



# XTMS65R330F(F1)

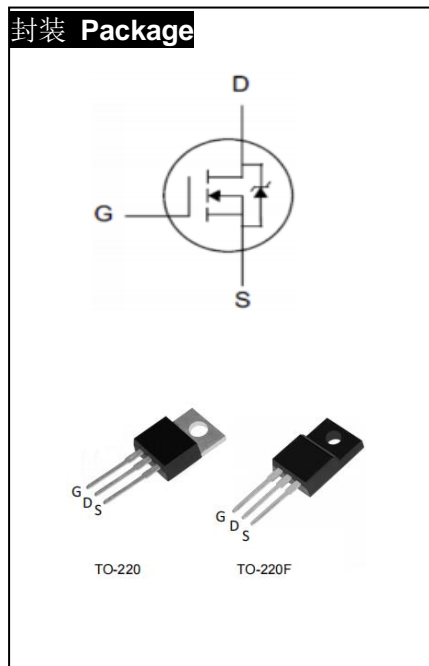
## 650V N-ch Planar MOSFET

### Product Description

$BV_{DSS}$	650	V
$I_D$	11	A
$R_{DS(ON),Typ.}$	0.33	$\Omega$

### General Features

- New revolutionary high voltage technology
- $R_{DS(ON),typ.}=0.33\Omega@V_{GS}=10V$
- High peak current capability
- Ultra low Gate Charge
- Periodic avalanche rated



Device	Package	Marking
XTMS65R330F1	TO-220	XTMS65R330F1
XTMS65R330F	TO-220F	XTMS65R330F

### 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	$\pm 30$	
$I_D$	Continuous Drain Current	11	A
$I_D$	Continuous Drain Current( $T_C=100^\circ\text{C}$ )	7	
$I_{DM}$	Pulsed Drain Current at $V_{GS}=10V$	44	
$E_{AS}$	Single Pulse Avalanche Energy	250	mJ
$P_D$	Power Dissipation	35	W
	Derating Factor above $25^\circ\text{C}$	0.28	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	3.57	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	$^{\circ}C/W$

**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	$\mu A$	$V_{DS}=650V, V_{GS}=0V$
$I_{GSS}$	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	-	0.33	0.4	$\Omega$	$V_{GS}=10V, I_D=5.5A$
$V_{GS(TH)}$	Gate Threshold Voltage	2.0	-	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$



## Dynamic Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$C_{iss}$	Input Capacitance	-	632	-	pF	$V_{GS}=0V,$ $V_{DS}=100V,$ $f=1.0MHz$
$C_{rSS}$	Reverse Transfer Capacitance	-	2.3	-		
$C_{oss}$	Output Capacitance	-	37	-		
$Q_g$	Total Gate Charge	-	23	-	nC	$V_{DD}=520V,$ $I_D=11A, V_{GS}=10V$
$Q_{gs}$	Gate-to-Source Charge	-	5.3	-		
$Q_{gd}$	Gate-to-Drain (Miller) Charge	-	11	-		

## Resistive Switching Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$t_{d(ON)}$	Turn-on Delay Time	-	12	-	ns	$V_{DD}=325V,$ $I_D=11A,$ $V_{GS}=10V$ $R_g=24\Omega$
$t_{rise}$	Rise Time	-	35	-		
$t_{d(OFF)}$	Turn-Off Delay Time	-	64	-		
$t_{fall}$	Fall Time	-	31	-		

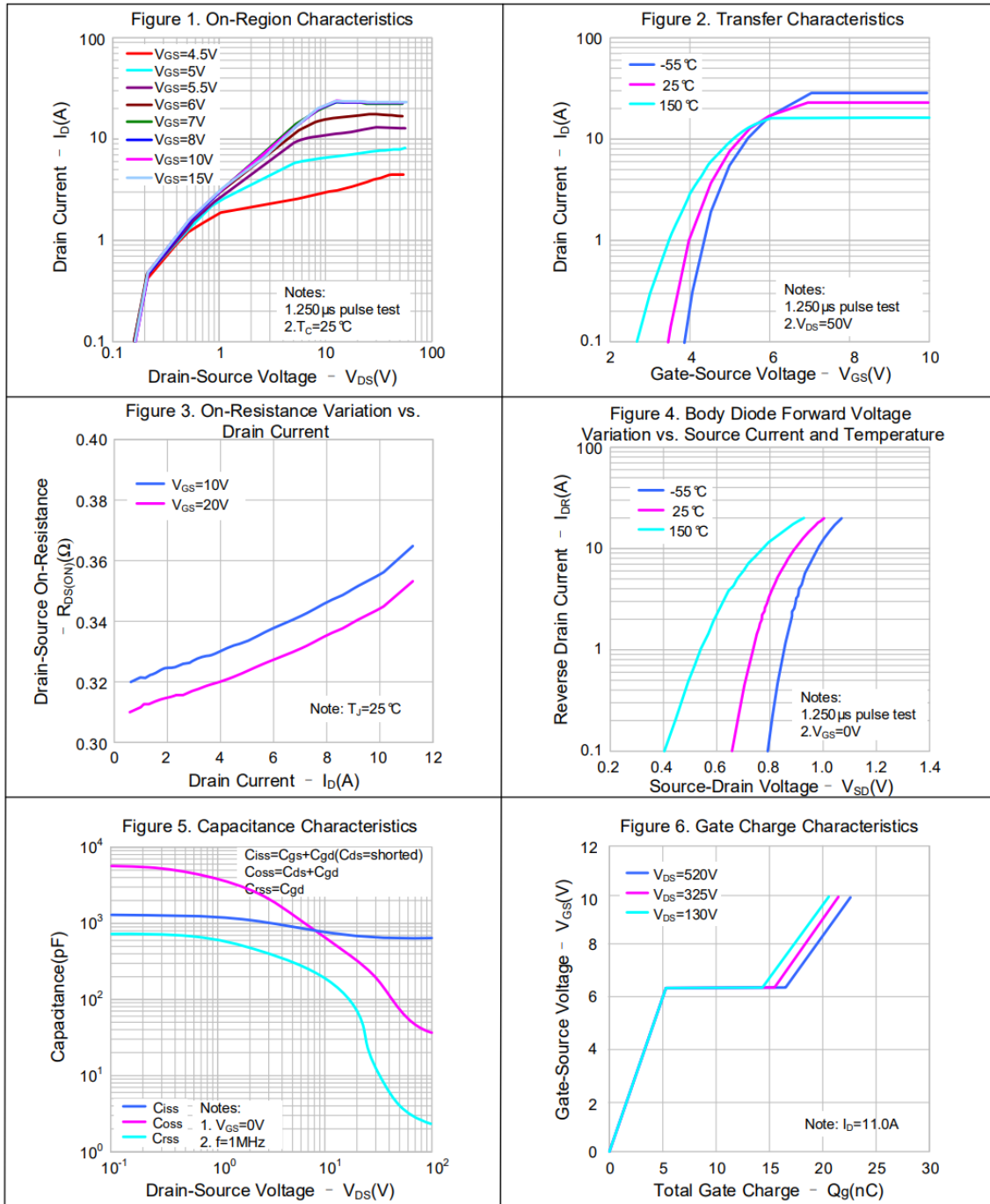
## Source-Drain Body Diode Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$V_{SD}$	Diode Forward Voltage	-	-	1.4	V	$I_S=11A, V_{GS}=0V$
$t_{rr}$	Reverse Recovery Time	-	361	-	ns	$V_{GS}=0V, I_S=11A,$ $di/dt=100A/\mu s$
$Q_{rr}$	Reverse Recovery Charge	-	3.9	-	uC	

[1] Pulse width $\leq 380\mu s$ ; duty cycle $\leq 2\%$

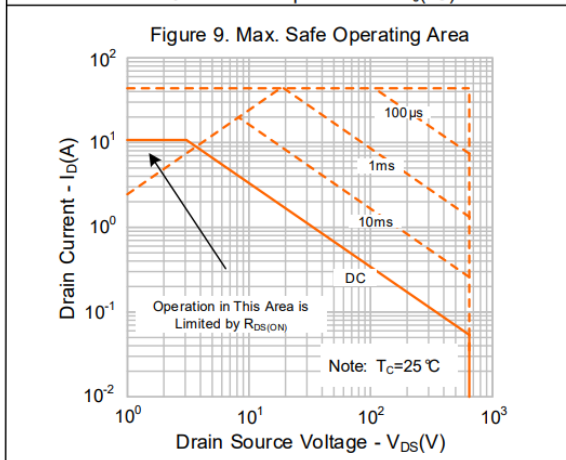
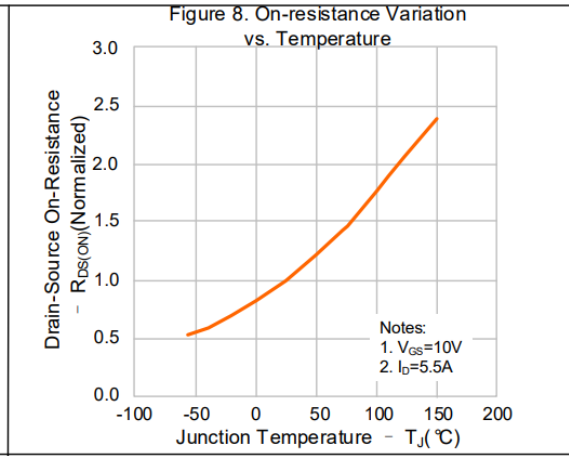
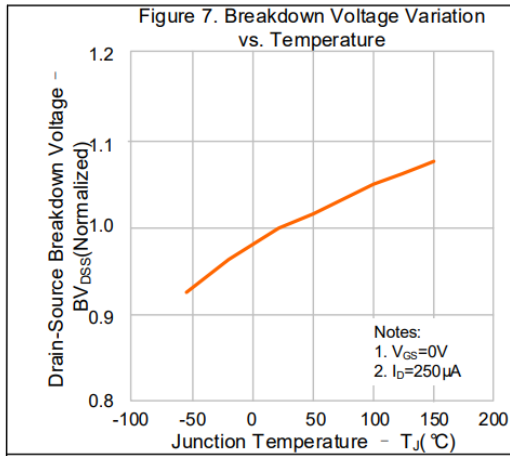


## Typical Characteristics





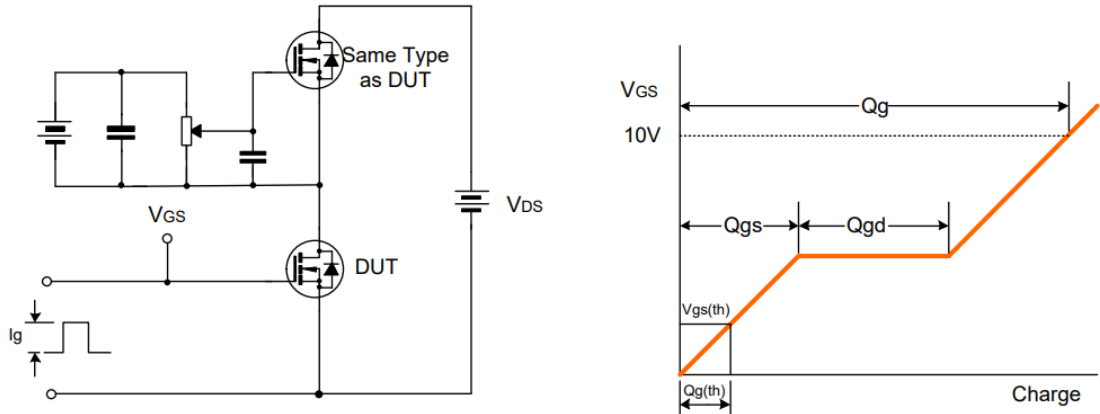
Typical Characteristics(Cont.)



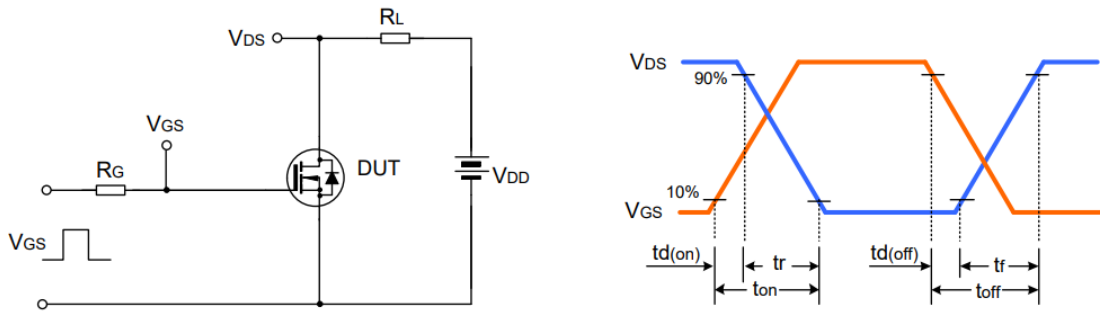


Test Circuits and Waveforms

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform

