Features

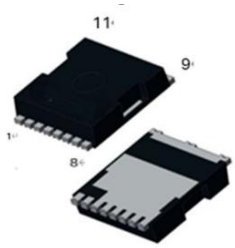
- Easy to use, compatible with standar gate drivers
- Excellent Q_G x RDS(on) figure of merit (FOM)
- Low Q_{RR}, no free-wheeling diode required
- Low switching loss
- RoHS compliant and Halogen-free
- Qualified according to JEDEC criteria

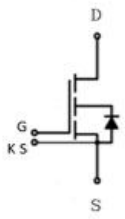
Product Summary		
V_{DSS}	650	V
$R_{DS(on)}$,	50	mΩ
Q_G, typ	12.5	nC
Q_{RR}, typ	155	nC

- Servo motors

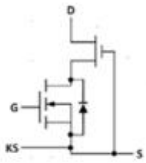
Applications

- High efficiency power supplies
- Telecom and datacom
- Automotive





Schematic Symbol



Cascode Device Structure

Packaging

Pin	Description
1-6	Source
7	Kelvin Source
8	Gate
9-11	Drain

Part Number	Marking	Package	Packaging	Base QTY
CRNZ035C65H	NZ035C65H	TOLL	Tape and Reel	1800

Maximum ratings, at T_C=25 ° C, unless otherwise specified

Symbol	Parameter		Limit Value	Unit
I_D	Continuous drain current @T_C=25 ° C		58	A
	Continuous drain current @T_C=125 ° C		37	A
$I_{D,pulse}$	Pulsed drain current @T_C=25 ° C (pulse width: 100us)		175	A
	Pulsed drain current @T_C=125 ° C (pulse width: 100us)		120	A
V_{DSS}	Drain to source voltage		650	V
$V_{DSS,puls}$	Drain to source pulse voltage[a]		800	V
V_{GSS}	Gate to source voltage		± 20	V
P_D	Gate to source pulse voltage		227	W
T_C	Operating junction temperature	Case	-55 to 150	° C
T_J		Junction	-55 to 150	° C
T_S	Storage temperature		-55 to 150	° C
T_{CSOLD}	Soldering peak temperature		260	° C

Thermal Resistance

Symbol	Parameter	Min	Typ.	Max	Unit
R_{thJC}	Junction-to-case	-	0.55	-	°C/W
R_{thJA}	Junction-to-ambient [b]	-	50	-	°C/W

Notes:
a. Off-state spike duty cycle < 0.01, spike duration < 2us
b. Device on one layer epoxy PCB for drain connection (vertical and without air stream cooling, with 6cm2 copper area and 70μm thickness)

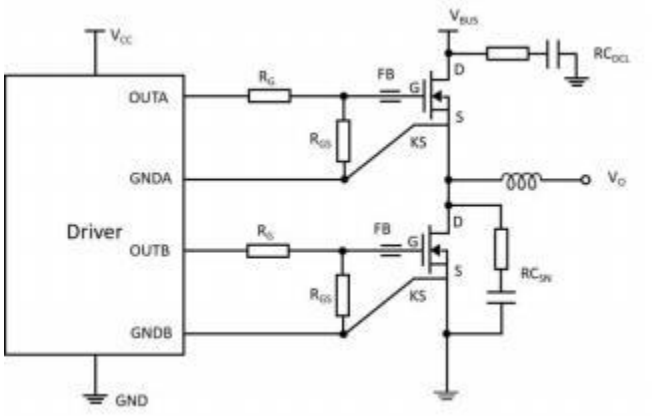
Electrical Parameters, at T_J=25 ° C, unless otherwise specified

Symbol	Min	Typ	Max	Unit	Test Conditions
Forward Characteristics					
$V_{DSS-MAX}$	650	-	-	V	V_{GS}=0V
$V_{GS(th)}$	3	4	5	V	V_{DS}=V_{GS}, I_D=500 μA
$R_{DS(on)}$ [c]	-	35	45	mΩ	V_{GS}=12V, I_D=4A, T_J=25° C
	-	70	-		V_{GS}=12V, I_D=4A, T_J=150° C
I_{DSS}	-	8	20	μA	V_{DS}=650V, V_{GS}=0V, T_J=25° C
	-	50	-	μA	V_{DS}=650V, V_{GS}=0V, T_J=150° C
I_{GSS}	-	2	20	nA	V_{GS}=20V
	-	-2	-20	nA	V_{GS}=-20V
C_{ISS}	-	1916	-	pF	V_{GS}=0V, V_{DS}=400V, f=1MHz
C_{OSS}	-	135	-	pF	
C_{RSS}	-	5.7	-	pF	
$C_{O(er)}$	-	203	-	pF	V_{GS}=0V, V_{DS}=0 - 400V
$C_{O(tr)}$	-	388	-	pF	
Q_{oss}	-	155	-	nC	
Q_G	-	12.5	-	nC	V_{DS}=400V, V_{GS}=0 - 12V, I_D=36A
Q_{GS}	-	2.6	-		
Q_{GD}	-	4.4	-		
$t_{D(on)}$	-	30	-	ns	V_{DS}=400V, V_{GS}=0 - 12V, I_D=36A, R_G=47Ω
t_R	-	16	-		
$t_{D(off)}$	-	80	-		
t_F	-	10	-		
Reverse Characteristics					
V_{SD}	-	1.2	-	V	V_{GS}=0V, I_S=18A, T_J=25° C
	-	1.7	-		V_{GS}=0V, I_S=36A, T_J=25° C
	-	2.3	-	A	V_{GS}=0V, I_S=36A, T_J=150° C
Q_{RR}	-	127	-	nC	I_S=36A, V_{GS}=0V, di/dt=1000A/us, V_{DD}=400V
t_{RR}	-	43	-	nS	

Notes:
c. Dynamic on-resistance; see Figure 18 and 19 for test circuit and configuration

Circuit Implementation

Half bridge and full bridge topology



Recommended Half-bridge Circuit

Recommended gate drive: (0 V, 12 V)

Gate Ferrite Bead(FB)	Gate Resistance (RG)	Gate Source Resistance (RGS)	Switching RC Snubber (RCSN)	DC Link RC Snubber (RCDCL)
300 - 600 Ω@100MHz	33 Ω	10 kΩ	15 Ω + 470 pF	5 Ω + 4.7 nF

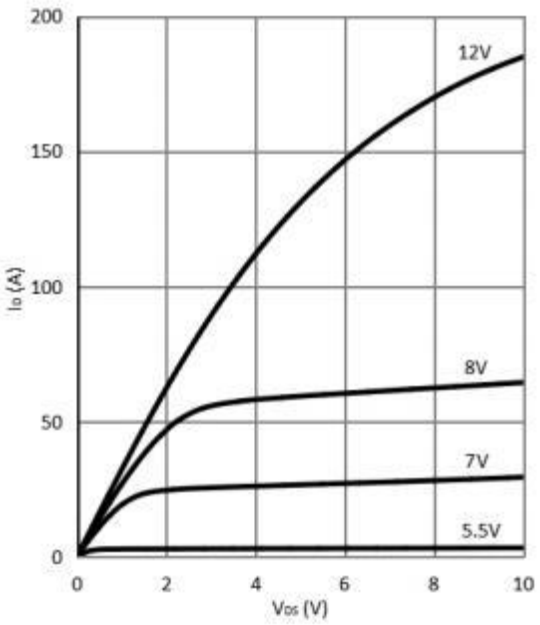
Notes:

d. RCSN should be placed as close as possible to the drain pin

e. The layout and wiring of the drive circuit should be as short as possible

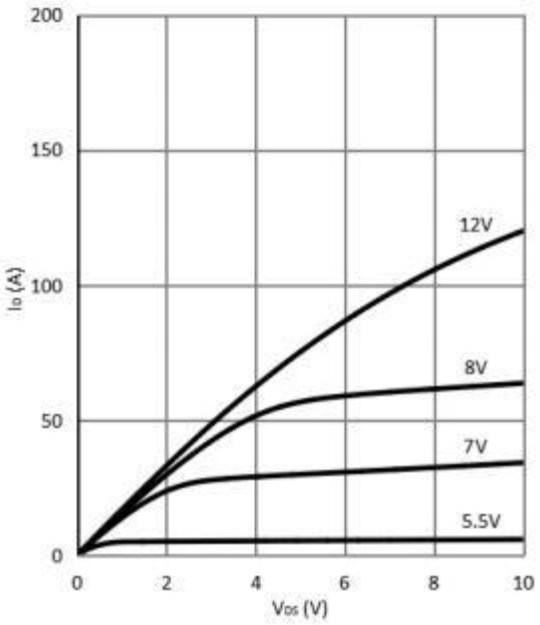
Typical Characteristics, at T_C=25 ° C, unless otherwise specified

Figure 1. Typical Output Characteristics TJ=25° C



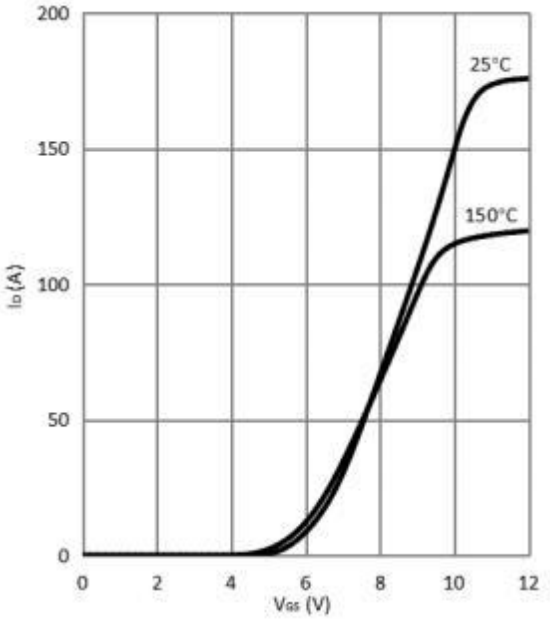
Parameter: V_{GS}

Figure 2. Typical Output Characteristics T_J=150° C



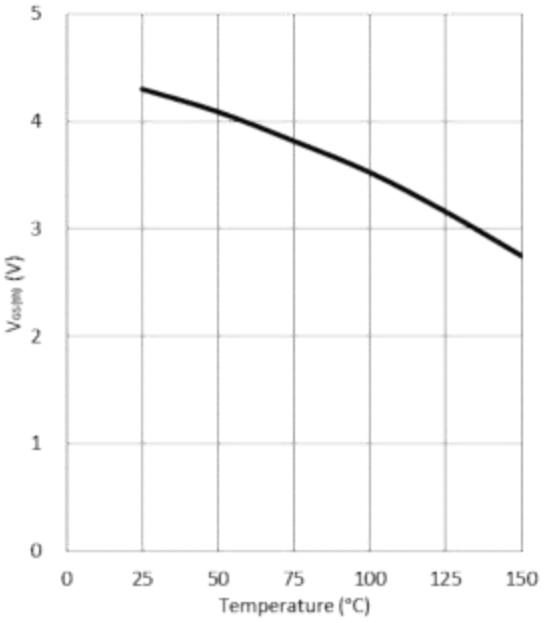
Parameter: V_{GS}

Figure 3. Typical Transfer Characteristics



V_{DS}=10V, Parameter: T_J

Figure 4. $V_{GS(th)}$ Vs Temperature Characteristics



V_{DS}=10V, Parameter: T_J

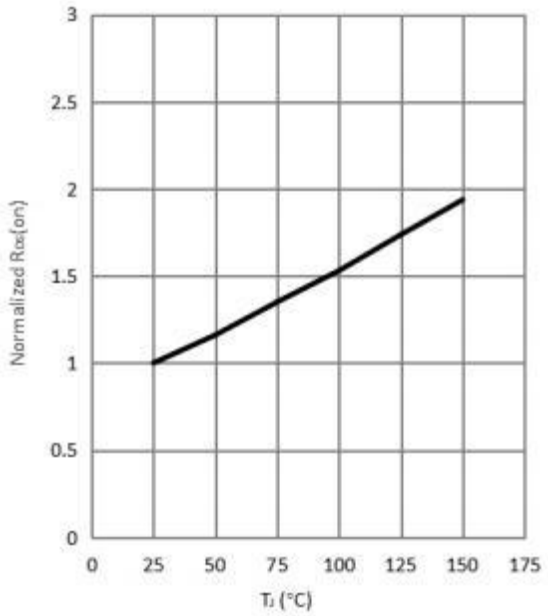
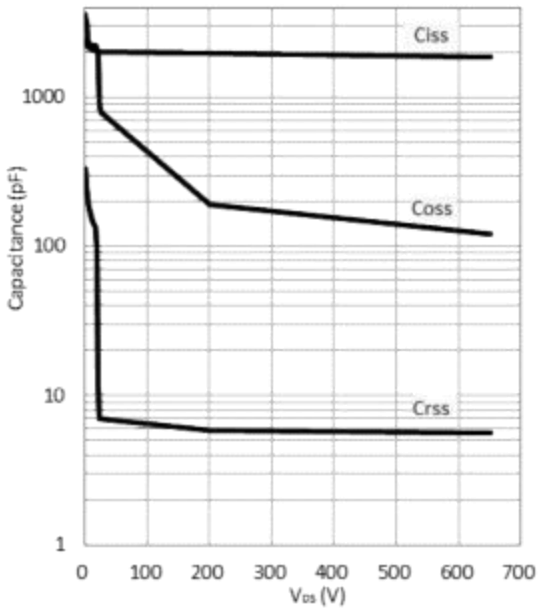
Figure 5. Normalized On-resistance	Figure 6. Typical Capacitance
	
I_D=4A, V_{GS}=12V	V_{GS}=0V, f=1MHz

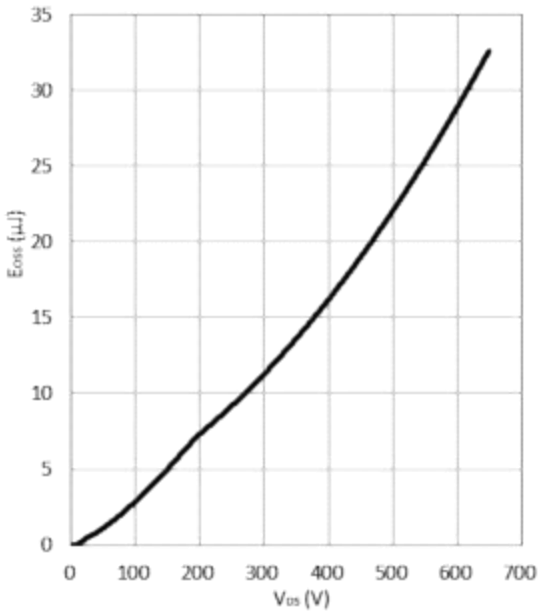
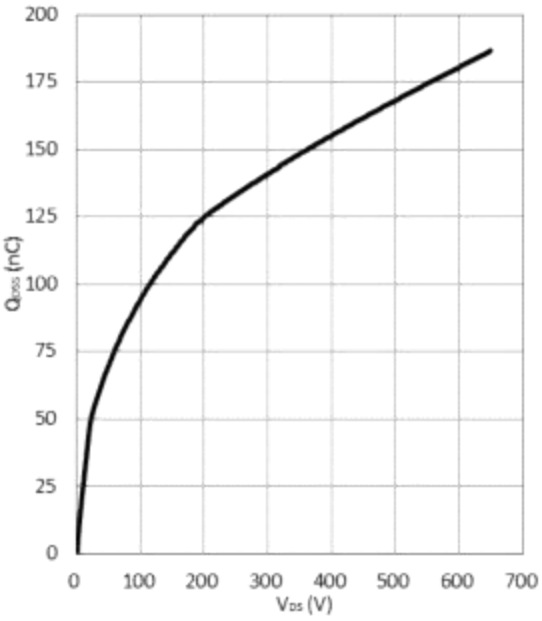
Figure 7. Typical Coss Stored Energy	Figure 8. Typical Qoss
	
V_{GS}=0V, f=1MHz	V_{GS}=0V, f=1MHz

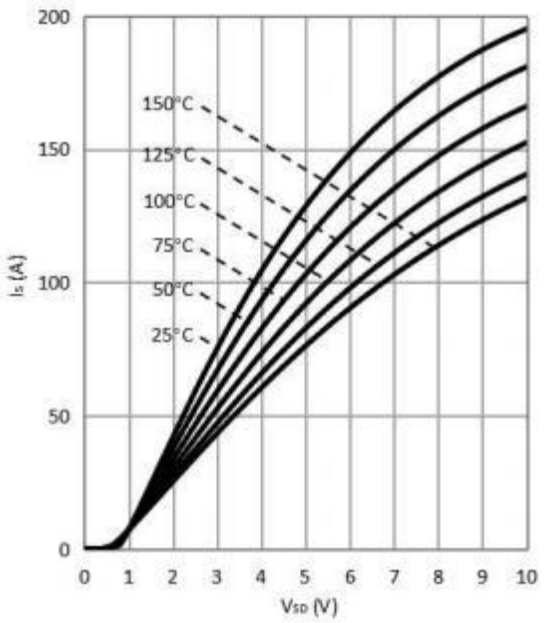
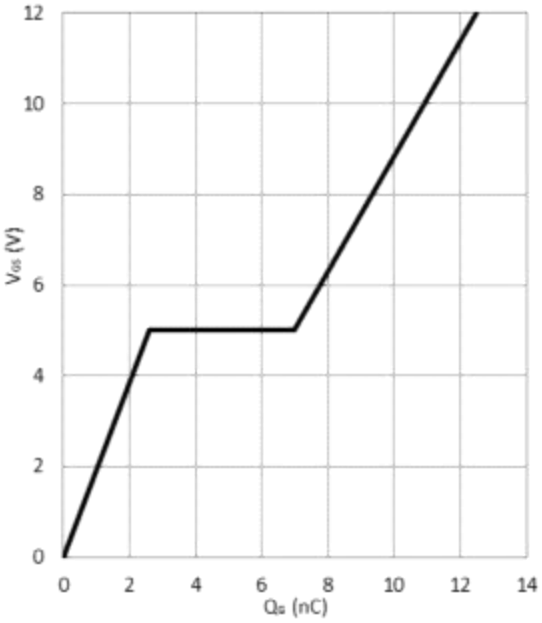
Figure 9. Forward Characteristic of Rev. Diode	Figure 10. Typical Gate Charge
	
$I_s=f(V_{SD})$, Parameter T_J	I_{DS}=36A, V_{DS}=400V

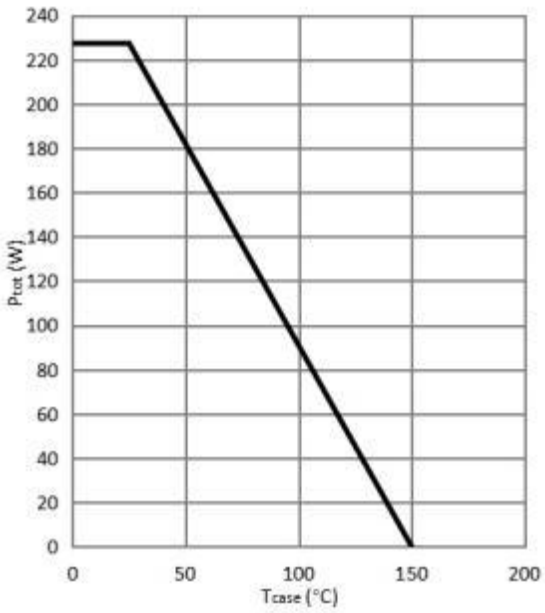
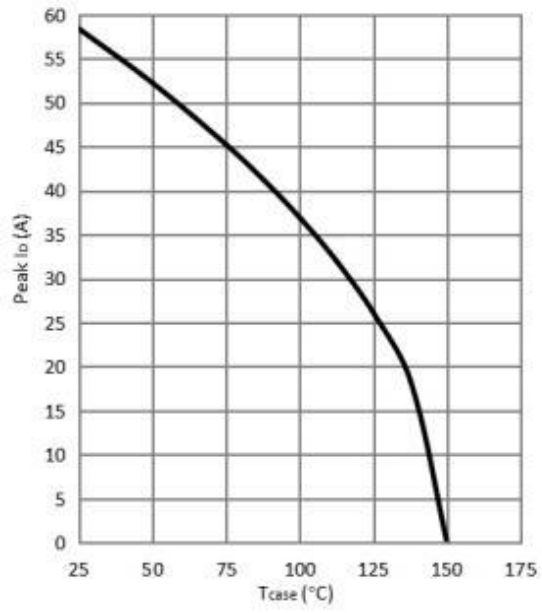
Figure 11. Power Dissipation	Figure 12. Current Derating
	

Figure 13. Transient Thermal Resistance

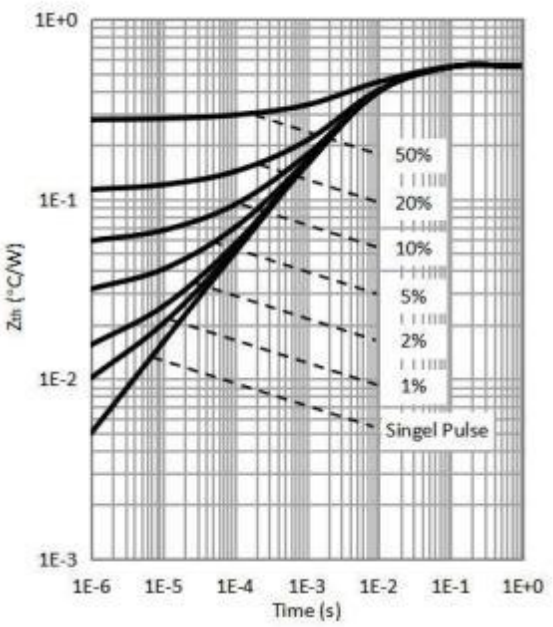
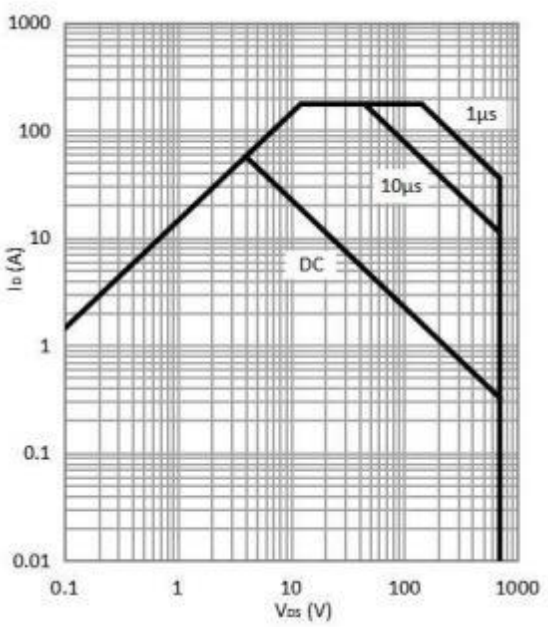
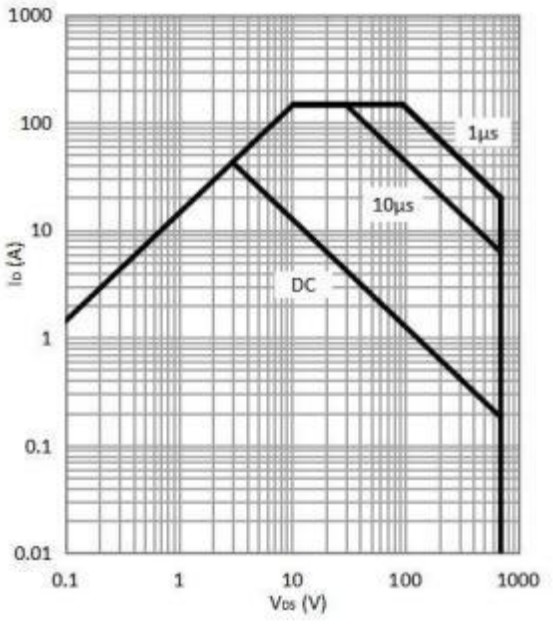


Figure 14. Safe Operating Area T_C=25° C



calculated based on thermal limit

Figure 15. Safe Operating Area T_C=80° C



calculated based on thermal limit

Test Circuits and Waveforms

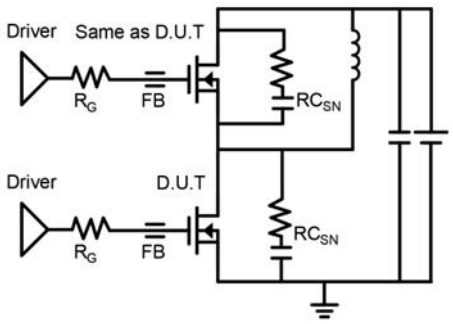
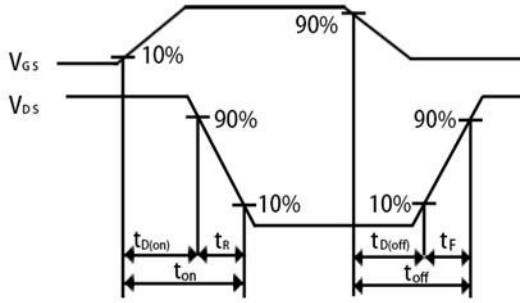
Figure 16. Switching Time Test Circuit	Figure 17. Switching Time Waveform
	

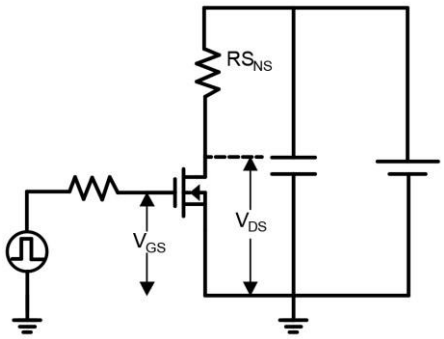
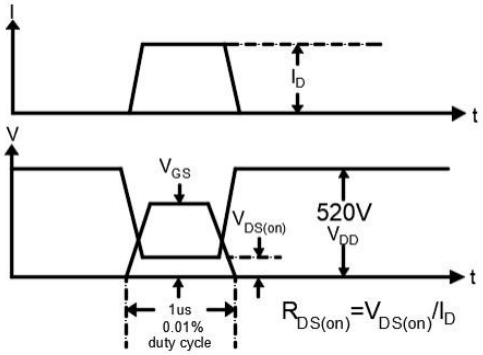
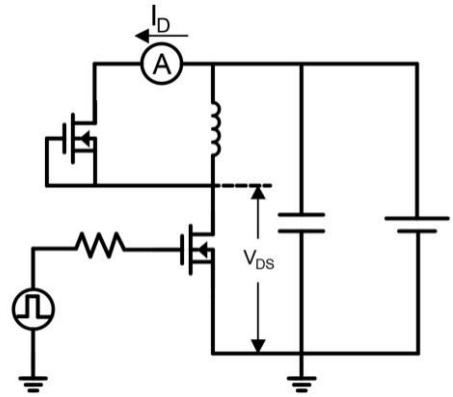
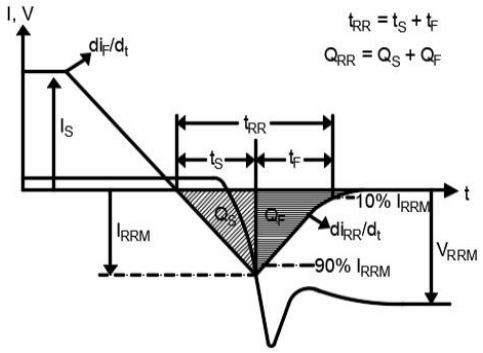
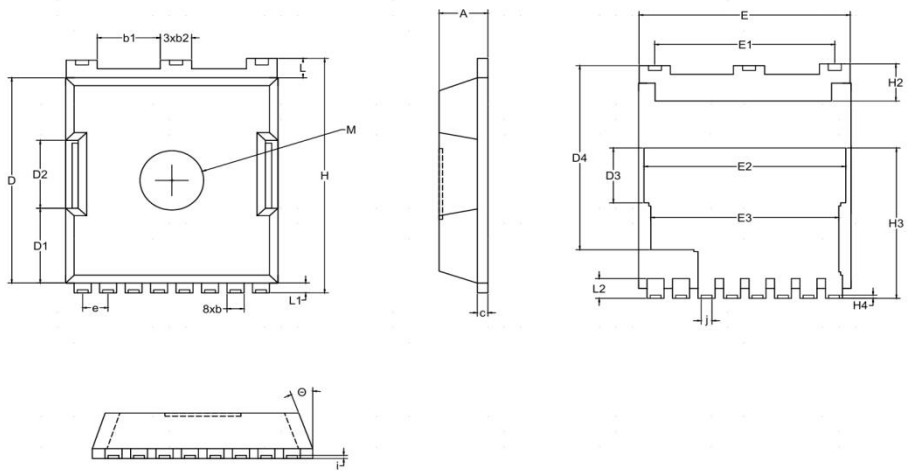
Figure 18. Dynamic $R_{DS(on)}$ Test Circuit	Figure 19. Dynamic $R_{DS(on)}$ Waveform
	

Figure 20. Diode Characteristic Test Circuits	Figure 21. Diode Recovery Waveform
	

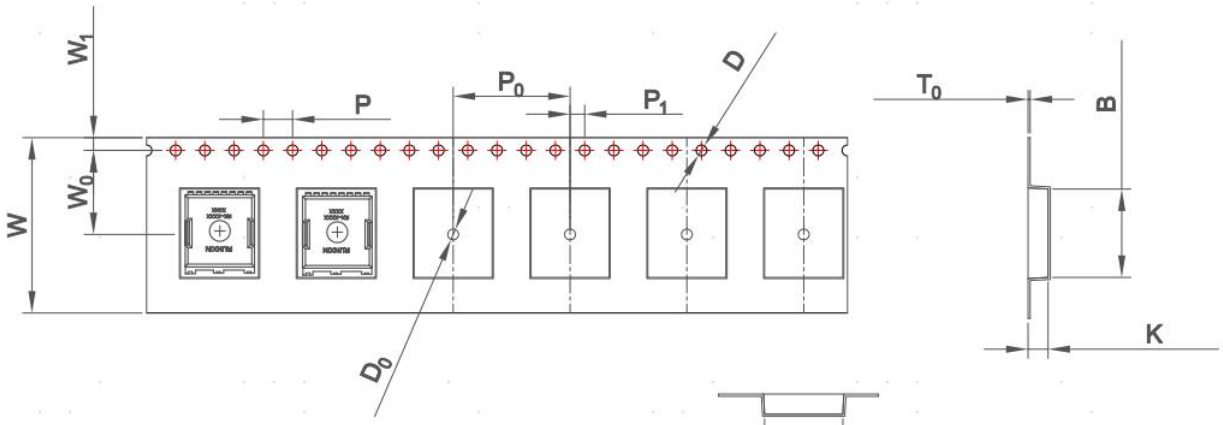
Package Outline

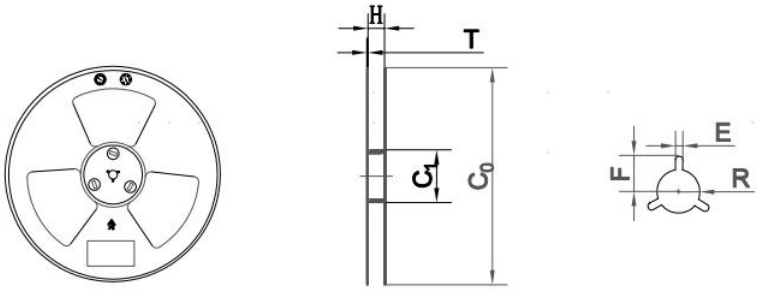


SYMBOL	Millimeter		
	Min	Nom	Max
A	2.20	2.30	2.40
b	0.70	0.80	0.90
b1	3.00	3.10	3.20
b2	1.10	1.20	1.30
c	0.40	0.50	0.60
D	10.28	10.38	10.58
D1		4.18REF	
D2		3.30 REF	
D3		2.77REF	
D4		9.03REF	
E	9.70	9.90	10.10
E1		8.50REF	
E2		9.40REF	
E3		8.50REF	
e	1.10	1.20	1.30
H	11.48	11.68	11.88
H2	1.10	1.20	1.30
H3	7.50	7.60	7.70
H4	0.13	0.23	0.33
i	0.10	-	-
j	0.42	0.45	0.50
L	0.50	0.70	0.90
L1	0.50	0.60	0.70
L2	1.05	1.20	1.30
M		3REF	
e		10°REF	

Tube Information

Dimensions are shown in millimeters





Tape Dimension(mm)					
W	24±0.1	P	4±0.1	A	10.7±0.1
W0	11.5±0.1	P0	16±0.1	B	12.1±0.1
W1	1.75±0.1	P1	2±0.1	D0	1.5±0.1
K	2.75±0.1	D	1.5±0.1	T0	0.30±0.03

Reel Dimension(mm)			
H	26±0.1	F	10.5±0.1
T	2±0.2	E	2.8±0.1
C0	330±3	R	6.5±0.1
C1	100±1		

Revision History

Version	Date	Change(s)
0.1	2025/09/25	Release preliminary datasheet

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qualified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as automotive, aviation/aerospace and life-support devices or systems.

Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.