

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

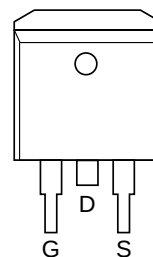
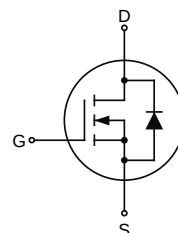
Spilt Gate Trench Technology
Excellent $R_{DS(ON)}$
Low gate charge

1.2 Applications

DC-DC Converter
Load Switch for Portable Device
Battery Switch
Rectifier

1.3 Quick reference

$BV \geq 100V$
 $I_D \leq 120A$
 $R_{DS(ON)} \leq 5.4m\Omega @ V_{GS} = 10V$ (Type:4.5m Ω)



Top View
TO-263

2. Package Marking and Ordering Information

Product Name	Package	Marking	Reel size	Tape width	Quantity (pcs)
KJ053N10D	TO-263	KJ053N10D XXXXXX	13"	24 mm	800

3. Absolute Maximum Ratings ($T_C=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A=25^{\circ}C$	Continuous Drain Current $V_{GS} @ 10V$	120	A
$I_D @ T_A=100^{\circ}C$	Continuous Drain Current $V_{GS} @ 10V$	84	A
I_{DM}	Pulsed Drain Current ¹	440	A
E_{AS}	Single Pulse Avalanche Energy ²	225	mJ
P_D	Power Dissipation	192	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	-55~150	$^{\circ}C$
$R_{\theta JC}$	Thermal Resistance Junction-Case	0.65	$^{\circ}C/W$

4. Electrical Characteristics (T_A=25°C unless otherwise specified)

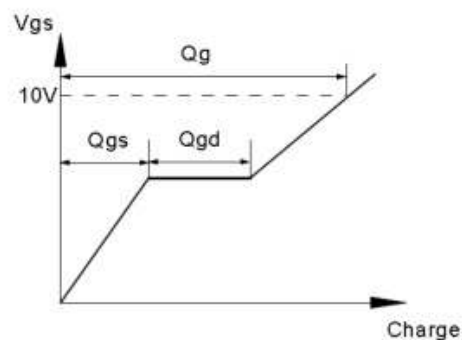
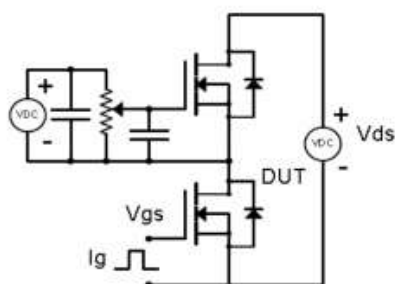
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	100	-	-	V
V _{GS(th)}	Gate Threshold Voltage ³	V _{DS} =V _{GS} , I _{DS} =250μA	2	3	4	V
I _{DSS}	Zero Gate Voltage Source Current	V _{DS} =100V, V _{GS} =0V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)}	Drain-Source On-State Resistance ³	V _{GS} =10V, I _D =20A	-	4.5	5.4	mΩ
R _G	Gate Resistance	Frequency=1.0MHz	-	3.5	-	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =50V Frequency=1MHz	-	3244	-	pF
C _{oss}	Output Capacitance		-	1075	-	
C _{rss}	Reverse Transfer Capacitance		-	52	-	
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} =50V, R _L =2.5Ω V _{GS} =10V, R _G =6Ω	-	22	-	ns
t _r	Turn-on Rise Time		-	36	-	
t _{d(off)}	Turn-off Delay Time		-	49	-	
t _f	Turn-off Fall Time		-	31	-	
Q _g	Total Gate Charge	V _{DS} =50V, I _{DS} =20A V _{GS} =10V	-	51	-	nC
Q _{gs}	Gate-Source Charge		-	15	-	
Q _{gd}	Gate-Drain Charge		-	13	-	
Source-Drain Diode Characteristics						
V _{DS}	Diode Forward Voltage ³	V _{GS} =0V, I _S =20A	-	-	1.2	V
I _S	Diode Forward Current ⁴		-	-	120	A
t _{rr}	Reverse Recovery Time	I _S =15A, V _{GS} =0V dI _F /dt=100A/μs	-	58	-	ns
Q _{rr}	Reverse Recovery Charge		-	90	-	nC

Notes:

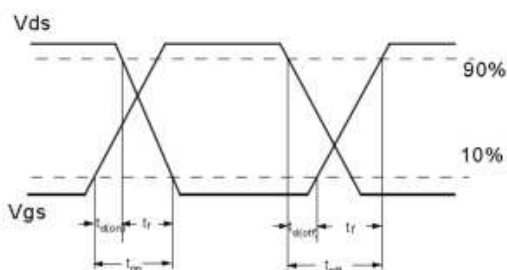
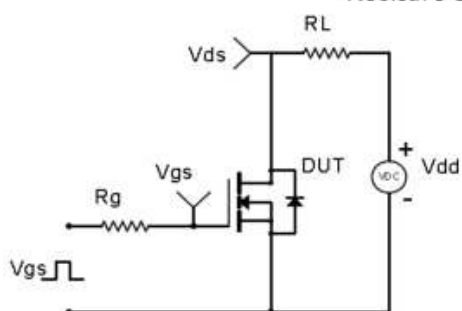
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. E_{AS} condition: T_J=25°C, V_{DD}=50V, R_G=25Ω, L=0.5mH
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
4. Surface Mounted on FR-4 Board, t ≤ 10 sec

5. Test Circuit & Waveform

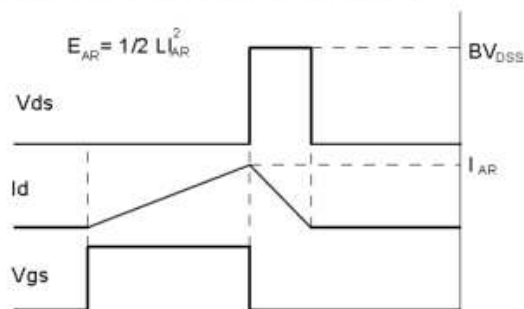
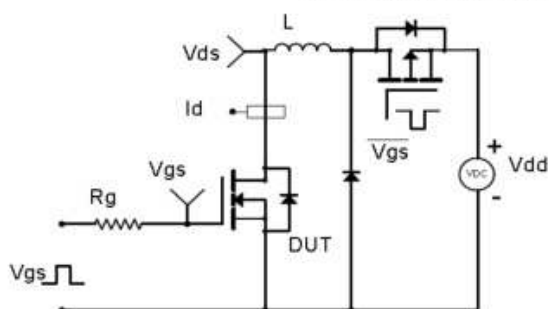
Gate Charge Test Circuit & Waveform



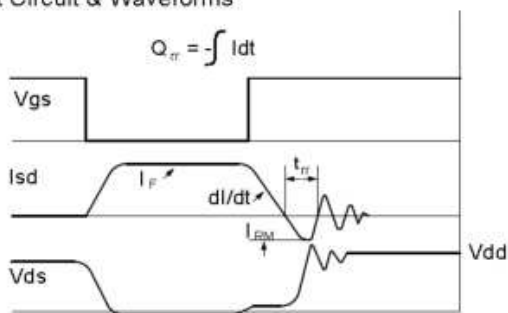
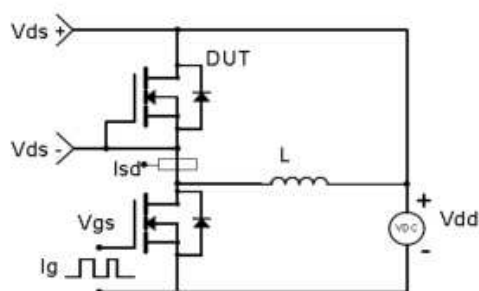
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



6. Typical Characteristics

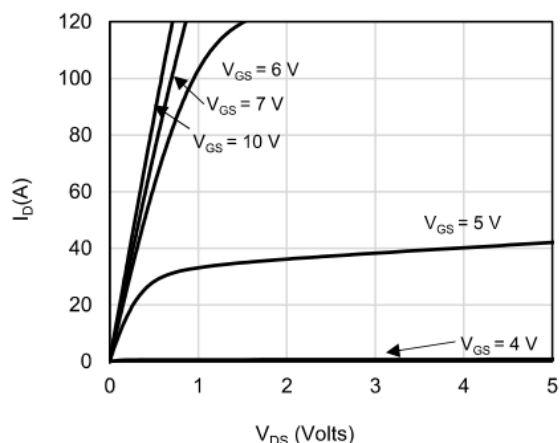


Figure 1: On-Region Characteristics

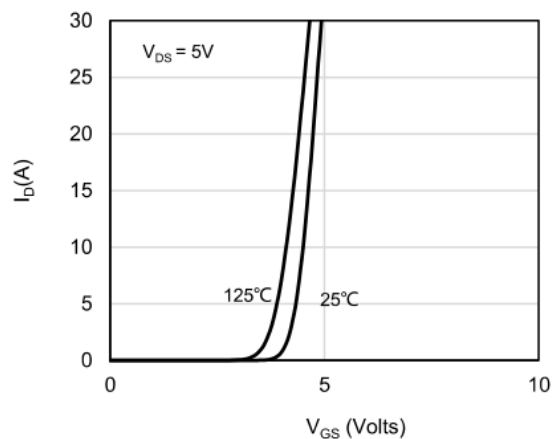


Figure 2: Transfer Characteristics

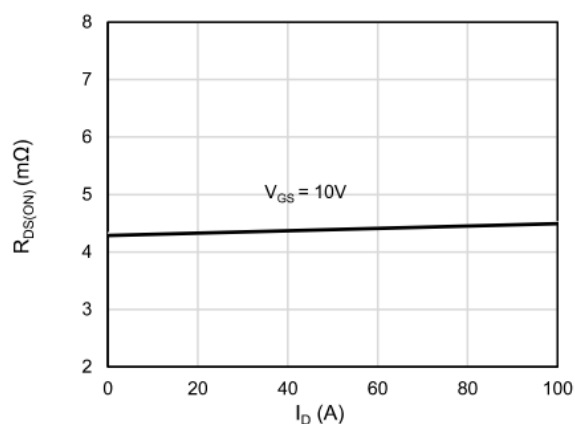


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

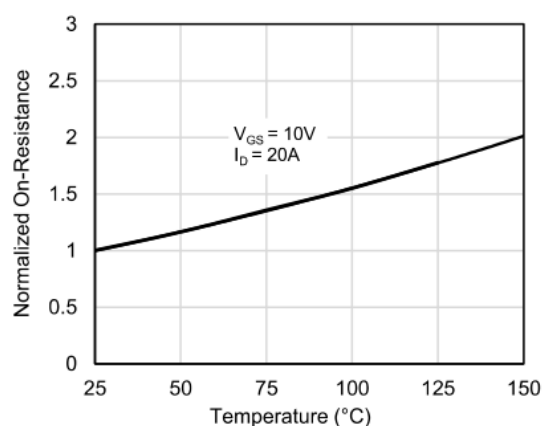


Figure 4: On-Resistance vs. Junction Temperature

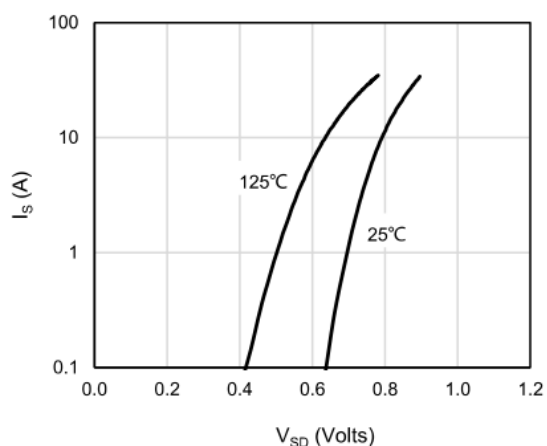


Figure 7: Body-Diode Characteristics

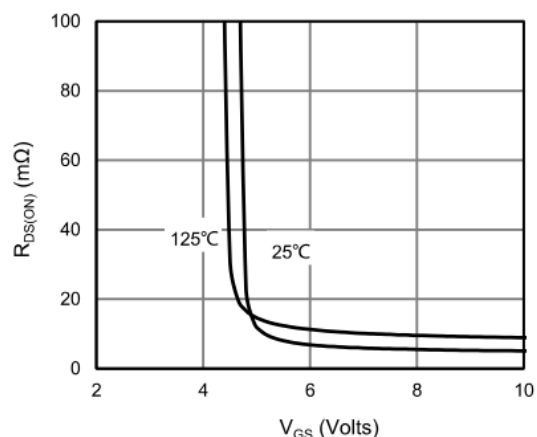


Figure 8: On-Resistance vs. Gate-Source Voltage

6. Typical Characteristics (cont.)

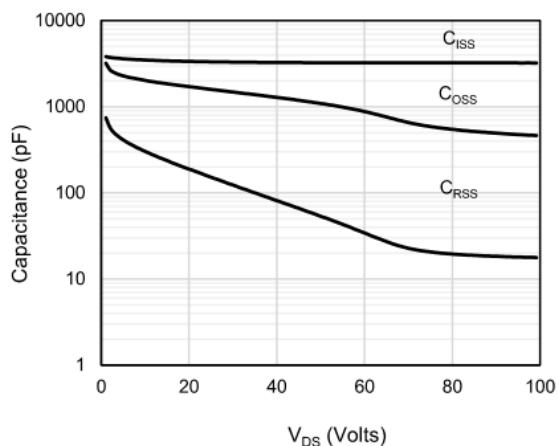


Figure 9: Capacitance Characteristics

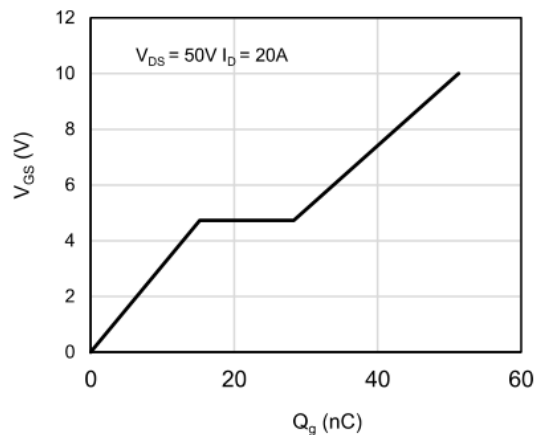


Figure 10: Gate-Charge Characteristics

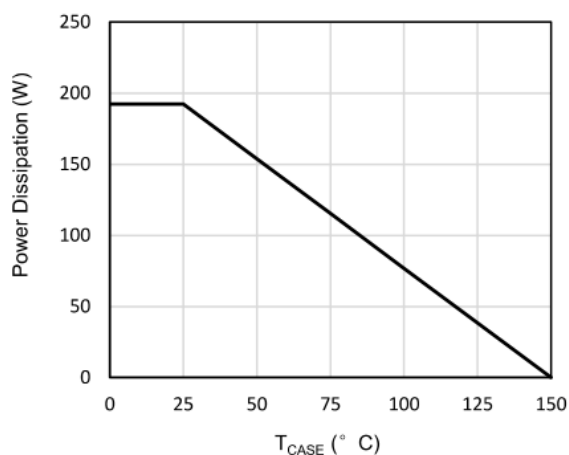


Figure 11: Power De-rating

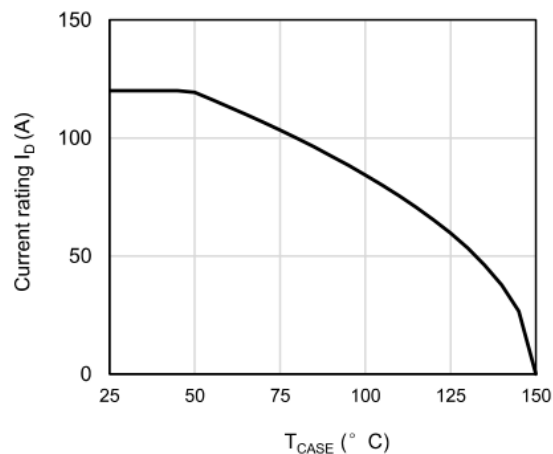


Figure 12: Current De-rating

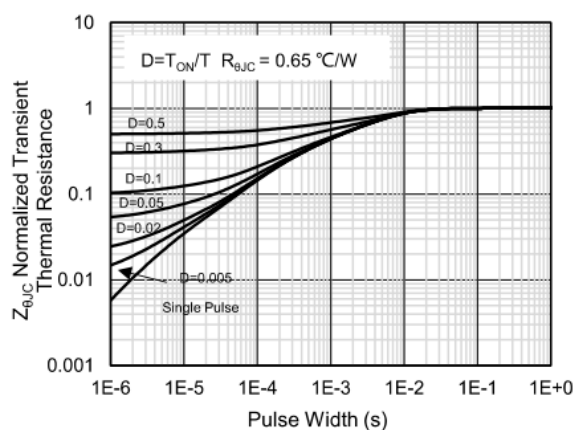


Figure 13: Normalized Maximum Transient Thermal Impedance

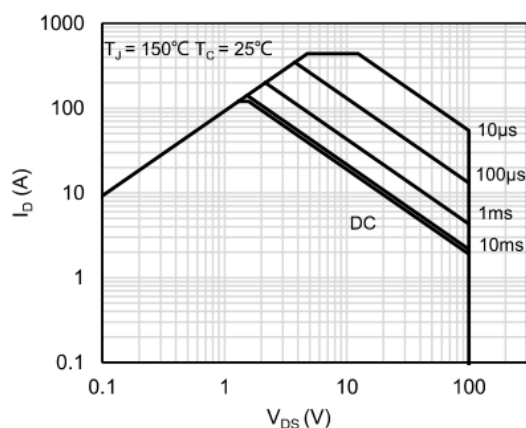
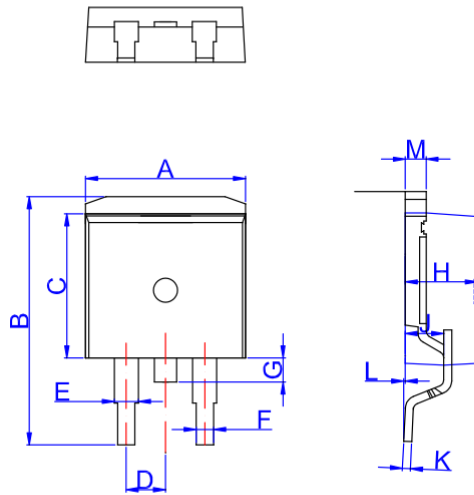


Figure 14: Maximum Forward Biased Safe Operating Area

7. Package Dimensions

TO-263 Package



TO-263

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.90		10.20	0.390		0.402
B	14.70		15.80	0.579		0.622
C	9.4		9.6	0.37		0.378
D		2.54			0.100	
E	1.20		1.40	0.047		0.055
F	0.75		0.85	0.029		0.033
G			1.75			0.069
H	4.40		4.70	0.173		0.185
J	2.30		2.70	0.091		0.106
K	0.38		0.55	0.015		0.022
L	0	0.10	0.25	0	0.004	0.010
M	1.25		1.35	0.049		0.053