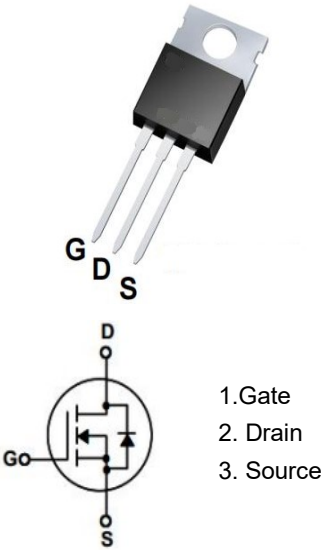




1.Features

- $R_{DS(ON)} \leq 4.5m\Omega$ @ $V_{GS}=10V$, $I_D=20A$
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Advanced SGT process
- Lead free product is acquired

TO-220



2.Mechanical Data

- Case:Molded Plastic,TO-220;
- Epoxy:UL 94V-0 rate flame retardant
- Terminals:Plated Leads Solderable per MIL-STD-750,Method-2026.
- Marking: marked on body.
- Mounting Position : Any.

3.Maximum Ratings and Electrical Characteristics

Rating at 25°C Cambient temperature unless otherwise specified

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	100	V
Drain Current (Package limit)	$T_C=25^{\circ}C$	I_D	130	A
	$T_C=100^{\circ}C$		119	
Drain Current (Silicon limit)	$T_C=25^{\circ}C$		183	
Drain Current Pulsed(Note 1)		I_{DM}	520	A
Gate-Source Voltage		V_{GS}	± 20	V
Power Dissipation($T_C=25^{\circ}C$)		P_D	250	W
Maximum Junction Temperature		T_J	150	$^{\circ}C$
Storage Temperature Range		T_{stg}	-55 to +150	$^{\circ}C$
Thermal Resistance, Junction-to-Case		$R_{\theta JC}$	0.5	$^{\circ}C/W$
Thermal Resistance, Junction-to- Ambient		$R_{\theta JA}$	50	$^{\circ}C/W$



Characteristics	Symbol	Test conditions	Min	TYP	Max	Unit
Off Characteristics						
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	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = 20V	-	-	100	nA
Gate-Source Leakage Current		V _{GS} = -20V	-	-	-100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS (th)}	V _{GS} = V _{DS} , I _D =250μA	1.2	1.8	2.5	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A	-	3.4	4.5	mΩ
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =50V	-	3454	-	pF
Output Capacitance	C _{oss}	V _{GS} =0V	-	1545	-	
Reverse Transfer Capacitance	C _{rss}	f=1.0MHZ	-	76	-	
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =50V, V _{GS} =10V R _G =3Ω; I _D =50A	-	14.5	-	ns
Turn-on Rise Time	t _r		-	20.1	-	
Turn-off Delay Time	t _{d(off)}		-	58	-	
Turn-off Fall Time	t _f		-	31.8	-	
Total Gate Charge	Q _g	V _{DS} =50V, V _{GS} =10A I _D =50A	-	70	-	nC
Gate-Source Charge	Q _{gs}		-	16	-	
Gate-Drain Charge	Q _{gd}		-	28	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage	V _{SD}	I _S =20A,V _{GS} =0V	-	0.8	1.4	V
Continuous Source Current	I _S		-	-	130	A
Reverse Recovery Time	trr	I _{SD} =20A, di/dt=100A/μs	-	65	-	ns
Reverse Recovery Charge	Qrr		-	89	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
3. Essentially independent of operating temperature



4. Rating And Characteristic Curves

Fig.1 Output Characteristics

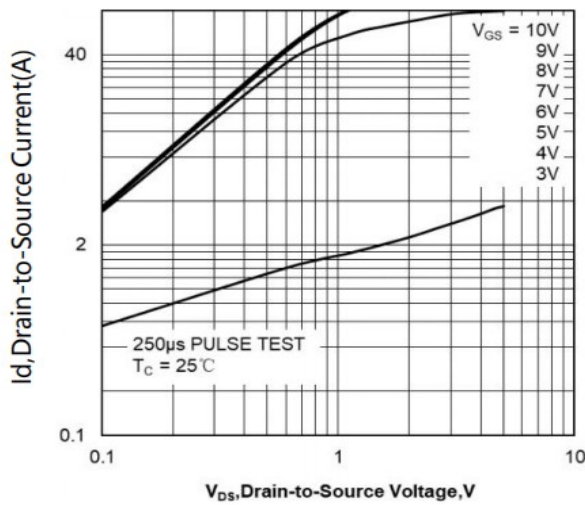


Fig.2 Transfer Characteristics

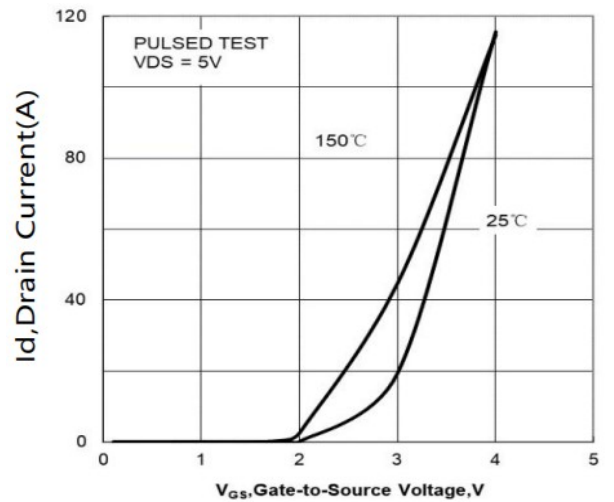


Fig.3 On-Resistance versus Drain Current

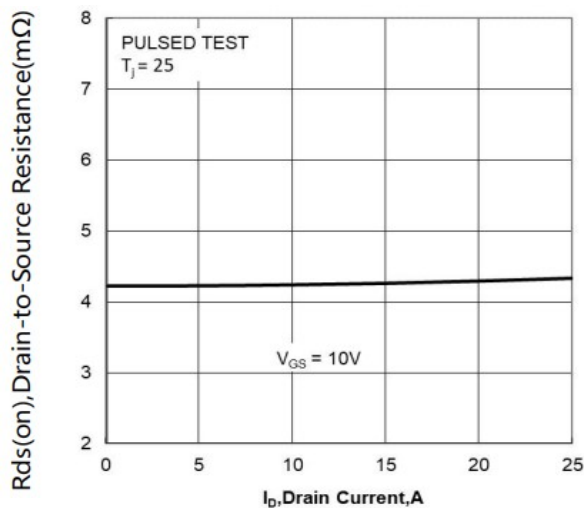


Fig.4 Diode forward voltage versus Current

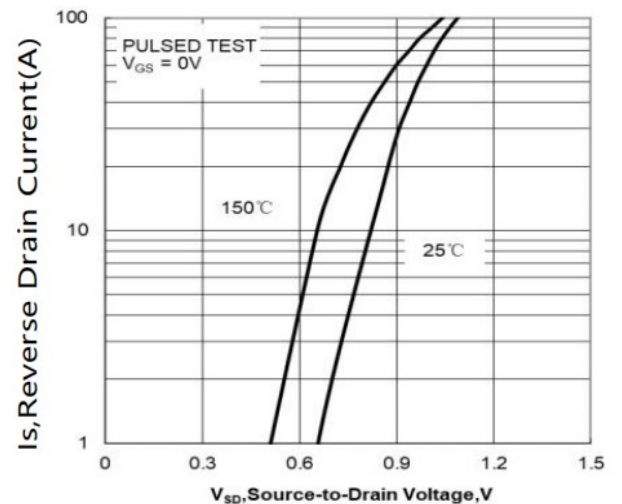


Fig.5 Typical Capacitance versus VDS

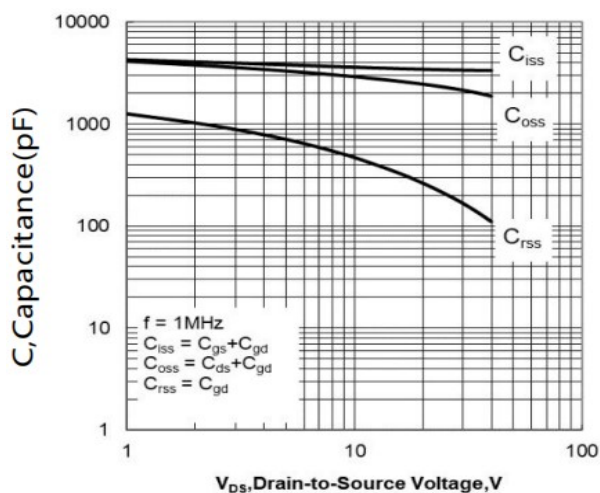


Fig.6 Typical Gate Charge versus VGS

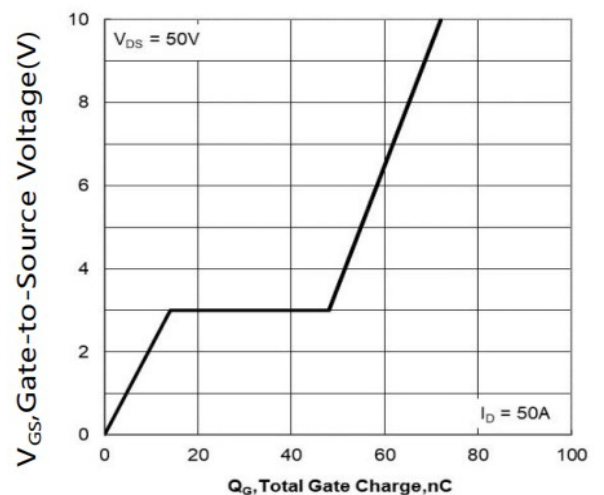




Fig.7 BV_{DSS} Variation with Temperature

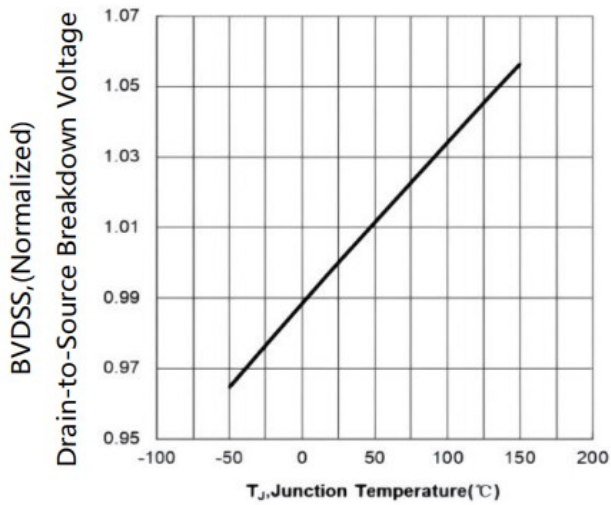


Fig.8 On-Resistance Variation with Temperature

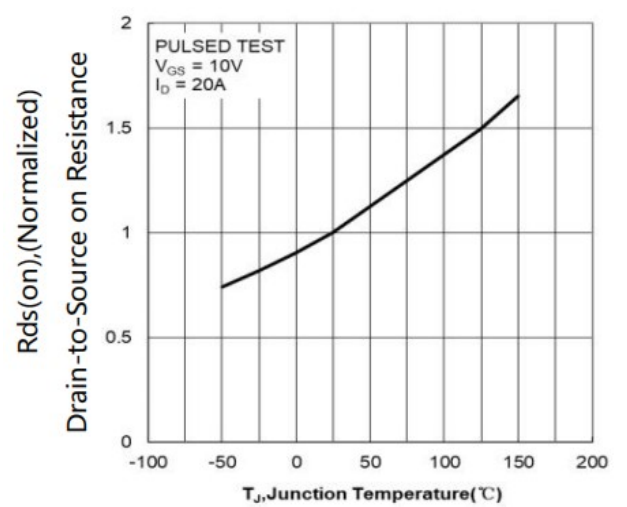


Fig.9 Maximum Safe Operating Area

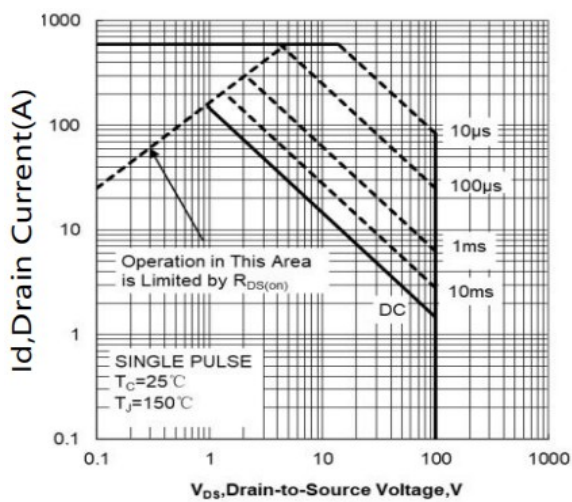
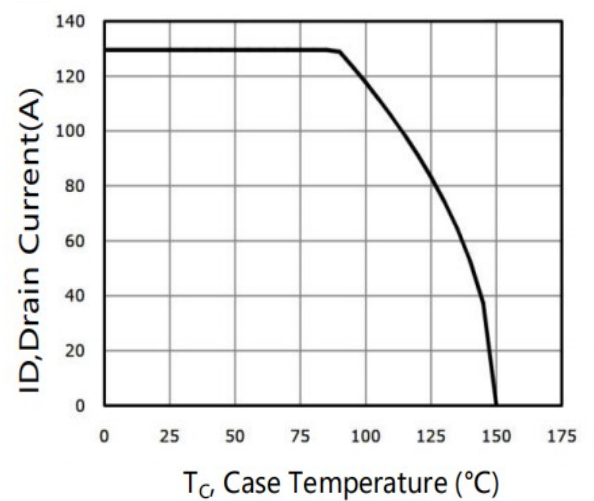


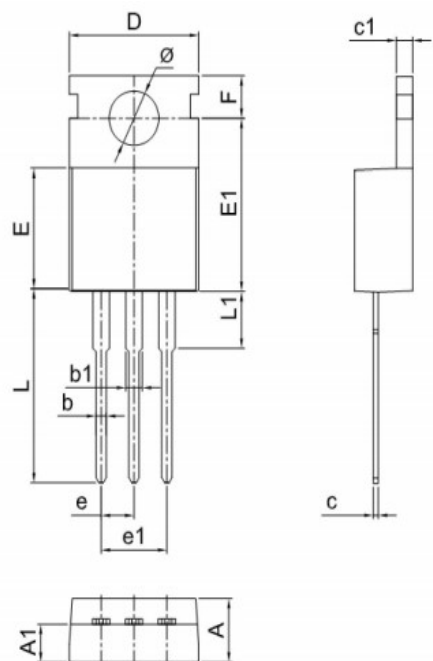
Fig.10 Continuous Drain Current vs Case Temperature





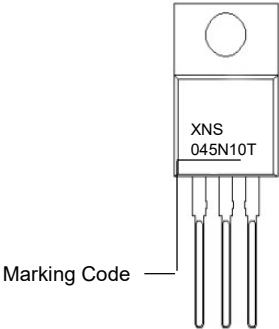
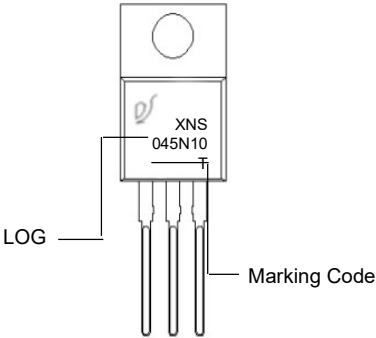
5.Dimensions

TO-220 Mechanical Drawing



Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.169	0.181	4.30	4.60
A1	0.098	0.110	2.50	2.80
b	0.028	0.035	0.70	0.90
b1	0.047	0.059	1.20	1.50
c	0.012	0.024	0.30	0.60
c1	0.045	0.055	1.15	1.40
D	0.390	0.402	9.90	10.20
E	0.335	0.354	8.50	9.00
E1	0.472	0.492	12.00	12.50
e	0.094	0.104	2.40	2.65
e1	0.191	0.209	4.85	5.30
F	0.102	0.110	2.60	2.80
L	0.520	0.543	13.20	13.80
L1	0.150	0.165	3.80	4.20
Ø	0.142	0.157	3.60	4.00

6. Part Marking System

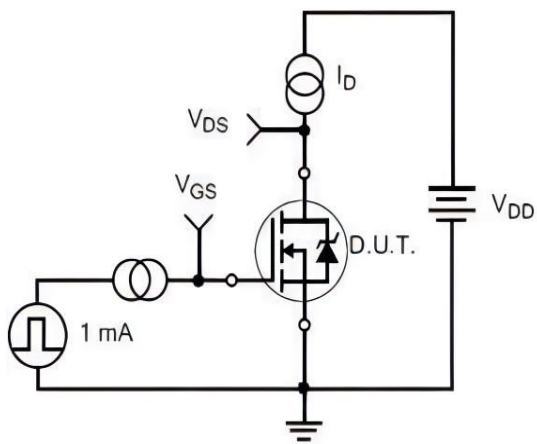


7. Package Information

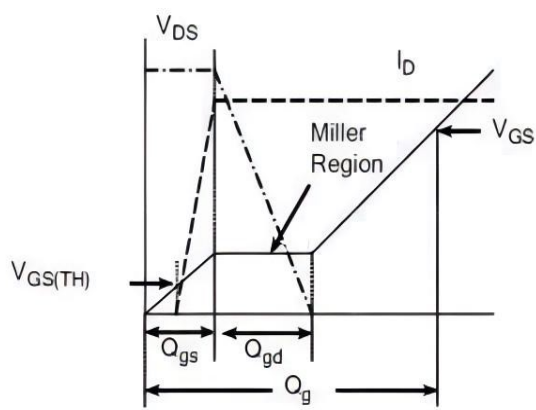
Package	Packing Type	Quantity(pcs)
TO-220	Tube	50



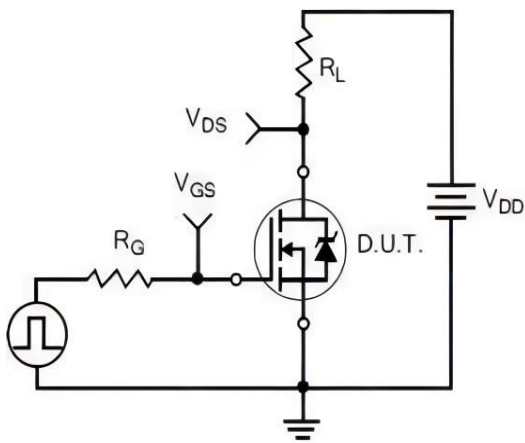
8.Test circuits



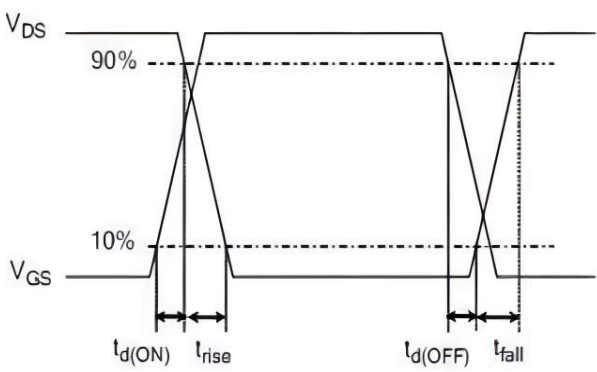
Gate Charge Test Circuit



Gate Charge Waveform



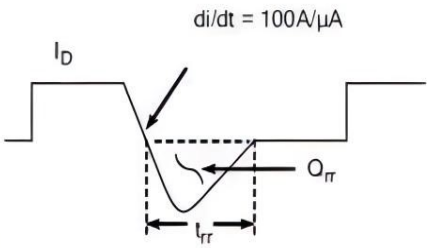
Resistive Switching Test Circuit



Resistive Switching Waveforms

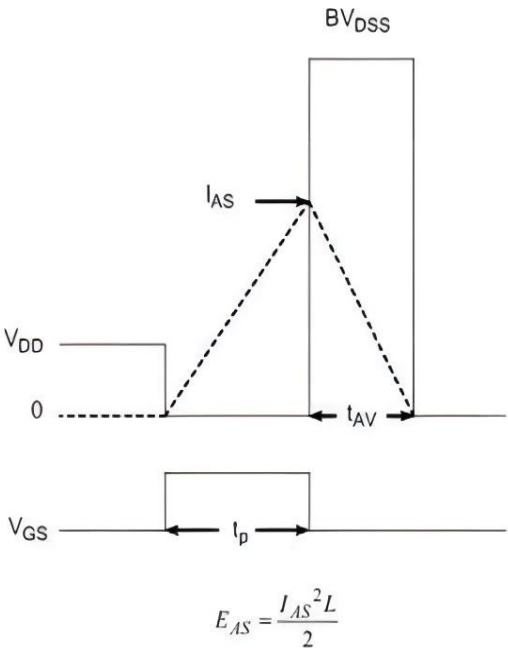


100V 183A N-CHANNEL POWER MOSFET



Diode Reverse Recovery Test Circuit

Diode Reverse Recovery Waveform



Unclamped Inductive Switching Test Circuit

Unclamped Inductive Switching Waveforms



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