



XTMS65R220D

650V N-ch Planar MOSFET

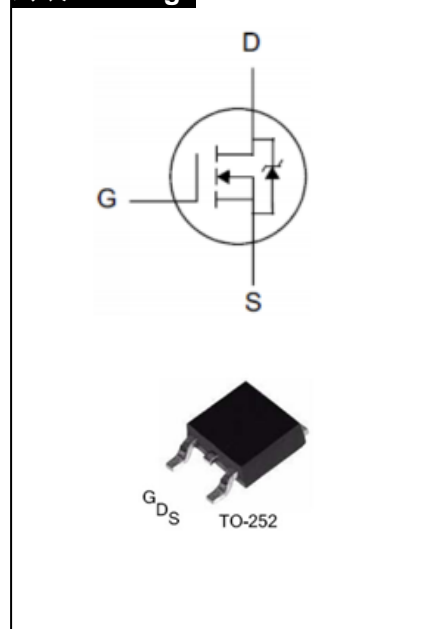
Product Description

BV_{DSS}	650	V
I_D	15	A
$R_{DS(ON),Typ.}$	0.22	Ω

General Features

- New revolutionary high voltage technology
- $R_{DS(ON),typ.}=0.22\Omega@V_{GS}=10V$
- High peak current capability
- Ultra low Gate Charge
- Periodic avalanche rated

封装 Package



Device	Package	Marking
XTMS65R220D	TO-252	XTMF65R220D

Absolute Maximum Ratings $T_j=25^\circ\text{C}$

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Voltage	650	V
V_{GSS}	Gate-to-Source Voltage	± 30	
I_D	Continuous Drain Current	15	A
I_{DM}	Pulsed Drain Current at $V_{GS}=10V$	60	
E_{AS}	Single Pulse Avalanche Energy	304	mJ
P_D	Power Dissipation	131	W
	Derating Factor above 25°C	1.05	W/ $^\circ\text{C}$
$T_J \& T_{STG}$	Operating and Storage Temperature Range	-55 to 150	$^\circ\text{C}$

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.



Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.95	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62	$^{\circ}C/W$

Electrical Characteristics $T_j=25^{\circ}C$

OFF Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
BV_{DSS}	Drain-to-Source Breakdown Voltage	650	-	-	V	$V_{GS}=0V, I_D=250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	-	-	1.0	μA	$V_{DS}=650V, V_{GS}=0V$
I_{GSS}	Gate-to-Source Leakage Current	-	-	+100	nA	$V_{GS}=+30V, V_{DS}=0V$
		-	-	-100		$V_{GS}=-30V, V_{DS}=0V$

ON Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	-	0.22	0.26	Ω	$V_{GS}=10V, I_D=8A$
$V_{GS(TH)}$	Gate Threshold Voltage	3	3.5	4	V	$V_{DS}=V_{GS}, I_D=250\mu A$

**Dynamic Characteristics**

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
C_{iss}	Input Capacitance	-	1210	1400	pF	$V_{GS}=0V,$ $V_{DS}=50V,$ $f=1.0MHz$
C_{rss}	Reverse Transfer Capacitance	-	0.2	-		
C_{oss}	Output Capacitance	-	74	-		
Q_g	Total Gate Charge	-	24.7	-	nC	$V_{DD}=480V,$ $I_D=15A, V_{GS}=10V$
Q_{gs}	Gate-to-Source Charge	-	8.2	-		
Q_{gd}	Gate-to-Drain (Miller) Charge	-	8.5	-		

Resistive Switching Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$t_{d(ON)}$	Turn-on Delay Time	-	14	-	ns	$V_{DD}=380V,$ $I_D=8A,$ $V_{GS}=10V$ $R_g=2.3\Omega$
t_{rise}	Rise Time	-	8	-		
$t_{d(OFF)}$	Turn-Off Delay Time	-	55	-		
t_{fall}	Fall Time	-	7	-		

Source-Drain Body Diode Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
V_{SD}	Diode Forward Voltage	-	-	1.2	V	$I_S=15A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	-	240	-	ns	$V_{GS}=0V, I_S=7.5A,$ $di/dt=100A/\mu s$
Q_{rr}	Reverse Recovery Charge	-	2	-	μC	

[1] Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$



Typical Characteristics

Figure1. Safe operating area

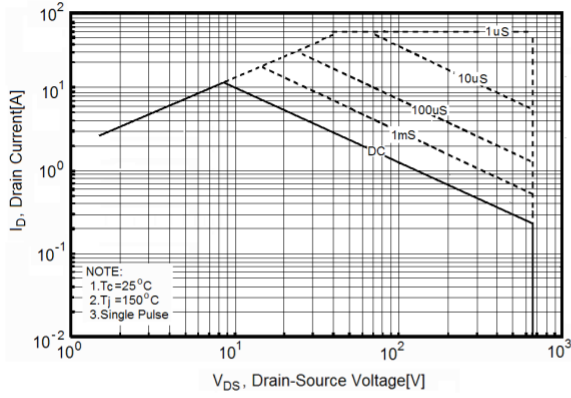


Figure2. Safe operating area for TO-220F

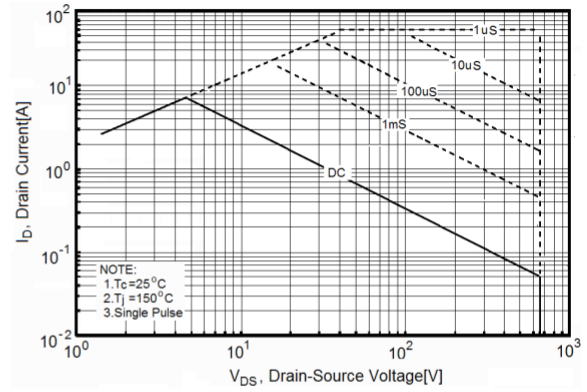


Figure3. Source-Drain Diode Forward Voltage

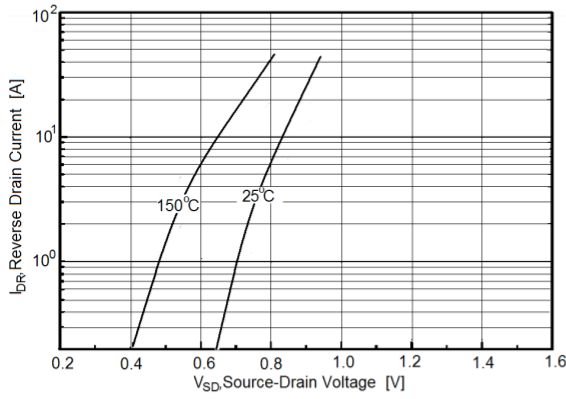


Figure4. Output characteristics

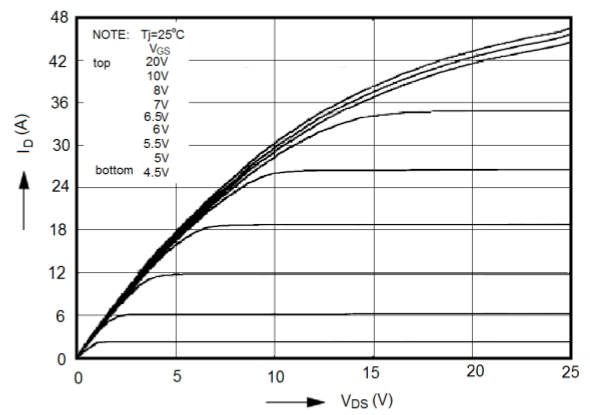


Figure5. Transfer characteristics

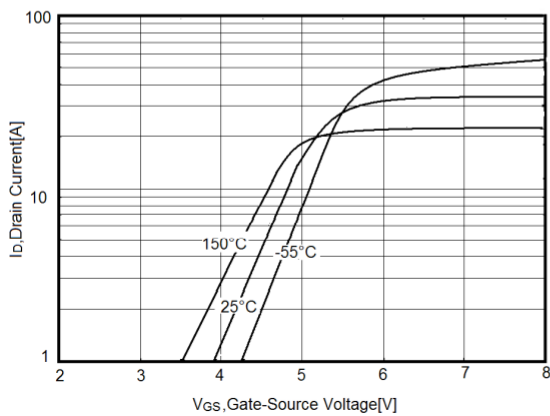
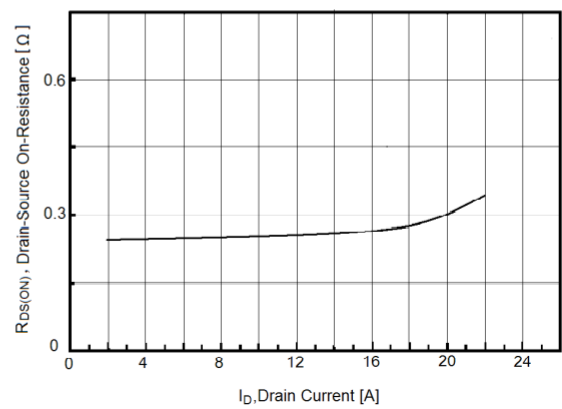


Figure6. Static drain-source on resistance





Typical Characteristics(Cont.)

Figure7. $R_{DS(ON)}$ vs Junction Temperature

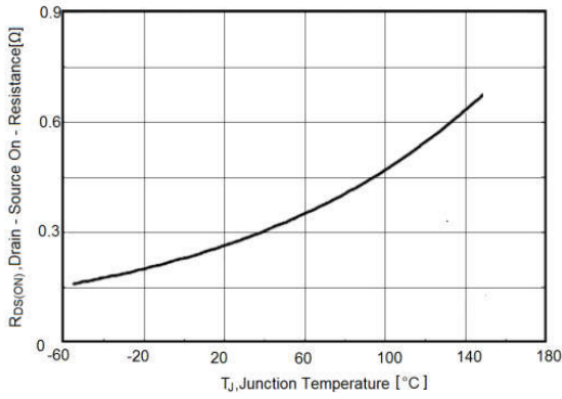


Figure8. BV_{DSS} vs Junction Temperature

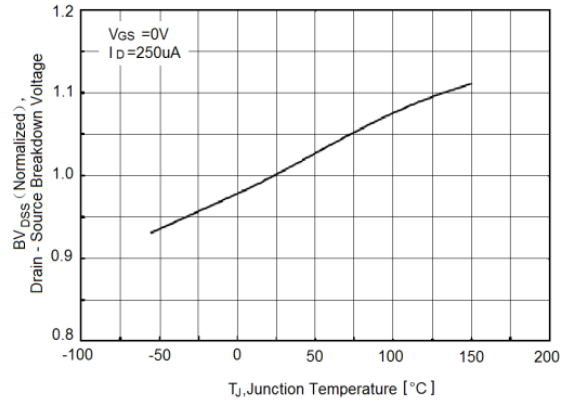


Figure9. Maximum I_D vs Junction Temperature

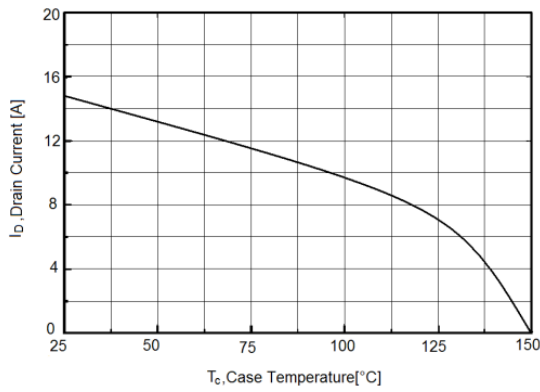


Figure10. Gate charge waveforms

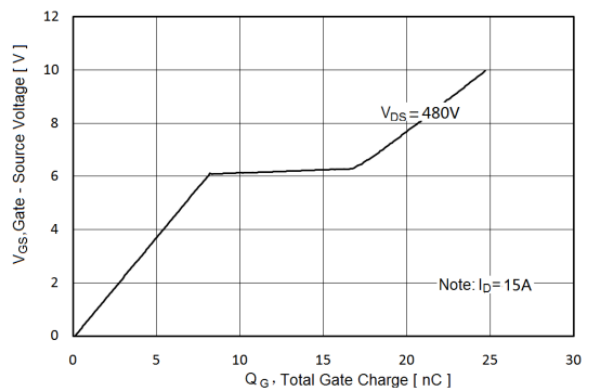


Figure11. Capacitance

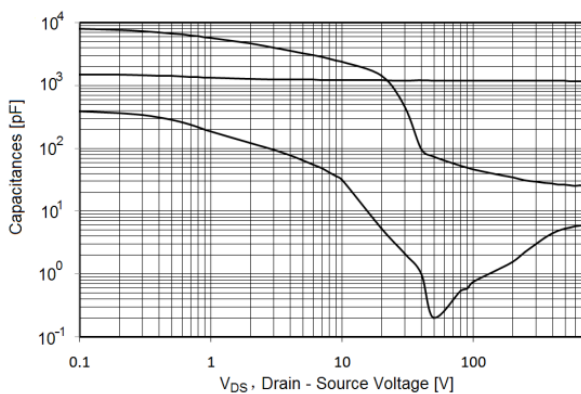
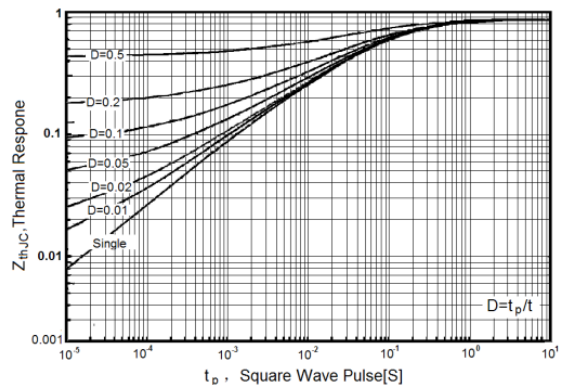


Figure12. Transient Thermal Impedance





Test Circuits and Waveforms

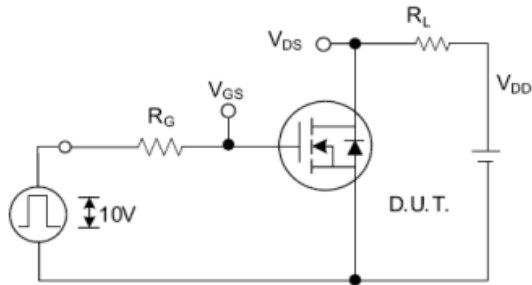


Fig. 2.1 Switching Test Circuit

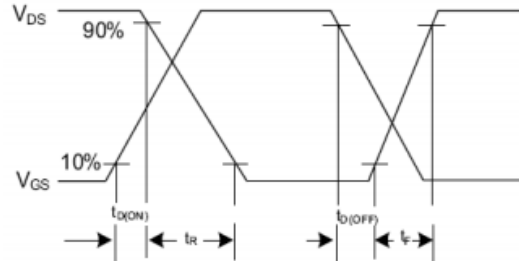


Fig. 2.2 Switching Waveforms

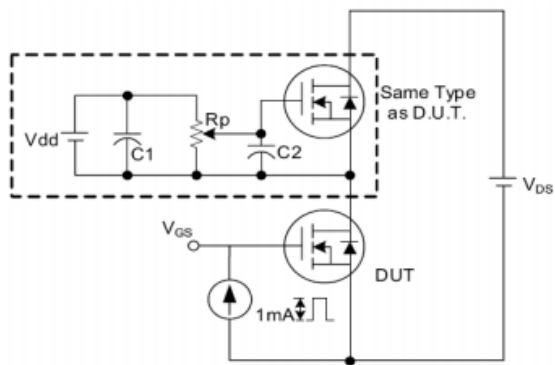


Fig. 3. 1 Gate Charge Test Circuit

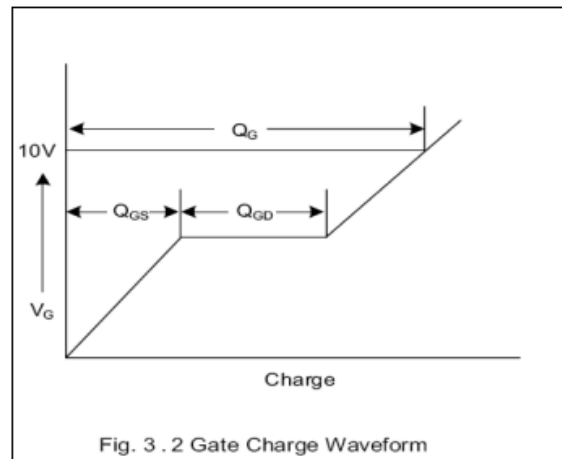


Fig. 3. 2 Gate Charge Waveform

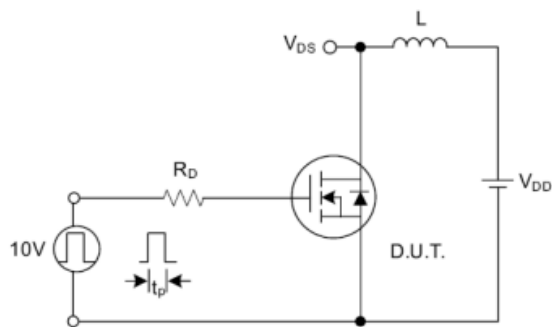


Fig. 4.1 Unclamped Inductive Switching Test Circuit

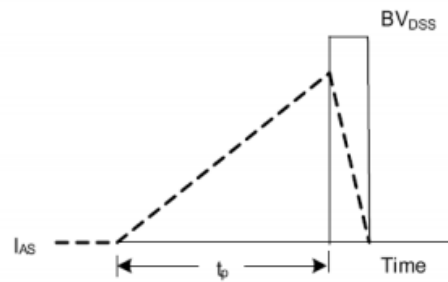


Fig. 4.2 Unclamped Inductive Switching Waveforms