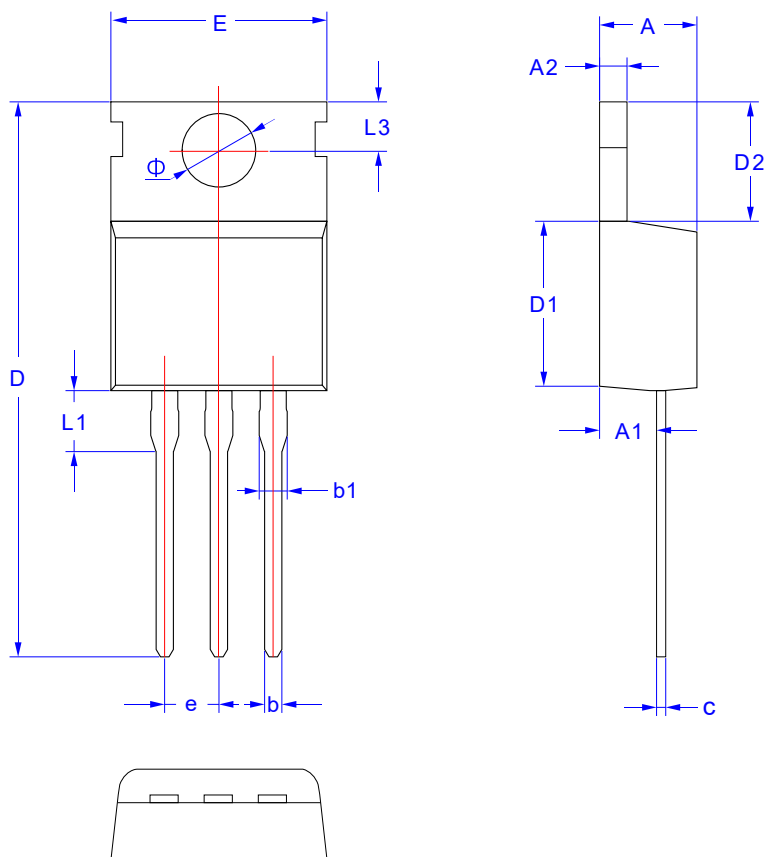


Figure 12. Gate Charge

8. Package Dimensions

TO-220 Package



Symbol	Dimensions in Millimeters	
	MIN	MAX
A	4.24	4.70
A1	2.20	3.00
b	0.70	0.95
b1	1.14	1.70
c	0.40	0.60
c1	1.15	1.40
D	28.0	29.8
D1	8.80	9.90
E	9.70	10.50
L1	3.80	
L2	6.25	6.90
L3	2.40	3.00
e	2.54 BSC	