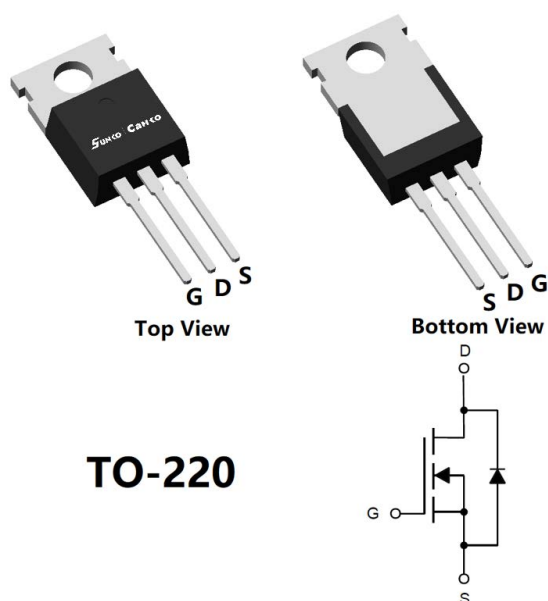


N-Channel Enhancement Mode Field Effect Transistor



TO-220

Product Summary

- V_{DS} 100V
- I_D 45A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) <17 mohm
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Low $R_{DS(on)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Fast switching and soft recovery
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

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

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	100	V
Gate-source Voltage		V_{GS}	± 20	V
Drain Current	$T_C=25^\circ\text{C}$	I_D	45	A
	$T_C=100^\circ\text{C}$		28.5	
Pulsed Drain Current ^A		I_{DM}	220	A
Avalanche energy ^B		EAS	77	mJ
Total Power Dissipation ^C	$T_C=25^\circ\text{C}$	P_D	100	W
	$T_C=100^\circ\text{C}$		40	
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	$^\circ\text{C}$

■ Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient ^D	$t \leq 10S$	$R_{\theta JA}$	12	15	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Ambient ^D	Steady-State		50	60	
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	1.0	1.25	

■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
SCP45G10B	B1	SCP45G10B	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	100			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V,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	2.8	4	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D =20A		14	17	mΩ
Diode Forward Voltage	V _{SD}	I _S =20A,V _{GS} =0V			1.3	V
Maximum Body-Diode Continuous Current	I _S				45	A
Gate resistance	R _G	f= 1 MHz, Open drain		1.2		Ω
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =50V,V _{GS} =0V,f=1MHZ		1135		pF
Output Capacitance	C _{oss}			399		
Reverse Transfer Capacitance	C _{rss}			18		
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V,V _{DS} =50V,I _D =25A		16		nC
Gate-Source Charge	Q _{gs}			5.6		
Gate-Drain Charge	Q _{gd}			2.4		
Reverse Recovery Chrage	Q _{rr}	I _F =20A, di/dt=100A/us		42		
Reverse Recovery Time	t _{rr}			39.8		
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =50V,I _D =25A R _{GEN} =2.2Ω		39.2		ns
Turn-on Rise Time	t _r			11		
Turn-off Delay Time	t _{D(off)}			53.2		
Turn-off fall Time	t _f			15.8		

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

B. V_{DD}=50V, R_G=25Ω, L=0.5mH, I_{AS}=17.5A,.

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

D. The value of R_{qJA} is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The Power dissipation PDSM is based on R_{qJA} ≤ 10s and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

■ Typical Performance Characteristics

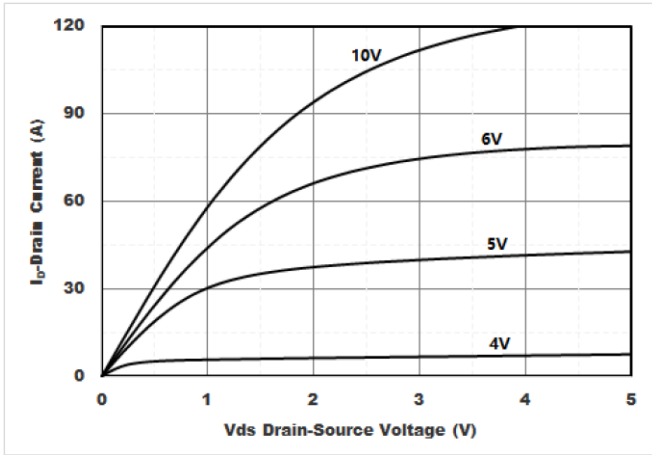


Figure1. Output Characteristics

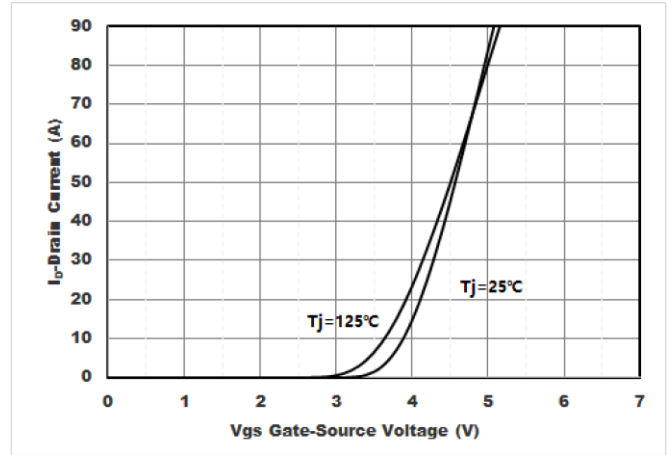


Figure2. Transfer Characteristics

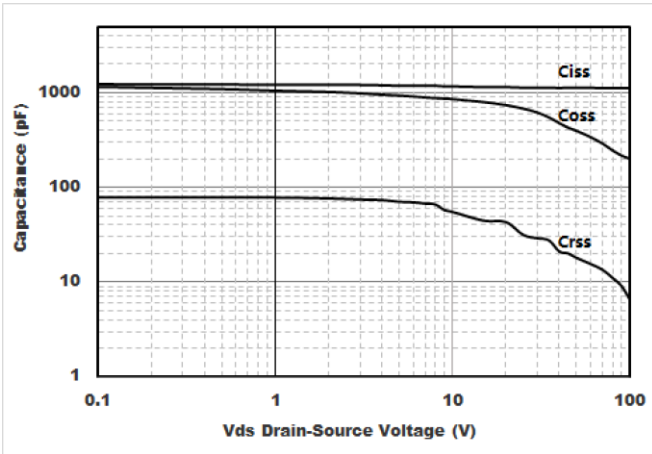


Figure3. Capacitance Characteristics

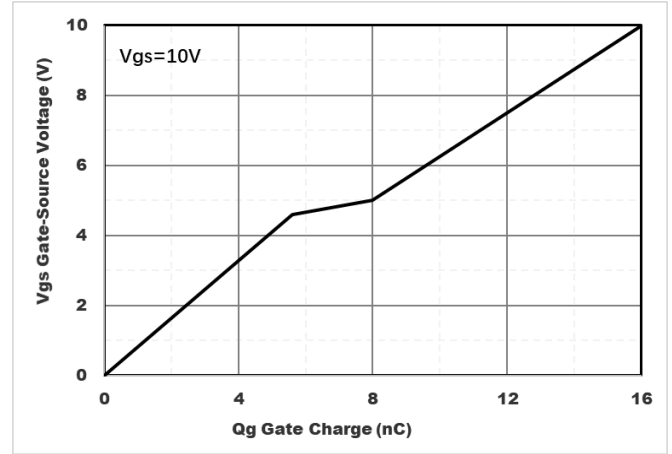


Figure4. Gate Charge

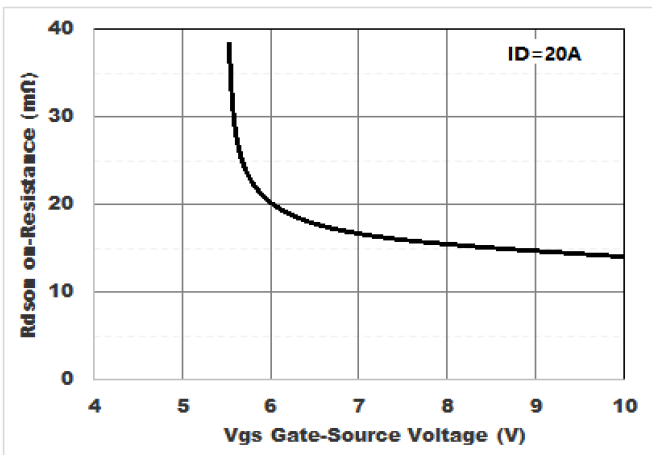


Figure5. : On-Resistance vs. Drain Current and Gate Voltage

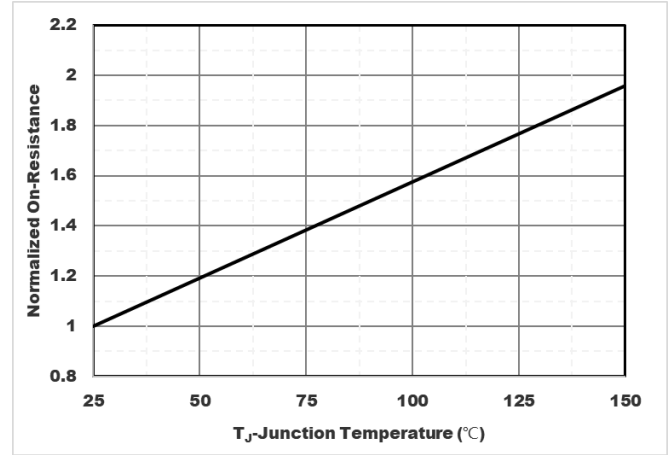


Figure6. Normalized On-Resistance

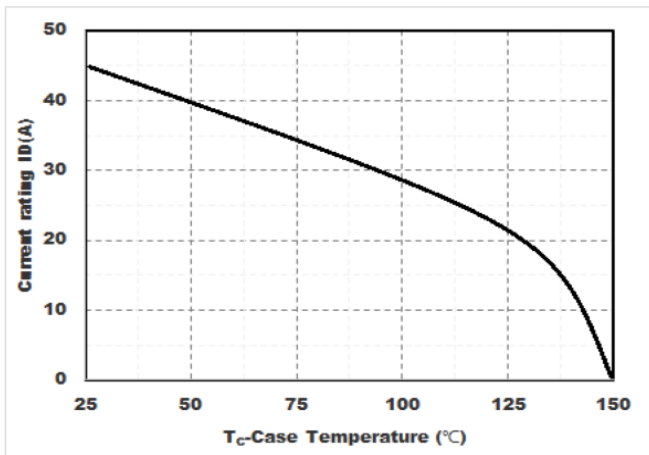


Figure7. Drain current

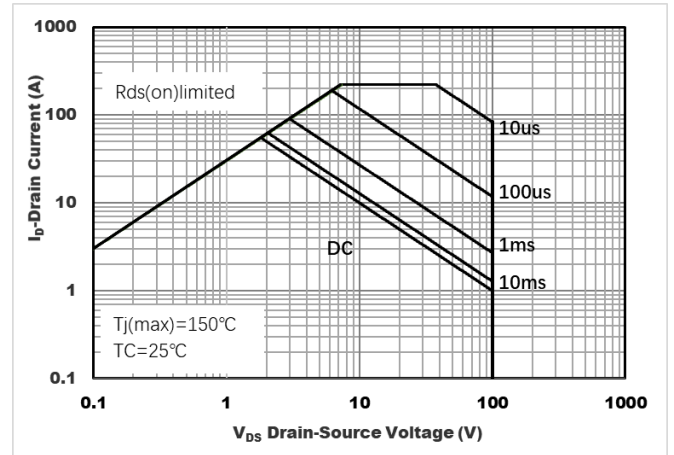


Figure8.Safe Operation Area

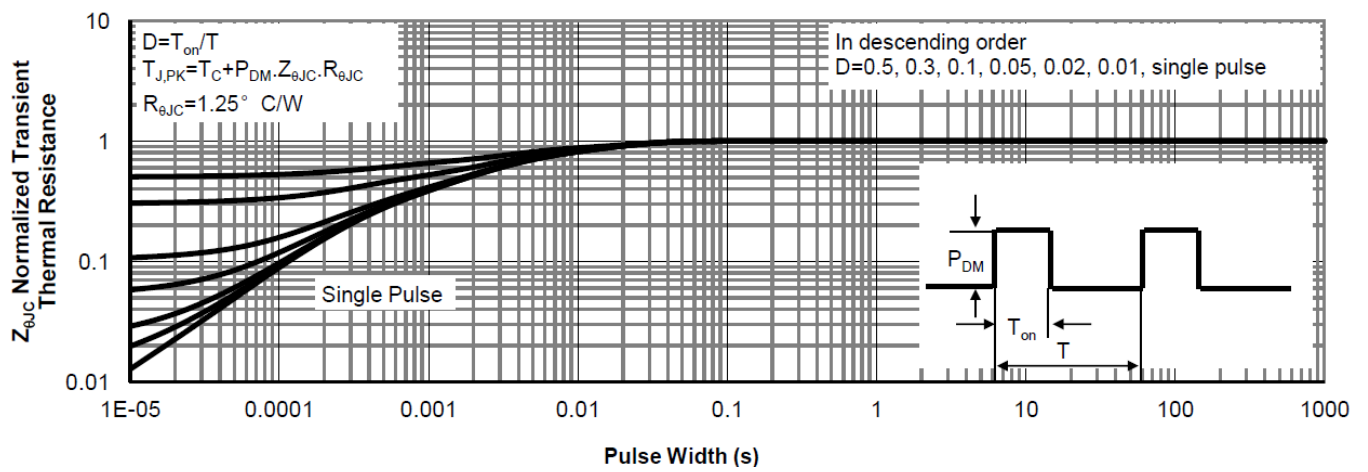
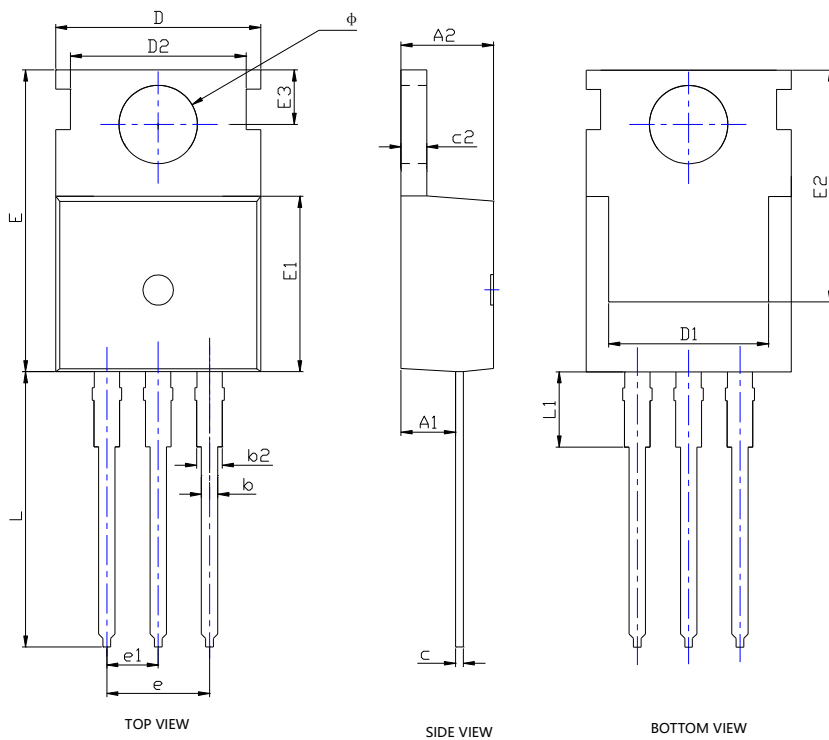


Figure9.Normalized Maximum Transient thermal impedance

■ TO-220AB-C Package information



SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A1	0.091	0.098	2.300	2.500
A2	0.173	0.181	4.400	4.600
b	0.028	0.035	0.700	0.900
b2	0.049	0.056	1.250	1.420
c	0.018	0.022	0.450	0.550
c2	0.049	0.053	1.250	1.350
D	0.382	0.402	9.700	10.200
D1	0.295	0.331	7.500	8.400
D2	0.335	0.350	8.500	8.900
E	0.602	0.634	15.300	16.100
E1	0.358	0.366	9.100	9.300
E2	0.497	0.525	12.630	13.330
E3	0.108BSC		2.750BSC	
e	0.200BSC		5.080BSC	
e1	0.100BSC		2.540BSC	
L	0.512	0.531	13.000	13.500
L1	---	0.138	---	3.500
ϕ	0.140	0.148	3.550	3.750

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

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