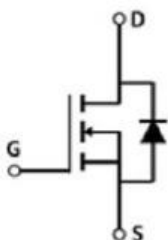


N-Channel Enhancement Mode Field Effect Transistor



TO-220

Product Summary

- V_{DS} 80V
- I_D 120A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) <4.8mohm
- 100% UIS Tested
- 100% ∇V_{DS} Tested

General Description

- Split gate trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Applications

- Battery protection
- Load switch
- Uninterruptible power supply

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

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	80	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}	480	A
Avalanche energy ^B		E_{AS}	702	mJ
Total Power Dissipation ^C	$T_C=25^\circ\text{C}$	P_D	190	W
	$T_C=100^\circ\text{C}$		75.8	
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	$^\circ\text{C}$

■ Thermal resistance

Parameter		Symbol	Limit	Units
Thermal Resistance Junction-to-Ambient ^D	$t \leq 10S$	$R_{\theta JA}$	16	$^\circ\text{C/W}$
	Steady-State		51.78	
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	0.66	$^\circ\text{C/W}$

■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
SCP120G08A	B1	SCP120G08A	50	/	5000	Tube

■ Electrical Characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250μA	80	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =80V,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	2.0	3.0	4.0	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	3.9	4.8	mΩ
Diode Forward Voltage	V _{SD}	I _S =20A,V _{GS} =0V	-	0.8	1.2	V
Maximum Body-Diode Continuous Current	I _S		-	-	120	A
Gate resistance	R _G	f=1MHz, Open drain	-	2	-	Ω
Transconductance	Gfs	VDS=10V,ID=50A		71.5		S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =40V,V _{GS} =0V,f=1MHZ	-	5666	-	pF
Output Capacitance	C _{oss}		-	860	-	
Reverse Transfer Capacitance	C _{rss}		-	7.5	-	
Switching Parameters						
Total Gate Charge	Q _g	VDS=40V , VGS=10V , ID=50A	-	73	-	nC
Gate-Source Charge	Q _{gs}		-	25	-	
Gate-Drain Charge	Q _{gd}		-	12	-	
Reverse Recovery Chrage	Q _{rr}	IF=50A , dI/dt=100A/us	-	50	-	ns
Reverse Recovery Time	t _{rr}		-	44	-	
Turn-on Delay Time	t _{D(on)}	VDS=40V , VGS=10V , RG=3Ω, ID=50A	-	27	-	
Turn-on Rise Time	t _r		-	32	-	
Turn-off Delay Time	t _{D(off)}		-	54	-	
Turn-off fall Time	t _f		-	17	-	

A. Repetitive rating; pulse width limited by max. junction temperature.

B. T_J=25°C, V_{DD}=50V, V_{GS}=10V, L=2mH I_{as}=26.5A.

C. P_d is based on max. junction temperature, using junction-case thermal resistance.

D. 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° C.

■ Typical Performance Characteristics

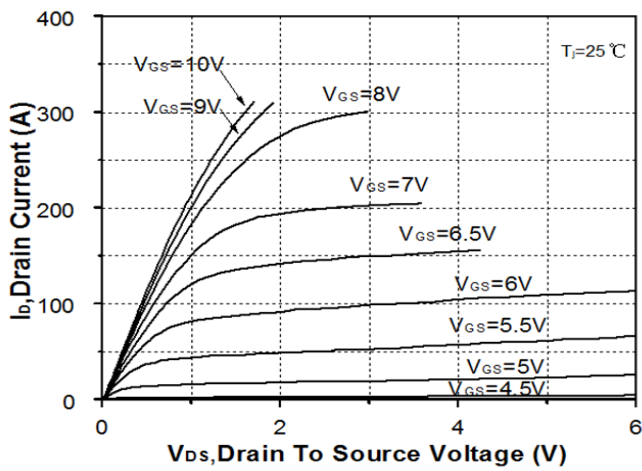


Figure1. Output Characteristics

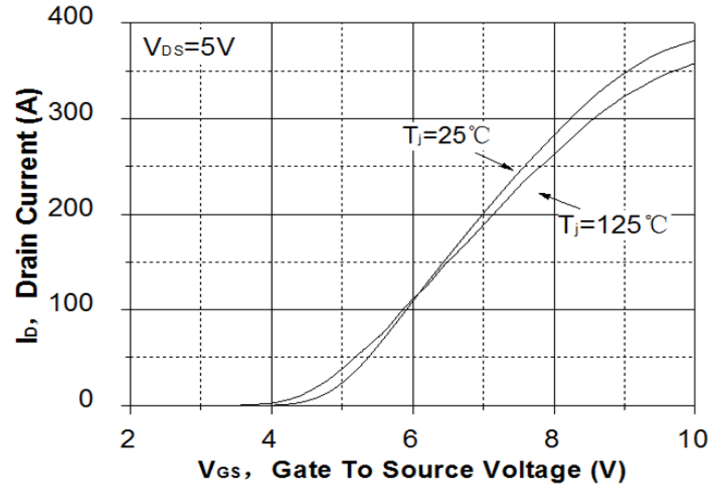


Figure2. Transfer Characteristics

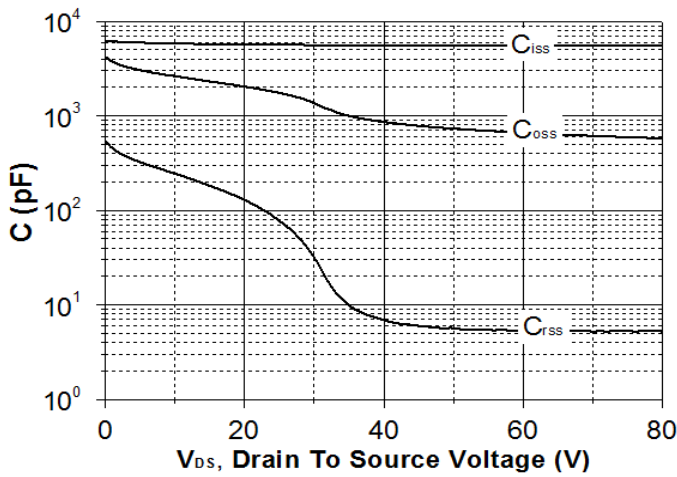


Figure3. Capacitance Characteristics

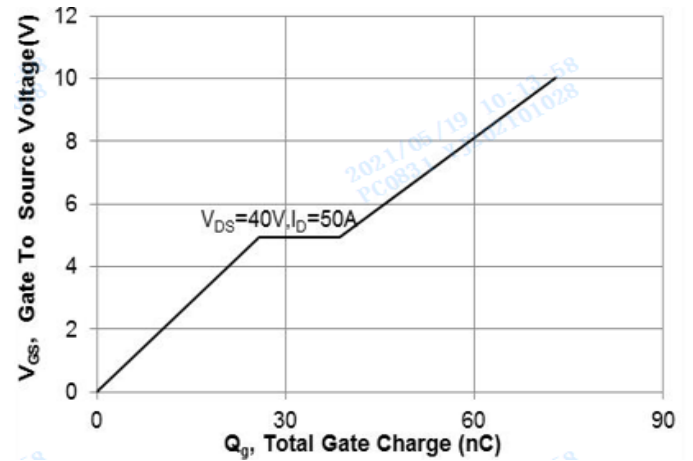


Figure4. Gate Charge

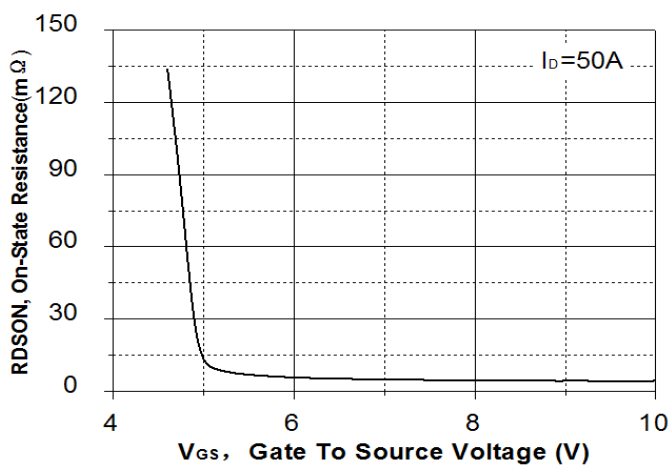


Figure5. On-Resistance vs. Gate to Source Voltage

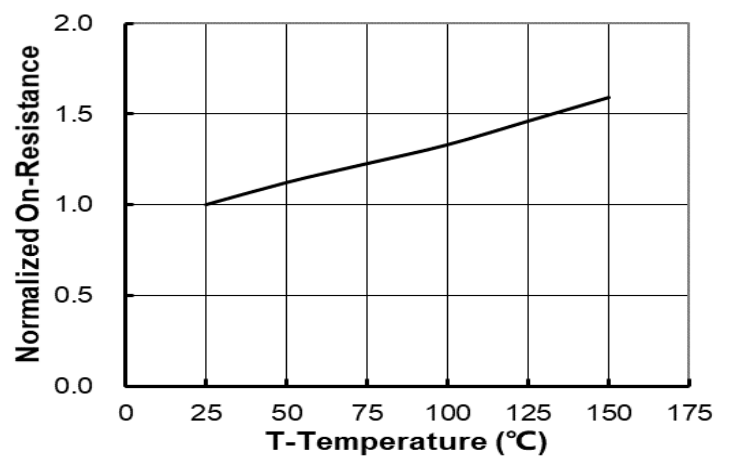


Figure6. Normalized On-Resistance

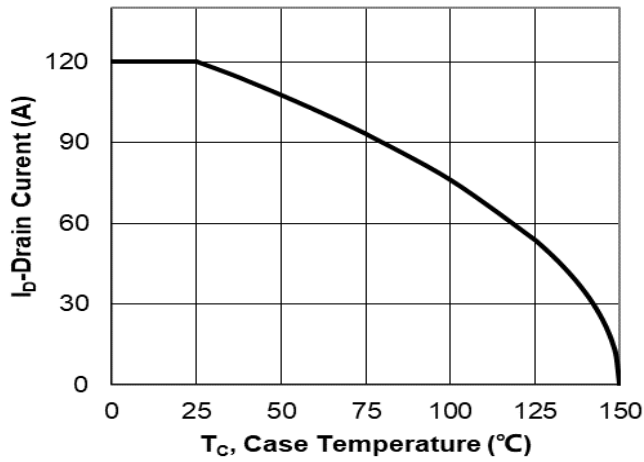


Figure7. Drain current

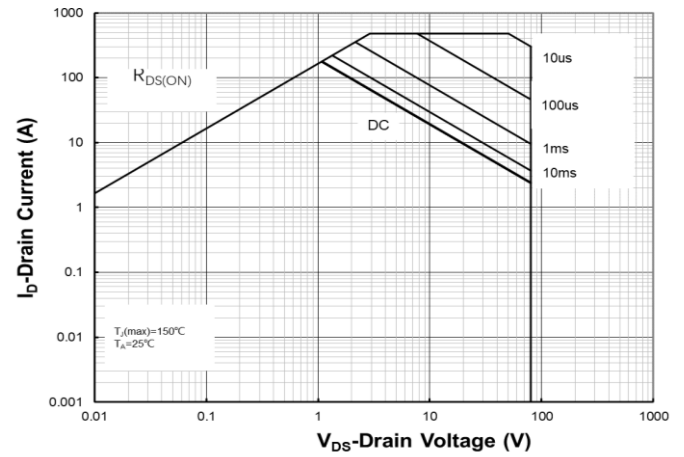


Figure8.Safe Operation Area

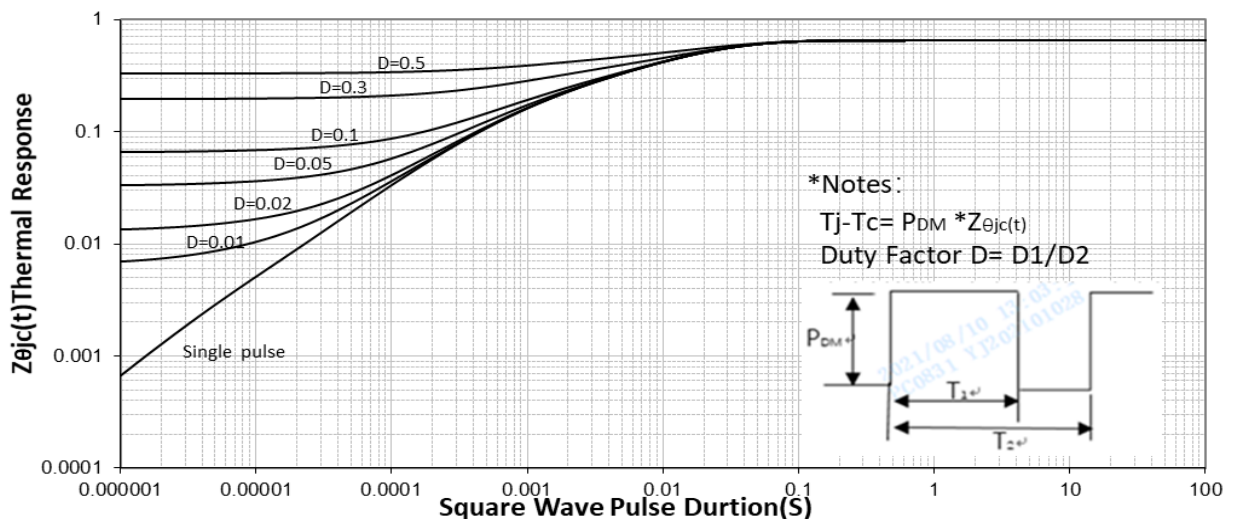
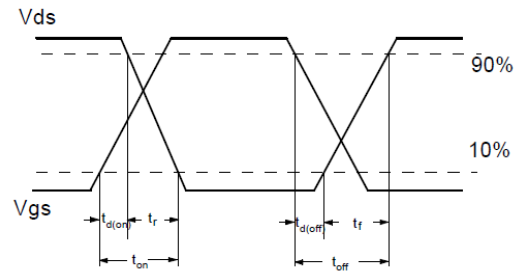
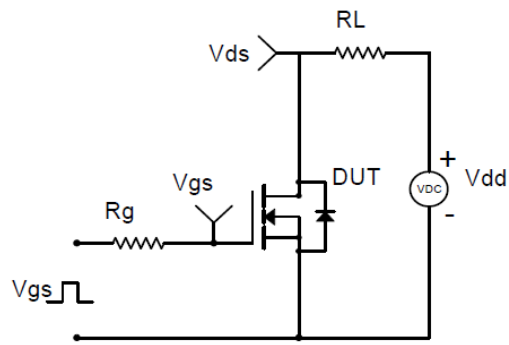
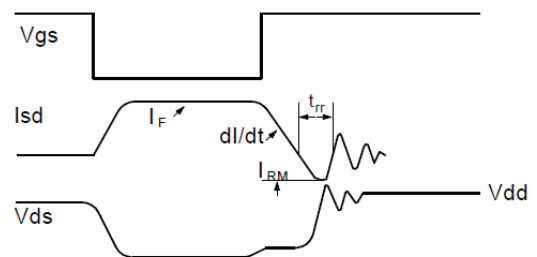
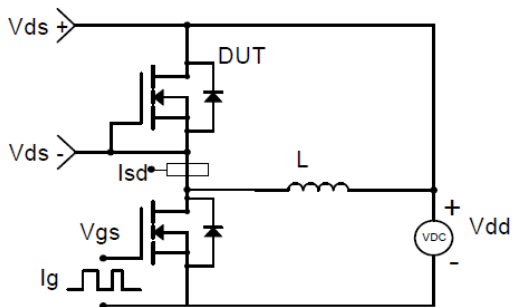


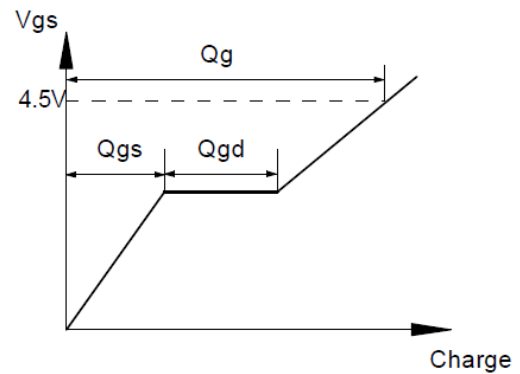
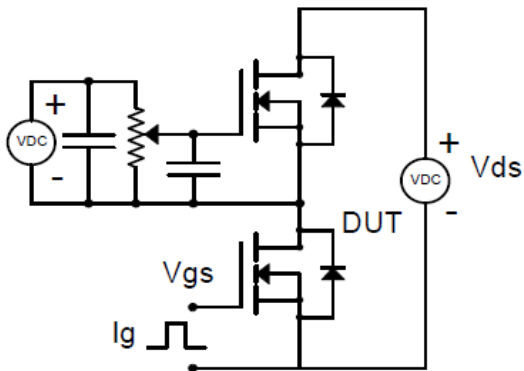
Figure9.Normalized Maximum Transient thermal impedance



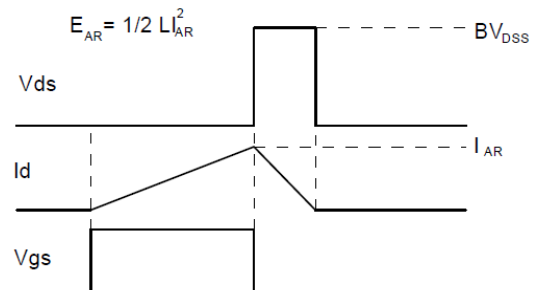
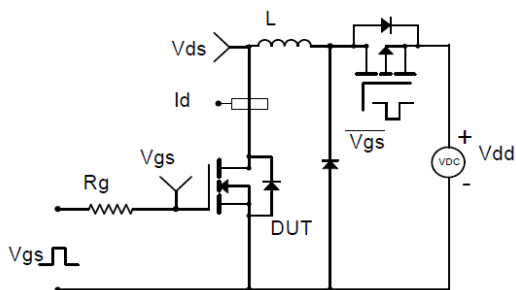
Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

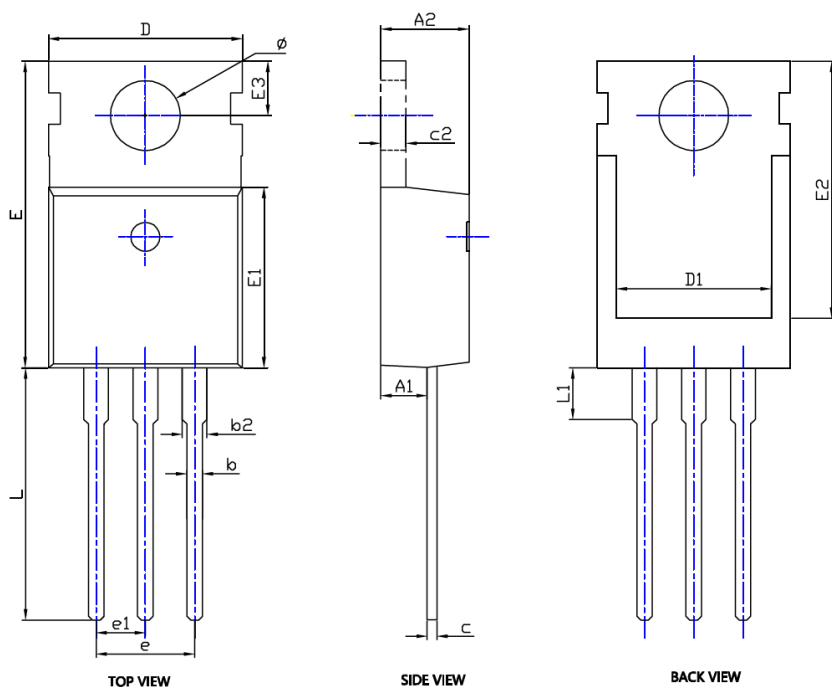


Gate Charge Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

■ TO-220AB-D Package information



SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A1	0.091	0.098	2.300	2.500
A2	0.175	0.183	4.450	4.650
b	0.030	0.033	0.750	0.850
b2	0.048	0.052	1.220	1.320
c	0.018	0.022	0.450	0.550
c2	0.050	0.052	1.270	1.330
D	0.386	0.402	9.800	10.200
D1	0.303	0.327	7.700	8.300
E	0.614	0.630	15.600	16.000
E1	0.360	0.372	9.150	9.450
E2	0.510	0.533	12.950	13.550
E3	0.110BSC		2.800BSC	
e	0.200BSC		5.080BSC	
e1	0.100BSC		2.540BSC	
L	0.506	0.518	12.850	13.150
L1	0.093	0.117	2.360	2.960
ø	0.138	0.146	3.500	3.700

NOTE:

- 1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
- 2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.

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