CQTP52N20T

200V N-Channel MOSFET

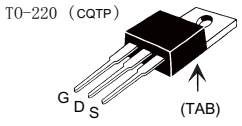
Key Parameters		
V_{DS} max	200	V
$V_{DS\ (Avalanche)}$ typ.	230	V
$R_{DS(ON)}$ typ. @ 10V	38	mΩ
I_{D25} max @ T = 25°C	210	A
I_{RP} max @ T_C= 100°C	105	A
T_J max	155	°C

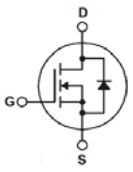
General Description

This Power MOSFET is specifically designed for Sustain; Energy Recovery & Pass switch applications in Plasma Display Panels. This MOSFET utilizes the latest processing techniques to achieve low on-resistance per silicon area and low EpULSE rating. Additional features of this MOSFET are 155°C

Features

- Advanced Process Technology
- Key Parameters Optimized for PDP Sustain, Energy Recovery and Pass Switch Applications
- Low E_{PULSE} Rating to Reduce Power Dissipation in PDP Sustain, Energy Recovery and Pass Switch Applications
- Low Q_G for Fast Response
- High Repetitive Peak Current Capability for Reliable Operation
- Short Fall & Rise Times for Fast Switching
- Repetitive Avalanche Capability for Robustness and Reliability
- Class-D Audio Amplifier 300W-650W (Half-bridge)





Absolute Maximum Ratings T_J=25℃ unless otherwise specified

Absolute Maximum Ratings T_C = 25 ℃, unless otherwise noted				
Parameter		Symbol	Value	Unit
Drain-Source Voltage	(note1)	V_{DSS}	200	V
Continuous Drain Current		I_D	52	A
Pulsed Drain Current	(note2)	I_{DM}	220	
Gate-Source Voltage		V_{GSS}	±20	V
Single Pulse Avalanche Energy	(note2)	E_{AS}	1700	mJ
Power Dissipation		P_D	250	W
Derating Factor above 25° C			2.4	W/°C
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55~+150	ºC

Thermal Resistance Characteristics

Thermal Resistance			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	0.5	ºC/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	

Electrical Characteristics T_J=25℃ unless otherwise specified

Specifications T_J = 25℃, unless otherwise noted						
Parameter	Symbol	**Test** Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	200	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 200V, V_{GS} = 0V, T_J = 25°C	--	--	1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2	--	4	V
Drain-Source On -Resistance (Note4)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 25A	--	0.038	0.041	
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	4510	--	pF
Output Capacitance	C_{oss}		--	567	—	
Reverse Transfer Capacitance	C_{rss}		--	290	—	
Total Gate Charge	Q_g	V_{DD} = 160V, I_D = 50A, V_{GS} 0 to 10V	--	91	156	nC
Gate-Source Charge	Q_{gs}		--	16	--	
Gate-Drain Charge	Q_{gd}		--	54	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 100V, I_D = 50A, VGS =10V. RG = 25	--	53	--	ns
Turn-on Rise Time	t_r		--	65	--	
Turn-off Delay Time	$t_{d(off)}$		--	429	--	
Turn-off Fall Time	t_f		--	230	--	
Drain-Source Body Diode Characteristics						
Continuous Source Current	I_{SD}	Integral PN-diode in MOSFET	--	--	52	A
Pulsed Source Current	I_{SM}		--	--	210	
Body Forward Voltage	V_{SD}	I_S = 20A, V_{GS} = 0V	--	--	1.5	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V, I_F = 10A, di_F/dt=100A /μs	--	261	--	ns
Reverse Recovery Charge	Q_{rr}		--	2.04	--	μC

NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L = 10mH, V_{DD} = 50V, R_G = 25 , Starting T_J = 25 ℃
3. Pulse Test: Pulse width ≤300μs, Duty Cycle≤1%

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Typical Characteristics T_J = 25°C, unless otherwise noted

Figure 1. **Output** Characteristics (T_J = 25°C)

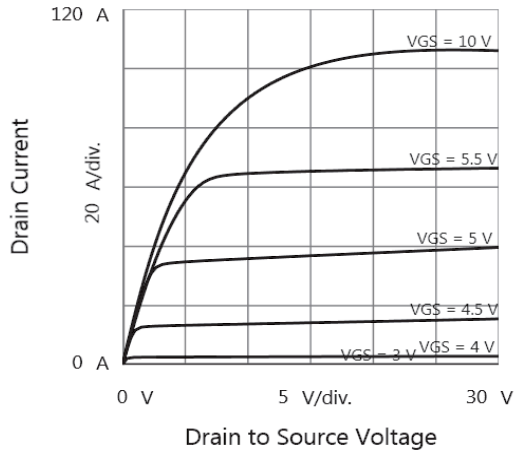


Figure 2. Transfer Characteristics

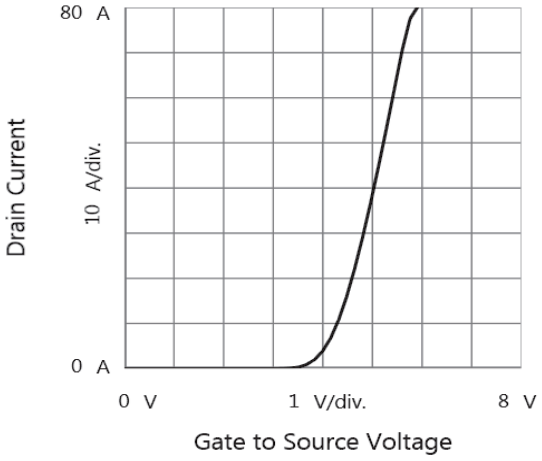
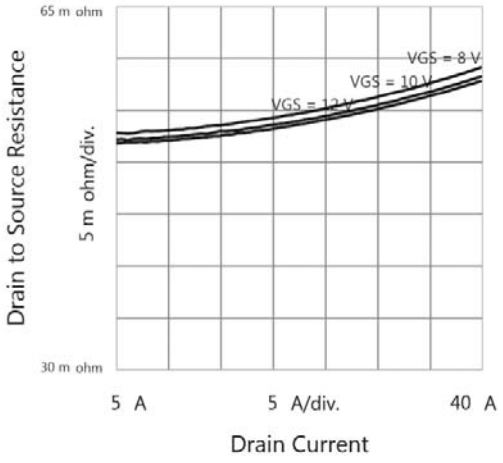


Figure 3. Drain to Source Resistance vs. **Drain** Current

Figure 4. Drain **to** Source Resistance **vs.** Gate **to** Source Voltage



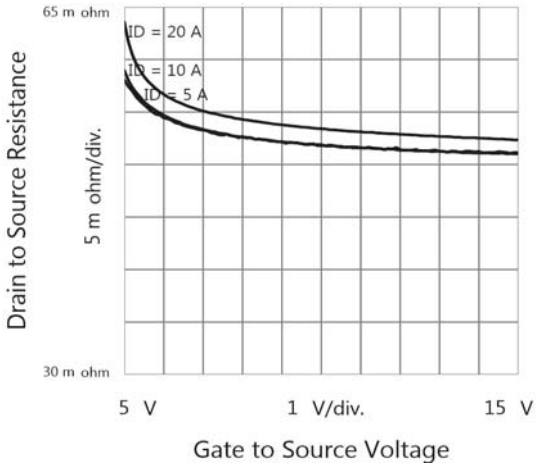
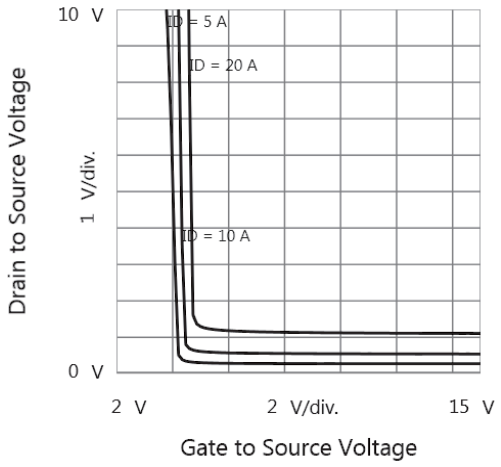
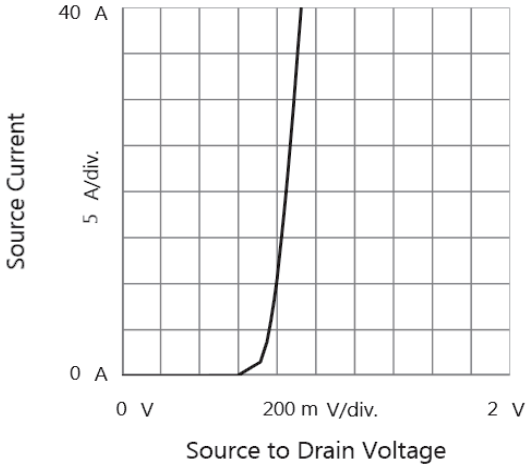


Figure 5. **Drain** to Source Voltage vs. Gate to Source Voltage

Figure 6. Body Diode Forward Characteristics





Typical Characteristics T_J = 25°C, unless otherwise noted

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

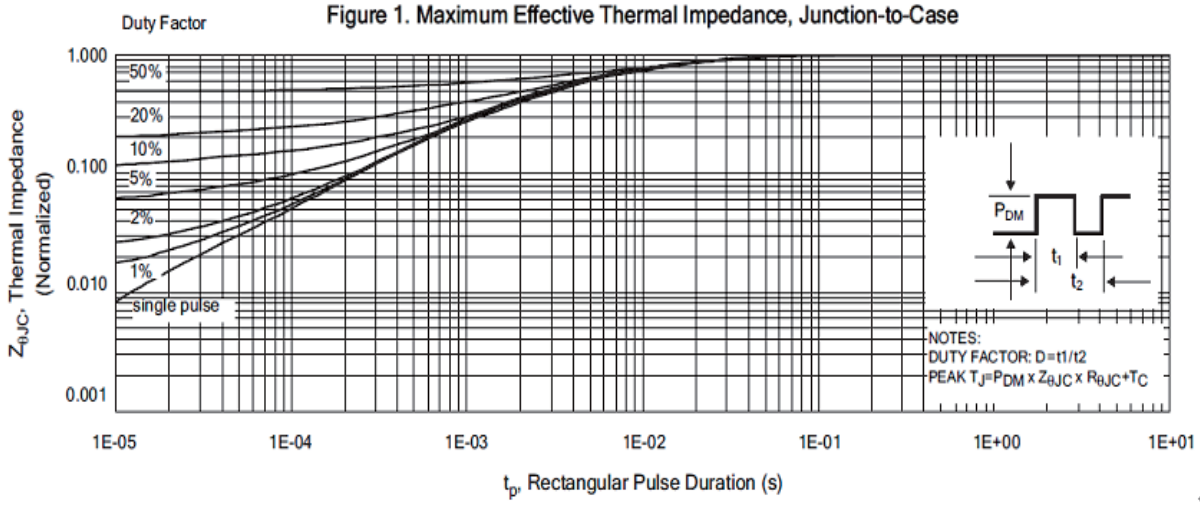


Fig2. $R_{DS(on)}$ Normalized to I_D = 25A Value vs. Drain Current

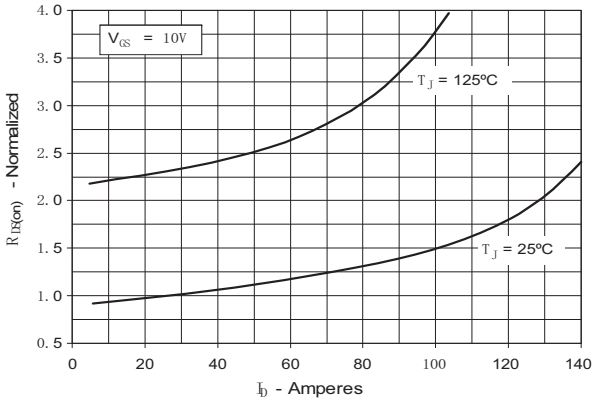


Fig3. Maximum Drain Current vs. Case Temperature

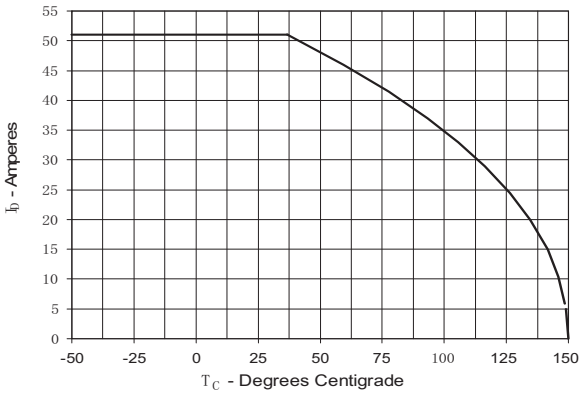


Fig4. Output Characteristics @ 125°C

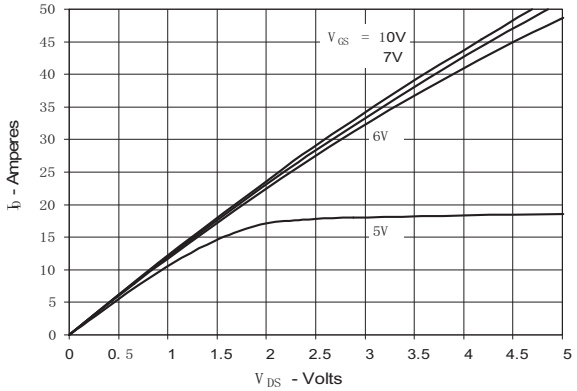
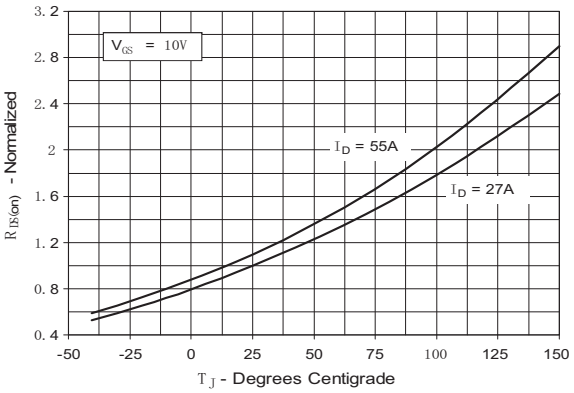


Fig5. $R_{DS(on)}$ Normalized to I_D = 27A Value vs. Junction Temperature



Typical Characteristics T_J = 25°C, unless

Figure 6. Maximum Peak Current Capability

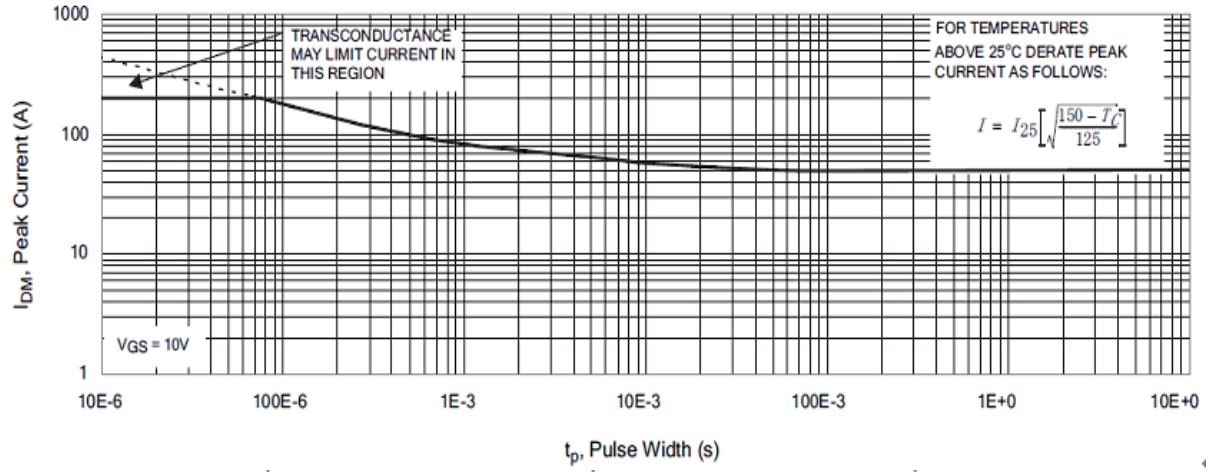


Figure 7. Typical Transfer Characteristics

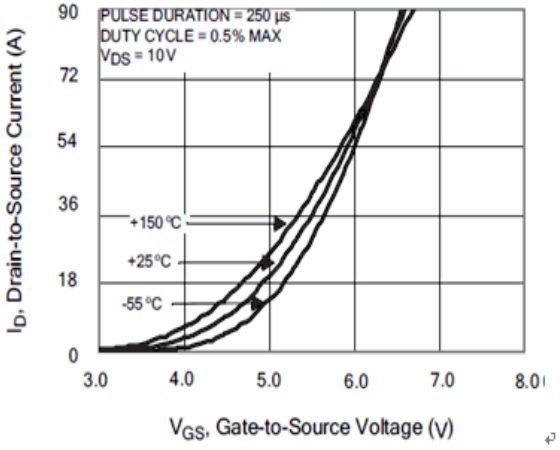


Figure 8. Unclamped Inductive Switching Capability

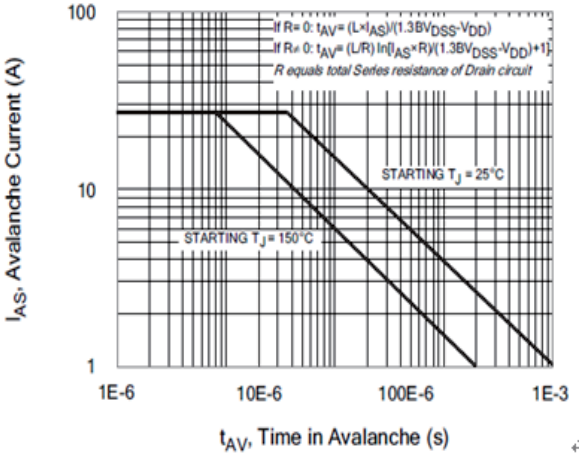


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

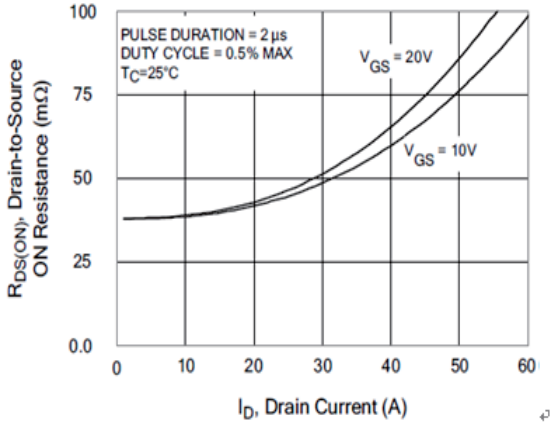


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

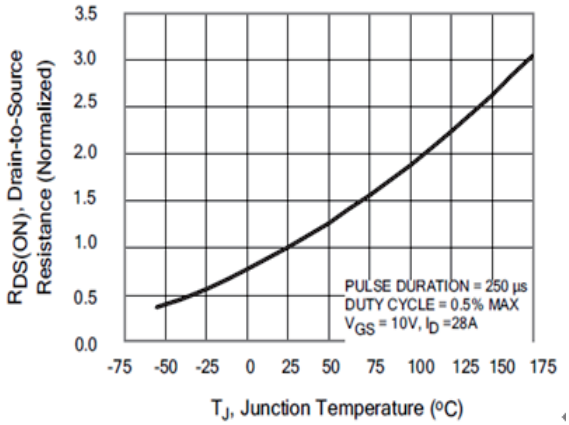


Figure 11. Typical Breakdown Voltage vs Junction Temperature

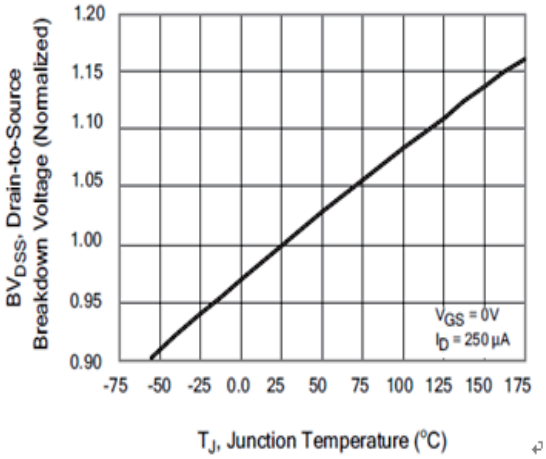


Figure 12. Typical Threshold Voltage vs Junction Temperature

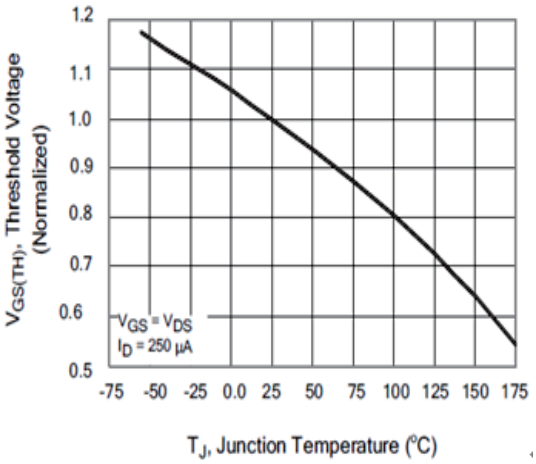


Figure 13. Maximum Forward Bias Safe Operating Area

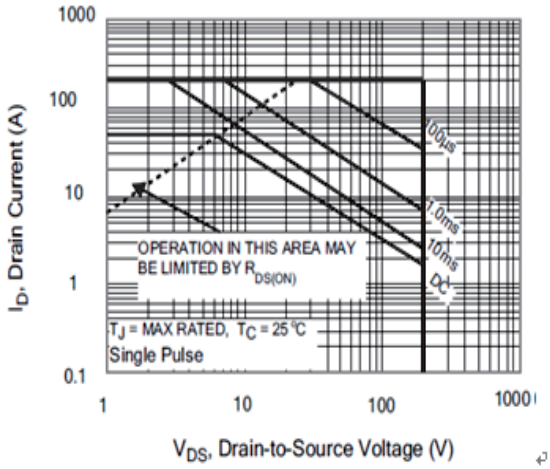


Figure 14. Capacitance vs Vds

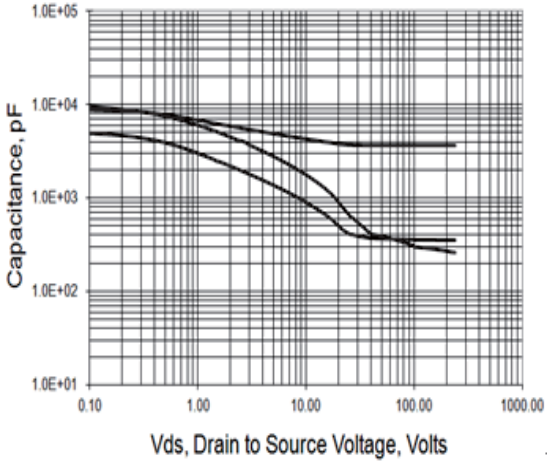


Figure 15 .Typical Gate Charge

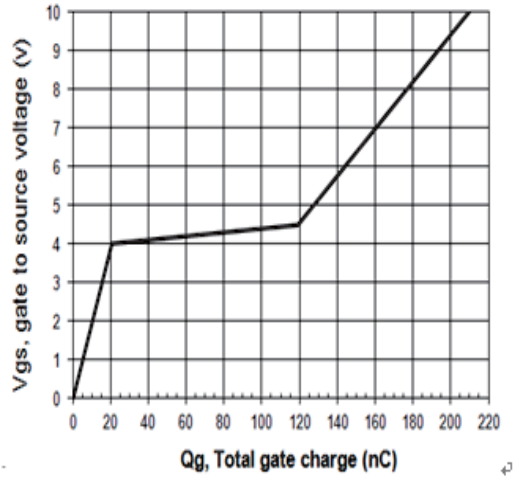


Figure 16. Typical Body Diode Transfer Characteristics

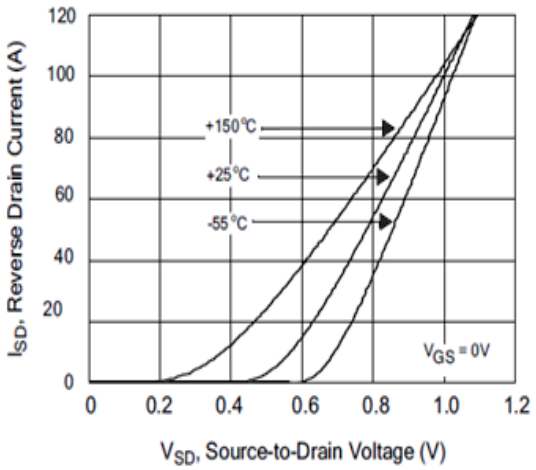


Figure A：Gate Charge Test **Circuit and**

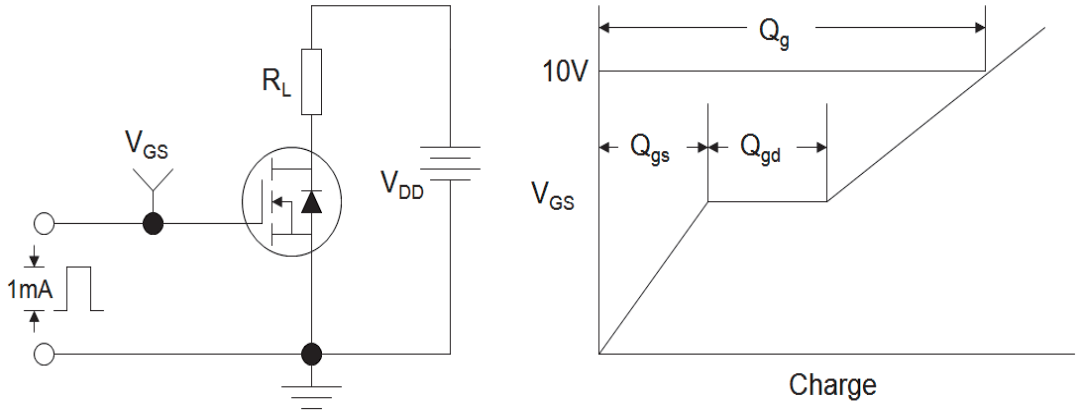


Figure B：Resistive **Switching Test Circuit**and Waveform

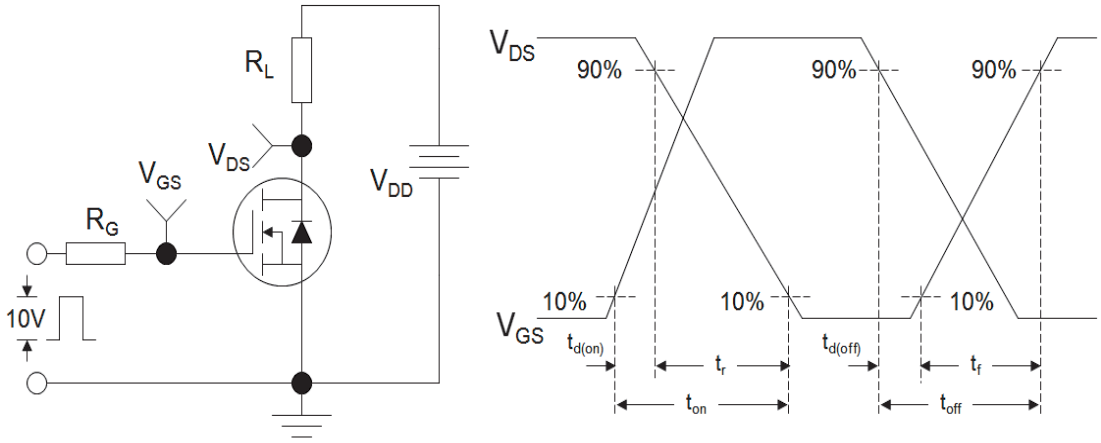


Figure C：Unclamped Inductive **Switching Test Circuit** and Waveform