Feature

★ Super Low Gate Charge
★ Green Device Available
★ Excellent CdV/dt effect decline
★ Advanced high cell density Trench technology

Product Summary

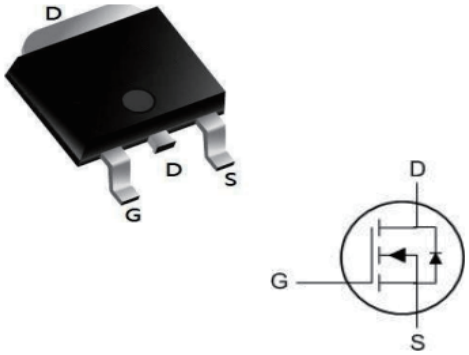
RoHS

BVDSS	RDSON	ID
100V	95mΩ	12A

Description

The S12N10 is the high cell density trenched N ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.
The S12N10 meet the RoHS and Green Product requirement with full function reliability approved.

TO252 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25°C	Continuous Drain Current, V_{GS}@ 10V[1]	12	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS}@ 10V[1]	3.2	A
I_{DM}	Pulsed Drain Current[2]	11	A
P_D@T_A=25°C	Total Power Dissipation[3]	1	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	125	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	80	°C/W

Electrical Characteristics (T_J =25 °C unless otherwise specified)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	100	110	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 100V, V_{GS} = 0V	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics note3						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1	1.8	3	V
$R_{DS(on)}$	Static Drain-Source On-Resistance note2	V_{GS} = 10V, I_D = 3A	-	95	140	mΩ
Dynamic Characteristics note4						
C_{iss}	Input Capacitance	V_{DS} = 50V, V_{GS} = 0V, f = 1.0MHz	-	196	-	pF
C_{oss}	Output Capacitance		-	25.9	-	pF
C_{rss}	Reverse Transfer Capacitance		-	21.4	-	pF
Q_g	Total Gate Charge	V_{DS} = 50V, I_D = 3A, V_{GS} = 10V	-	4.3	-	nC
Q_{gs}	Gate-Source Charge		-	3.5	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	3.1	-	nC
Switching Characteristics note4						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 50V, I_{DS}=3A R_G = 2Ω, V_{GEN} = 10V	-	14.7	-	ns
t_r	Turn-On Rise Time		-	3.5	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	20.9	-	ns
t_f	Turn-Off Fall Time		-	2.7	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current note2		-	-	4.5	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	12	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S =3A	-	-	1.3	V
t_{rr}	Body Diode Reverse Recovery Time	V_{GS} = 0V, I_F = 3A, di/dt =100A/μs	-	32.1	-	ns
Q_{rr}	Body Diode Reverse Recovery Time		-	39.4	-	nC
I_{rrm}	Peak Reverse Recovery Current		-	2.1	-	A

Notes:

1.Repetitive Rating: Pulse width limited by maximum junction temperature.

2.Surface Mounted on FR4 Board, t ⩽ 10 sec.

3.Pulse Test: Pulse Width ⩽ 300μs, Duty Cycle ⩽2%.

4.Guaranteed by design, not subject to production

5.V_{DD}=50 V, R_G=50 Ω, L=0.3 mH, starting T_j=25 °C

Typical Electrical and Thermal Characteristics (Curves)

Figure1: Output Characteristics

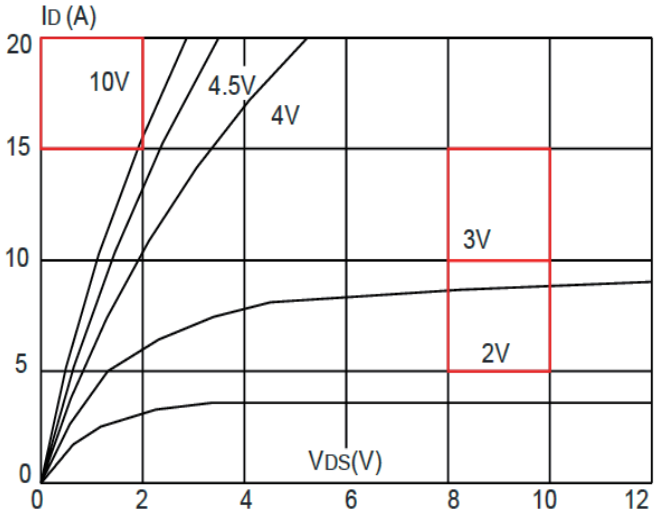


Figure 2: Typical Transfer Characteristics

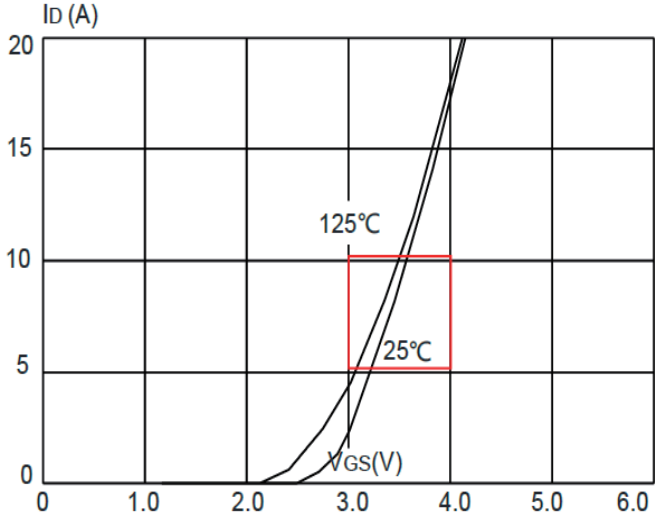


Figure 3:On-resistance vs. Drain Current

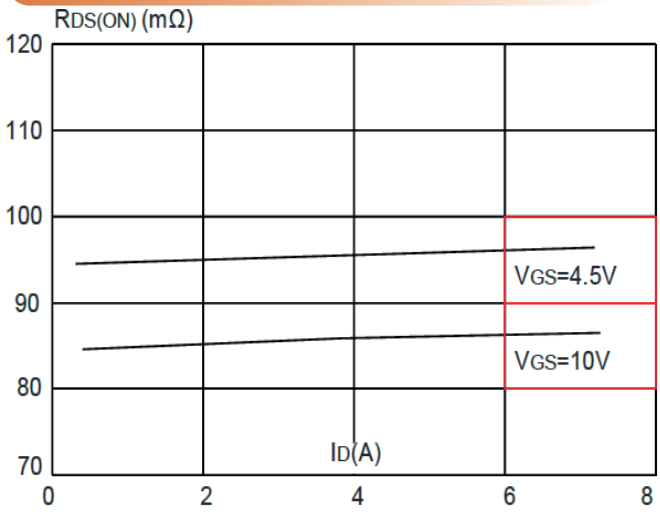


Figure 4: Body Diode Characteristics

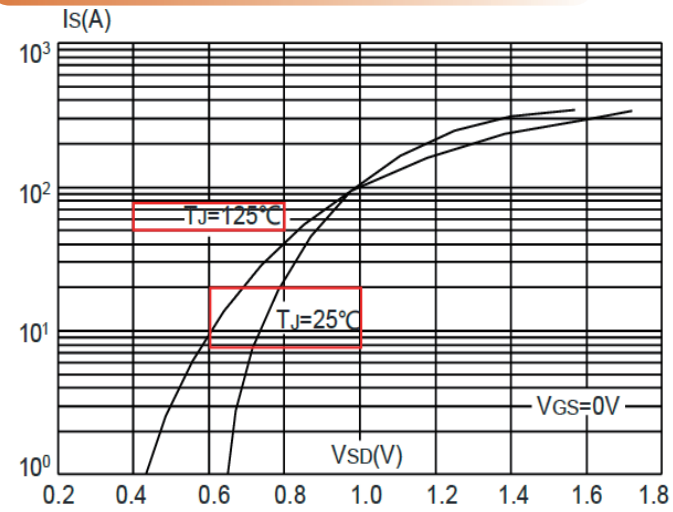


Figure 5: Gate Charge Characteristics

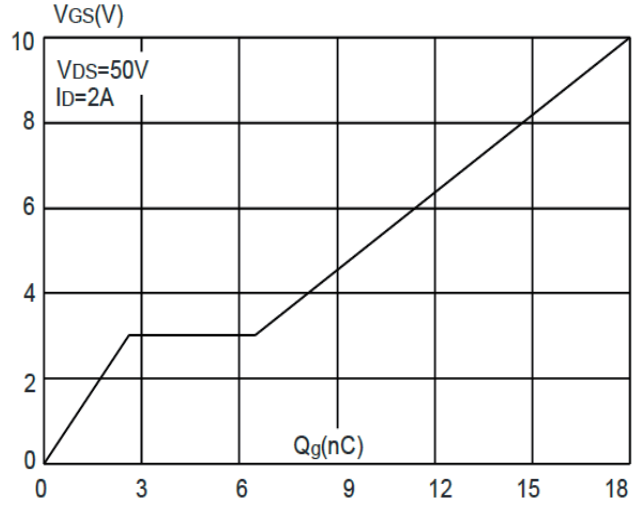
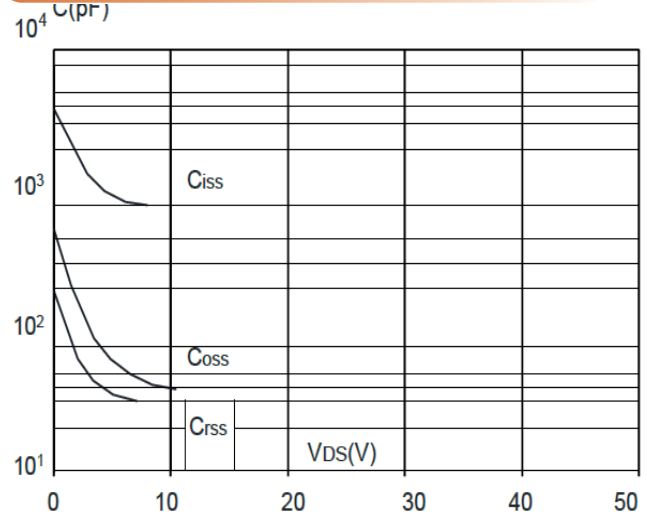


Figure 6:Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown Voltage

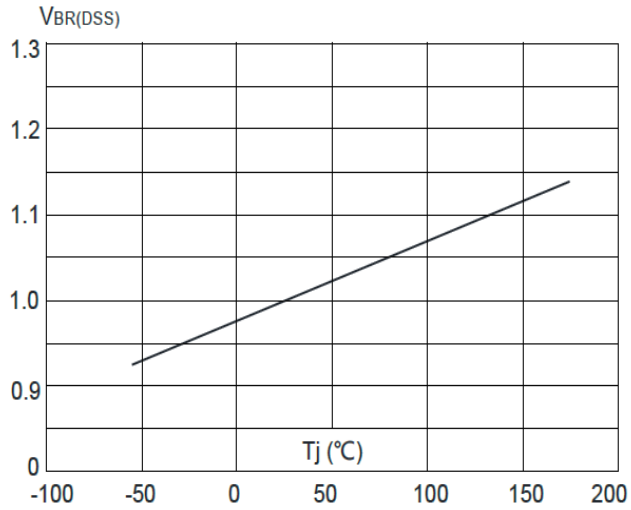


Figure 8:Normalized on Resistance vs.

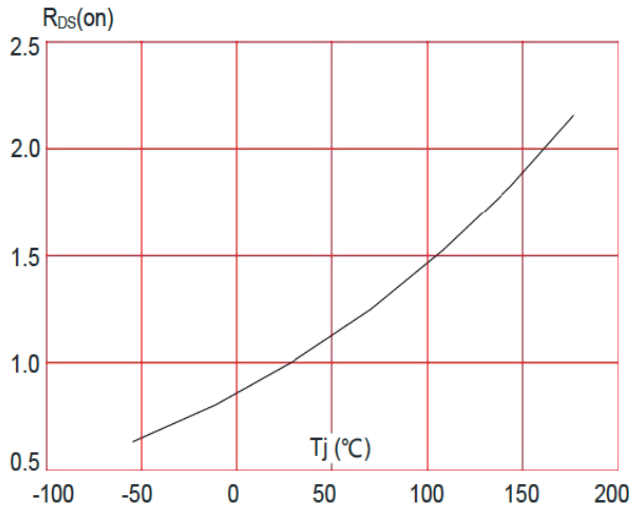


Figure 9: Maximum Safe Operating Area

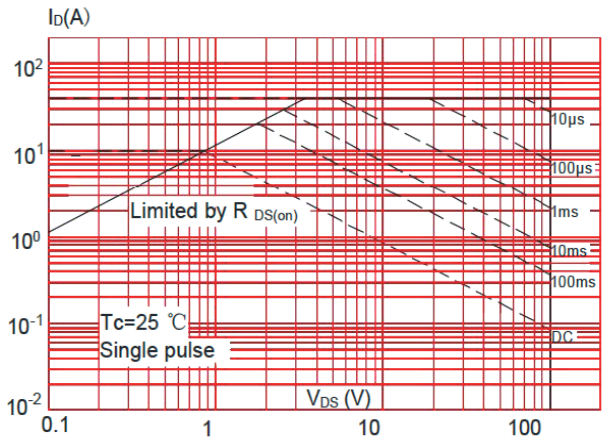


Figure 10: Maximum Continuous Drain C

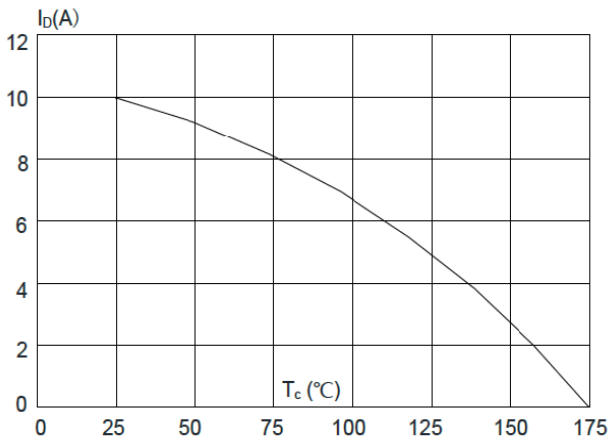
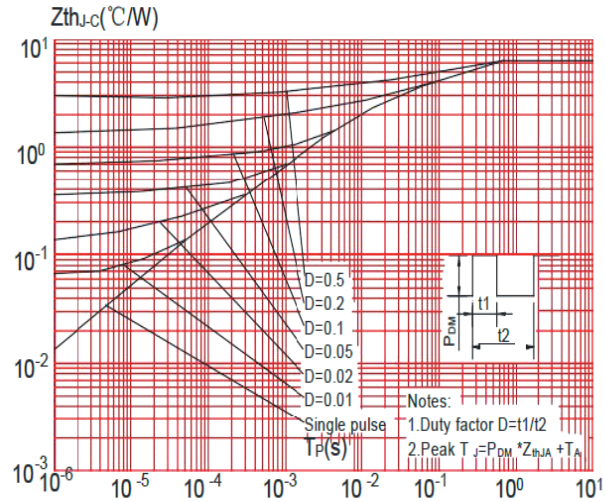
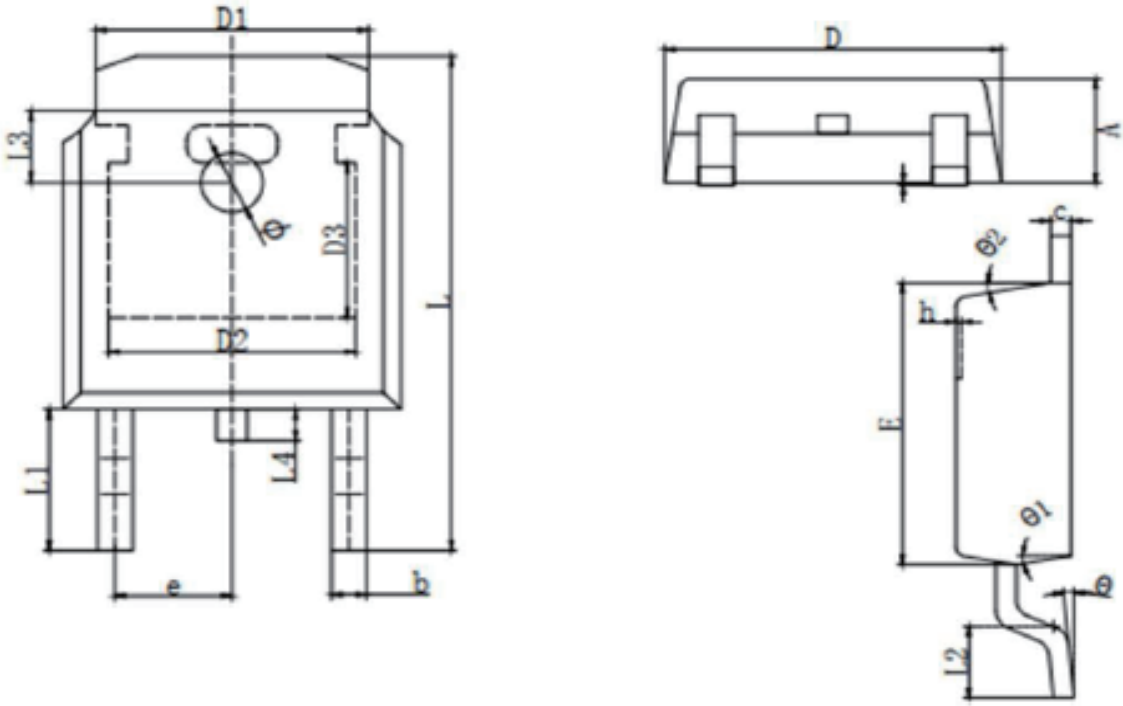


Figure 11 Maximum Effective Transient T



TO-252 Package outline



SYMBOL	MILLIMETER		SYMBOL	MILLIMETER	
	MIN	MAX		MIN	MAX
A	2.200	2.400	h	0.000	0.200
A1	0.000	0.127	L	9.900	10.30
b	0.640	0.740	L1	2.888 REF	
c	0.460	0.580	L2	1.400	1.700
D	6.500	6.700	L3	1.600 REF	
D1	5.334 REF		L4	0.600	1.000
D2	4.826 REF		φ	1.100	1.300
D3	3.166 REF		θ	0°	8°
E	6.000	6.200	θ1	9° TYP2	
e	2.286 TYP		θ2	9° TYP	