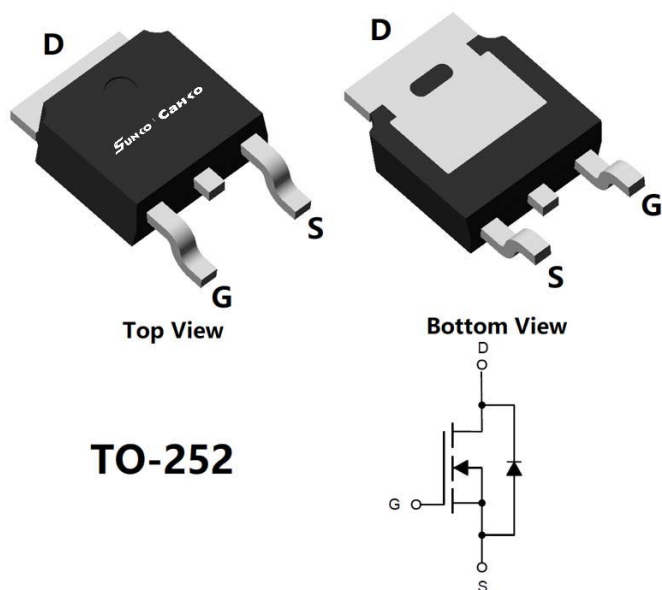


N-Channel Enhancement Mode Field Effect Transistor



TO-252

Product Summary

- V_{DS} 40 V
- I_D 120 A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) <3.5 mohm
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) <4.8 mohm
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Trench Power LV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- DC-DC Converters
- Power management functions
- Backlighting

■ Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	40	V
Gate-source Voltage		V_{GS}	± 20	V
Drain Current	$T_C=25^\circ\text{C}$	I_D	120	A
	$T_C=100^\circ\text{C}$		76	
Pulsed Drain Current ^A		I_{DM}	390	A
Total Power Dissipation @ $T_C=25^\circ\text{C}$ ^B		P_D	110	W
Total Power Dissipation @ $T_C=100^\circ\text{C}$ ^B		P_D	44	W
Total Power Dissipation @ $T_A=25^\circ\text{C}$ ^C		P_D	6.2	W
Single Pulse Avalanche Energy ^D		E_{AS}	272	mJ
Thermal Resistance Junction-to-Case		$R_{\theta JC}$	1.14	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction-to-Ambient		$R_{\theta JA}$	20	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range		T_J, T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
SCD120N04A	F1/F2	SCD120N04A	2500	/	25000	13" reel

■ Electrical Characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250μA	40			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V,V _{GS} =0V			1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} =0V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	1.0	1.5	2.5	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D =15A		2.8	3.5	mΩ
		V _{GS} = 4.5V, I _D =10A		4.0	4.8	
Diode Forward Voltage	V _{SD}	I _S =15A,V _{GS} =0V		0.80	1.2	V
Maximum Body-Diode Continuous Current	I _S				120	A
Gate resistance	Rg	f=1 MHz, Open drain		3.1		Ω
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =20V,V _{GS} =0V,f=1MHZ		4645		pF
Output Capacitance	C _{oss}			436		
Reverse Transfer Capacitance	C _{rss}			360		
Switching Parameters						
Total Gate Charge	Q _g (10V)	V _{GS} =10V,V _{DS} =20V,I _D =20A		102		nC
Total Gate Charge	Q _g (4.5V)			49		
Gate-Source Charge	Q _{gs}			15.8		
Gate-Drain Charge	Q _{gd}			21.9		
Reverse Recovery Charge	Q _{rr}	I _F =20A, di/dt=100A/us		7.4		ns
Reverse Recovery Time	t _{rr}			22.3		
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =20V , I _D =20A R _{GEN} =3Ω		12		
Turn-on Rise Time	t _r			54		
Turn-off Delay Time	t _{D(off)}			120		
Turn-off fall Time	t _f			80		

- A. Pulse Test: Pulse Width ≤ 300us, Duty cycle ≤ 2%.
- B. The power dissipation P_D is based on T_{J(MAX)}=150℃, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
- C. The value of R_{θJA} is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25℃.
- D. T_J=25℃, V_{DD}=40V, V_G=10V, L=0.5mH.

■ Typical Performance Characteristics

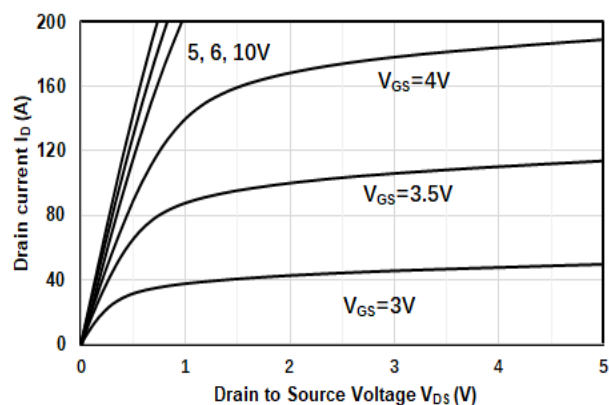


Figure1. Output Characteristics

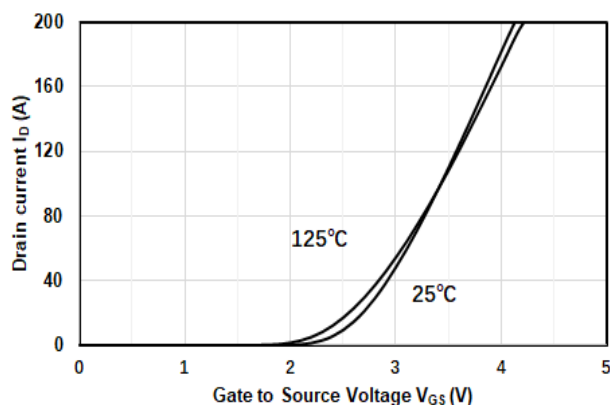


Figure2. Transfer Characteristics

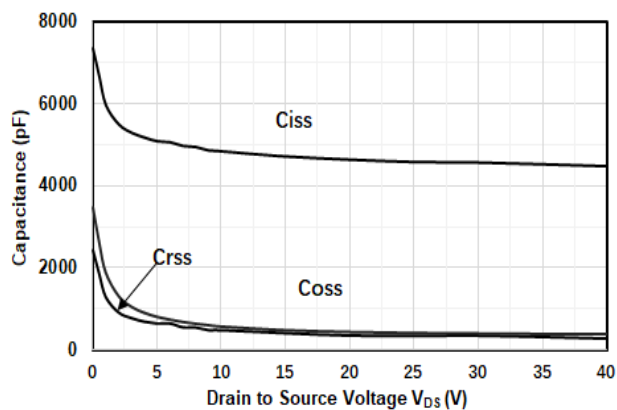


Figure3. Capacitance Characteristics

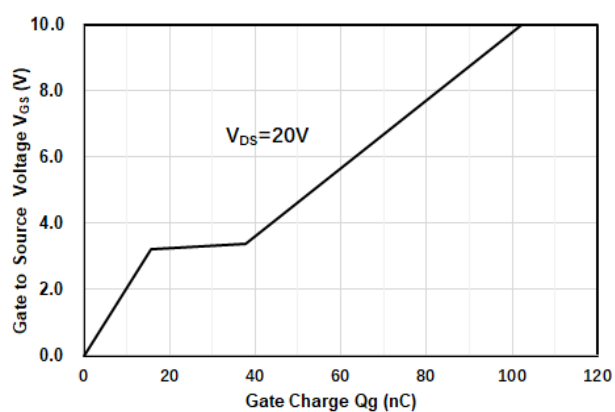


Figure4. Gate Charge

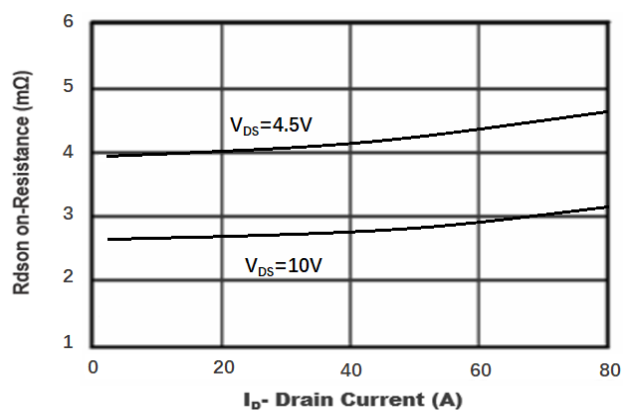


Figure5. Drain-Source on Resistance

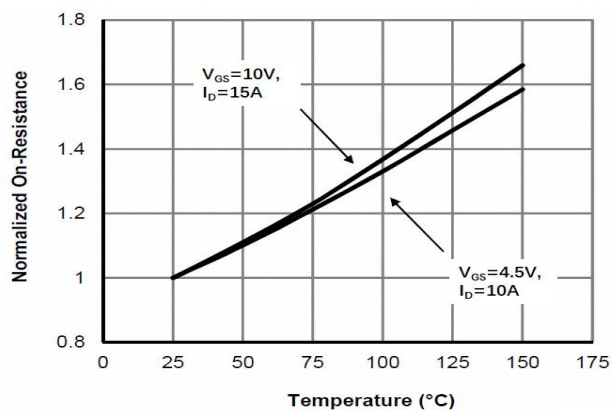


Figure6. Drain-Source on Resistance

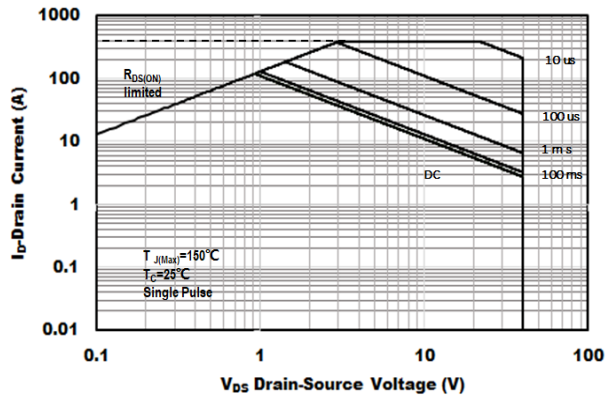


Figure7. Safe Operation Area

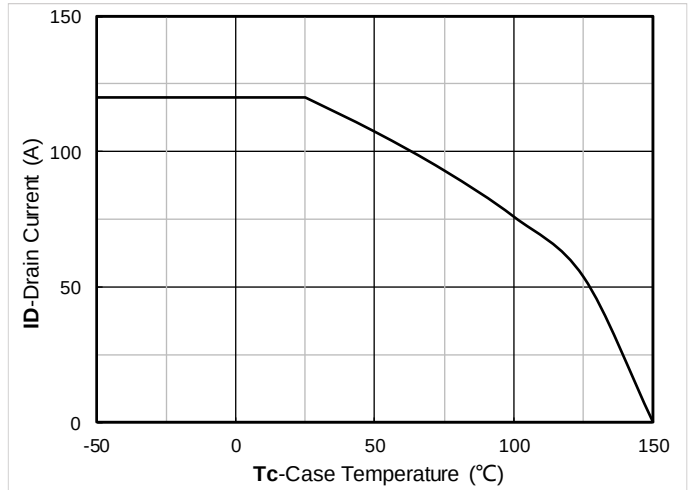


Figure8. Drain current vs. Case Temperature

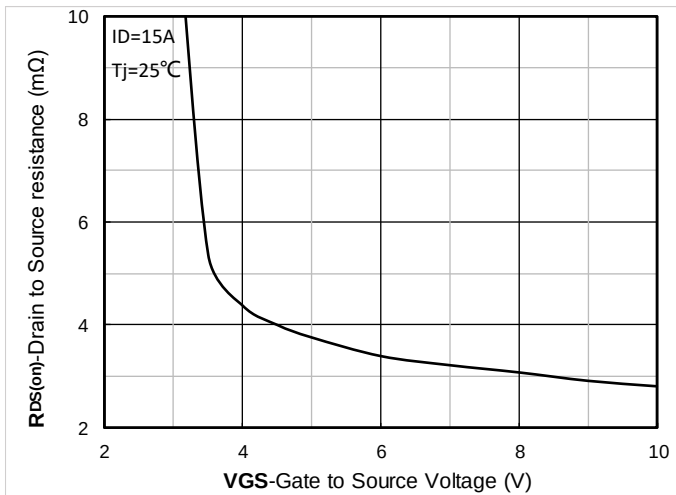


Figure 9. On-Resistance vs Gate to Source Voltage

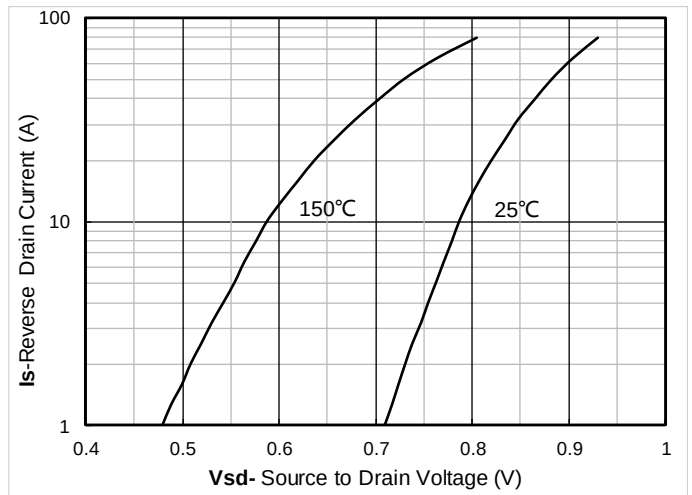


Figure 10. Forward characteristics of reverse diode

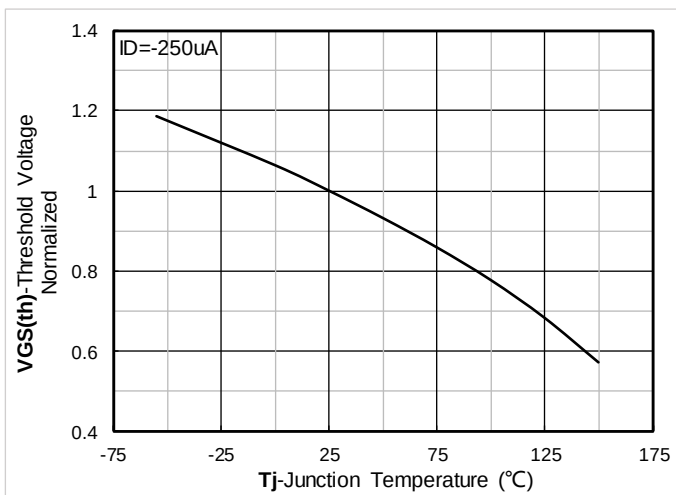


Figure 11. Normalized Threshold voltage

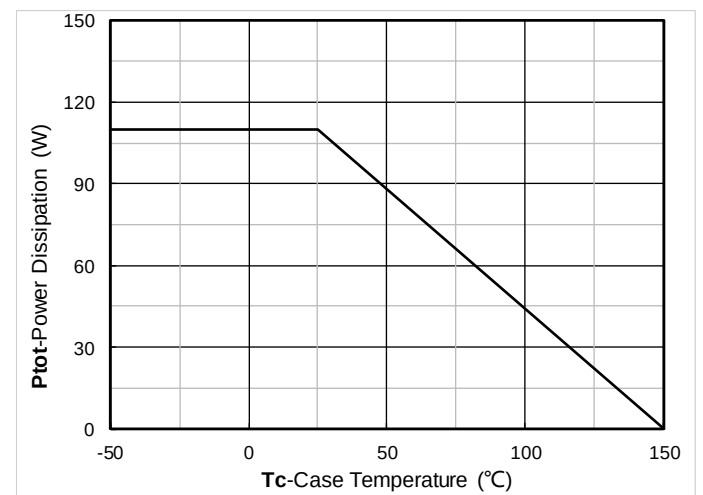


Figure 12. Power dissipation

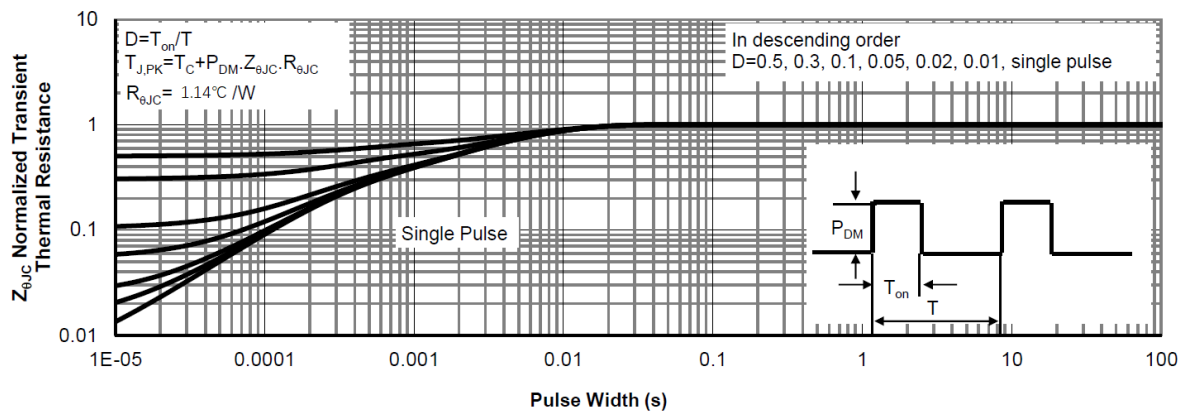
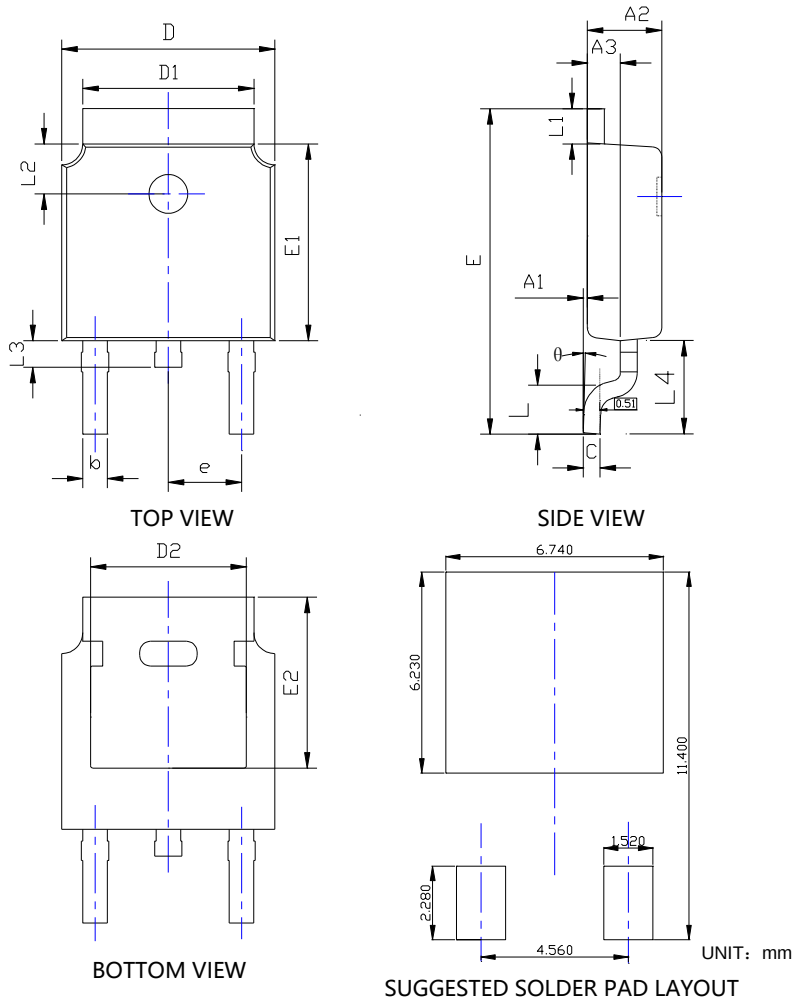


Figure13. Normalized Maximum Transient Thermal Impedance

■TO-252-B Package information



SYMBOL	DIMENSIONS					
	INCHES			Millimeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A1	0.000	---	0.008	0.000	---	0.200
A2	0.087	0.091	0.094	2.200	2.300	2.400
A3	0.035	0.039	0.043	0.900	1.000	1.100
b	0.026	0.030	0.034	0.660	0.760	0.860
c	0.018	0.020	0.023	0.460	0.520	0.580
D	0.256	0.260	0.264	6.500	6.600	6.700
D1	0.203	0.209	0.215	5.150	5.300	5.450
D2	0.181	0.189	0.195	4.600	4.800	4.950
E	0.390	0.398	0.406	9.900	10.100	10.300
E1	0.236	0.240	0.244	6.000	6.100	6.200
E2	0.203	0.209	0.215	5.150	5.300	5.450
e	0.090BSC			2.286BSC		
L	0.049	0.059	0.069	1.250	1.500	1.750
L1	0.035	---	0.050	0.900	---	1.270
L2	0.055	---	0.075	1.400	---	1.900
L3	0.240	0.310	0.039	0.600	0.800	1.000
L4	0.114REF			2.900REF		
θ	0°	---	10°	0°	---	10°

NOTE:

- 1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
- 2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
- 3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.

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