



UF840K-MTQ

Power MOSFET

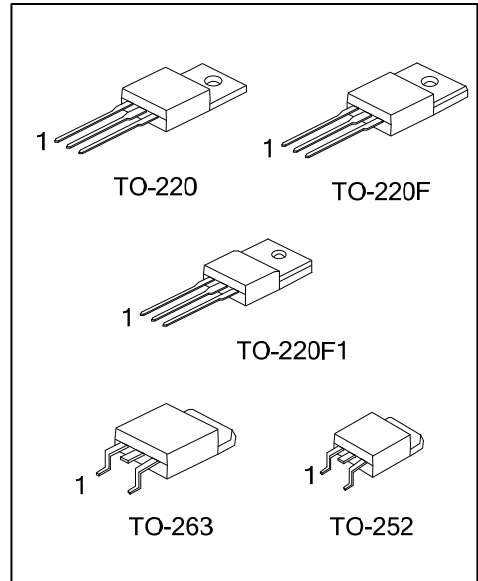
8.0A, 500V N-CHANNEL POWER MOSFET

DESCRIPTION

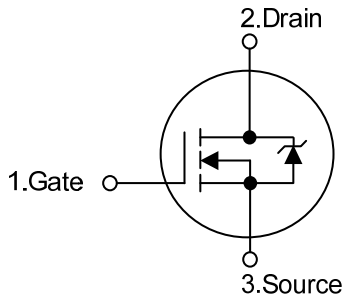
The N-Channel enhancement mode silicon gate power MOSFET is designed for high voltage, high speed power switching applications such as switching regulators, switching converters, solenoid, motor drivers, relay drivers.

FEATURES

- * Low $R_{DS(ON)} \leq 0.87 \Omega @ V_{GS}=10V, I_D=4.4A$
- * Single Pulse Avalanche Energy Rated
- * Fast Switching Speeds
- * Linear Transfer Characteristics
- * High Input Impedance



SYMBOL



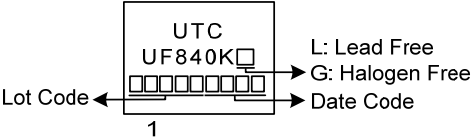
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen-Free		1	2	3	
UF840KL-TA3-T	UF840KG-TA3-T	TO-220	G	D	S	Tube
UF840KL-TF3-T	UF840KG-TF3-T	TO-220F	G	D	S	Tube
UF840KL-TF1-T	UF840KG-TF1-T	TO-220F1	G	D	S	Tube
UF840KL-TN3-R	UF840KG-TN3-R	TO-252	G	D	S	Tape Reel
UF840KL-TQ2-T	UF840KG-TQ2-T	TO-263	G	D	S	Tube
UF840KL-TQ2-R	UF840KG-TQ2-R	TO-263	G	D	S	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source

<p>UF840KG-TA3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TN3: TO-252, TQ2: TO-263</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



■ ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$, unless Otherwise Specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage ($T_J = 25^\circ\text{C} \sim 125^\circ\text{C}$)		V_{DSS}	500	V
Drain to Gate Voltage ($R_{GS} = 20\text{k}\Omega$, $T_J = 25^\circ\text{C} \sim 125^\circ\text{C}$)		V_{DGR}	500	V
Gate to Source Voltage		V_{GSS}	± 30	V
Drain Current (Note 2)	Continuous	I_D	8.0	A
	Pulsed	I_{DM}	32	A
Single Pulse Avalanche Energy (Note 3)		E_{AS}	336	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.3	V/ns
Power Dissipation	TO-220/TO-263	P_D	134	W
	TO-220F/ TO-220F1		44	W
	TO-252		107	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^\circ\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. $L = 10\text{mH}$, $I_{AS} = 8.0\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$.

4. $I_{SD} \leq 8.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$.

■ THERMAL RESISTANCES CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-220F1/TO-263			
	TO-252			
Junction to Case	TO-220/TO-263	θ_{JC}	0.93	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1			
	TO-252			

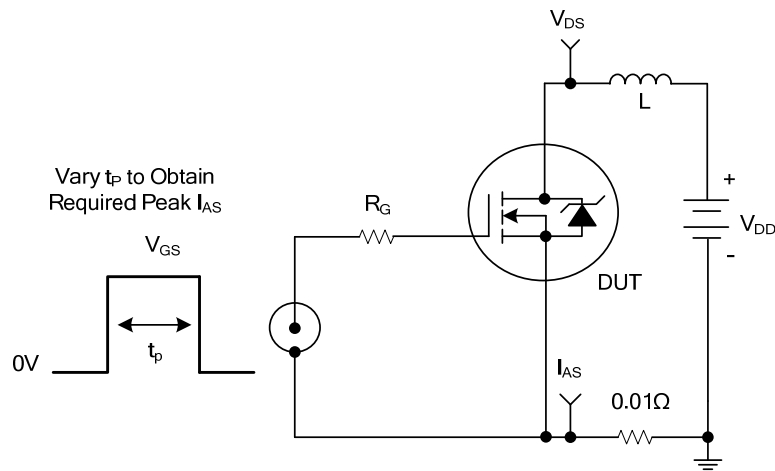
■ ELECTRICAL CHARACTERISTICS (T_J = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	500			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =Rated BV _{DSS} , V _{GS} =0V			25	μA
Gate-Source Leakage Current	Forward	I _{GSS}			+100	nA
	Reverse				-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =4.4A			0.87	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		920		pF
Output Capacitance	C _{OSS}			105		pF
Reverse Transfer Capacitance	C _{RSS}			10		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =400V, V _{GS} =10V, I _D =8.0A, I _G =10mA (Note 1, 2)		24		nC
Gate to Source Charge	Q _{GS}			3		nC
Gate to Drain Charge	Q _{GD}			2		nC
Turn-on Delay Time (Note 1)	t _{D(ON)}	V _{DS} =250V, V _{GS} =10V, I _D =8.0A, R _G =25Ω (Note 1, 2)		4.8		ns
Rise Time	t _R			11.6		ns
Turn-off Delay Time	t _{D(OFF)}			56		ns
Fall-Time	t _F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				8	A
Maximum Body-Diode Pulsed Current	I _{SM}				32	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =8.0A, V _{GS} =0V			2	V
Reverse Recovery Time (Note 1)	t _{rr}	I _S =8.0A, V _{GS} =0V, dI _F /dt=100A/μs		312		nS
Reverse Recovery Charge	Q _{rr}				3.1	

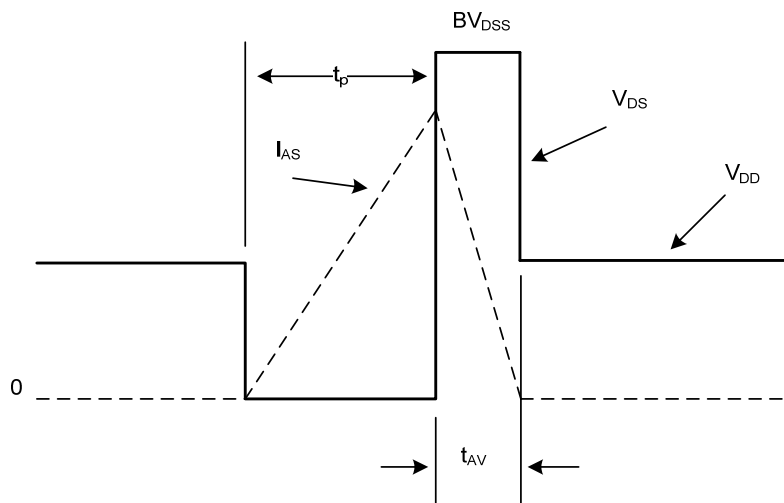
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

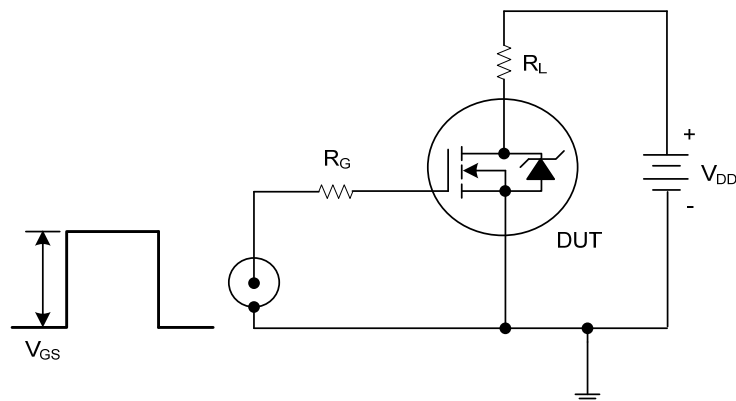
TEST CIRCUITS AND WAVEFORMS



Unclamped Energy Test Circuit

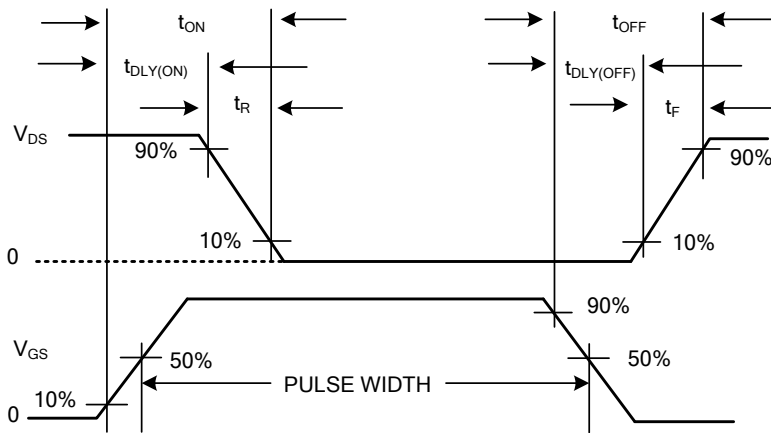


Unclamped Energy Waveforms

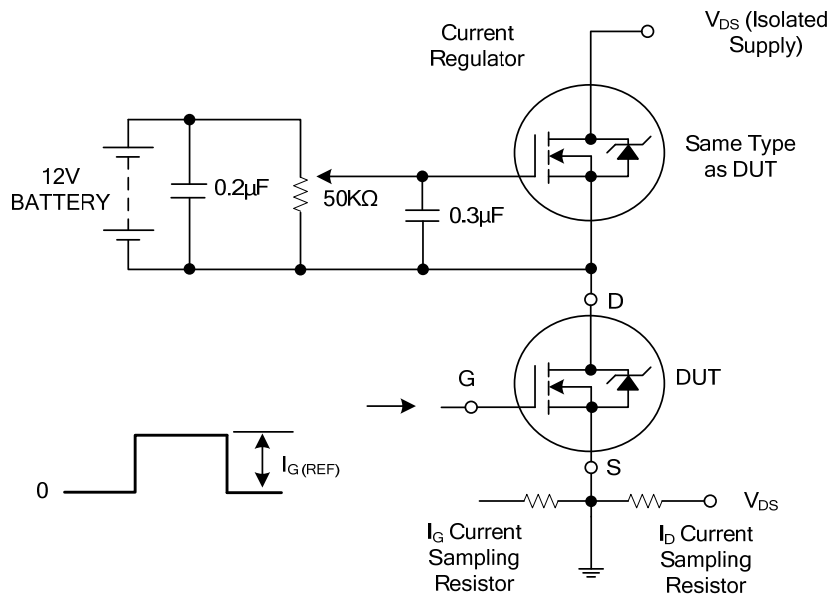


Switching Time Test Circuit

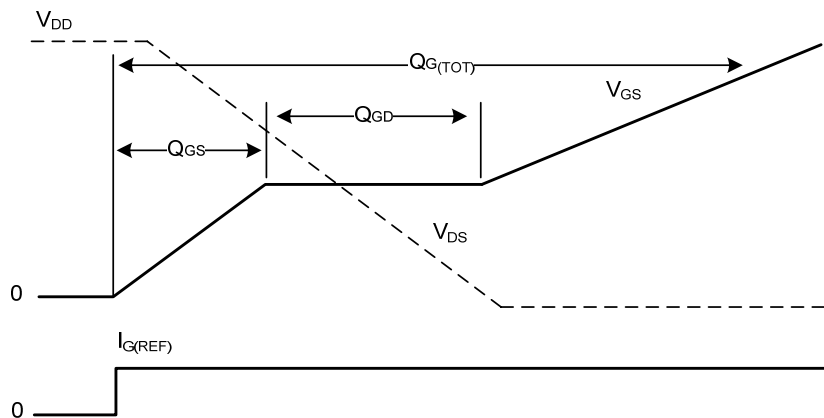
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



Resistive Switching Waveforms

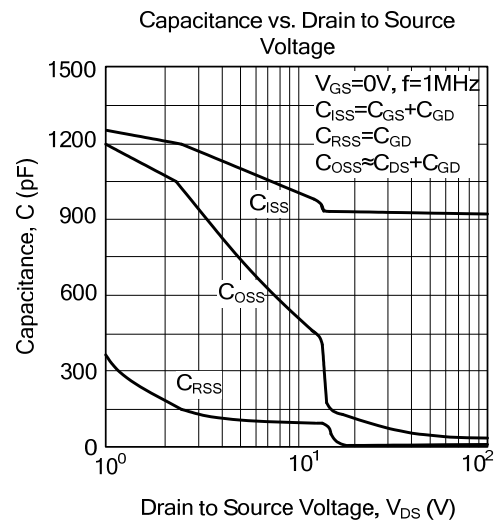
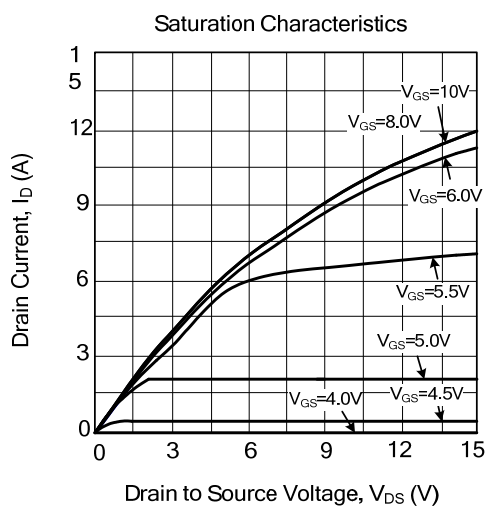
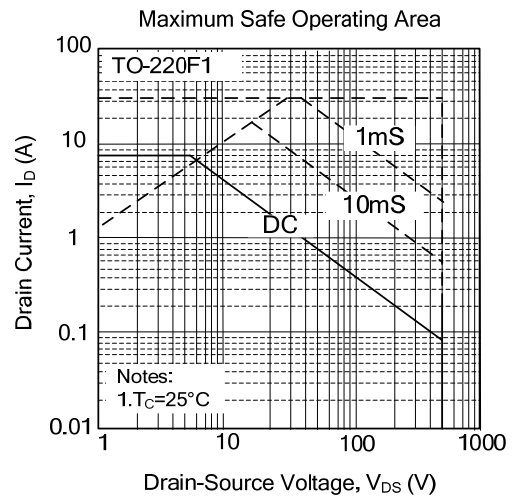
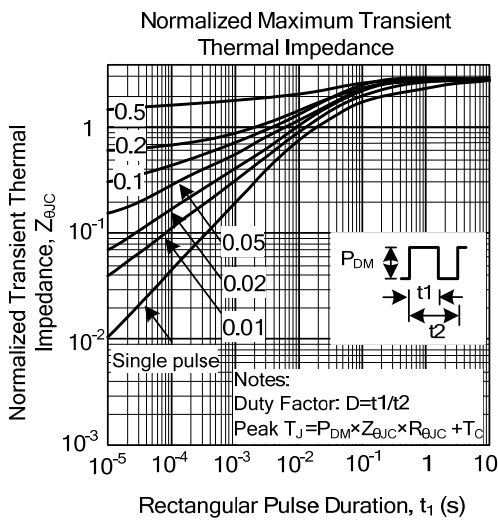
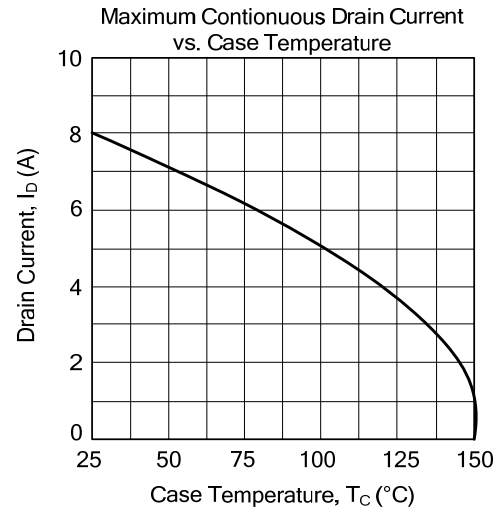
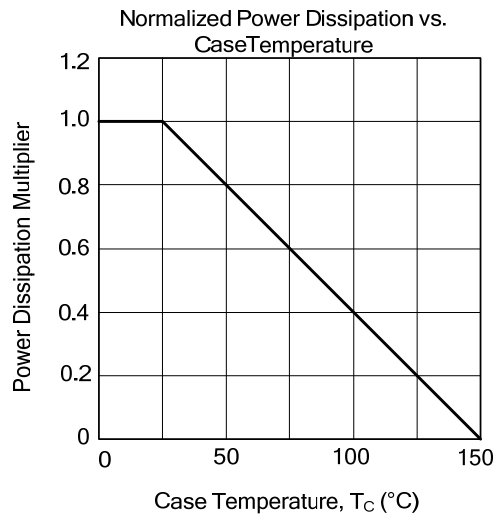


Gate Charge Test Circuit

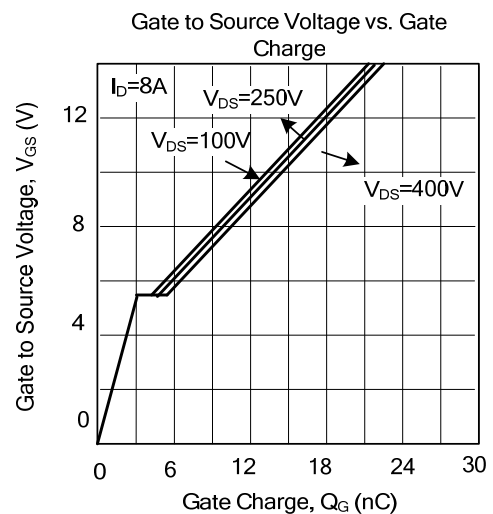
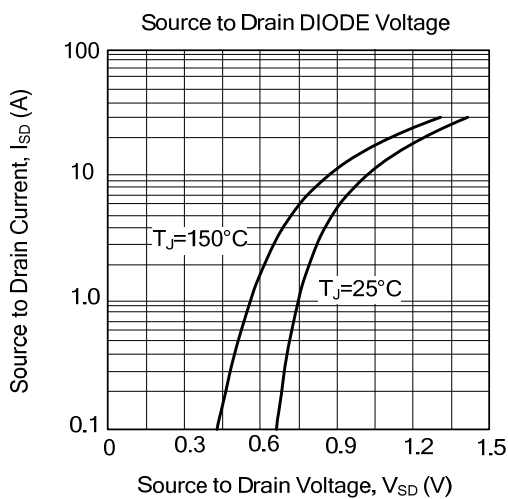
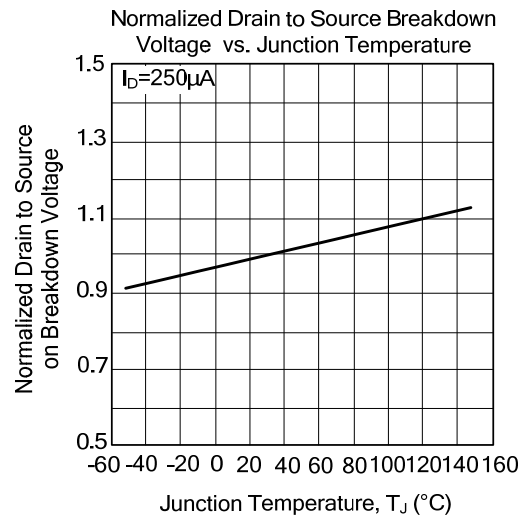
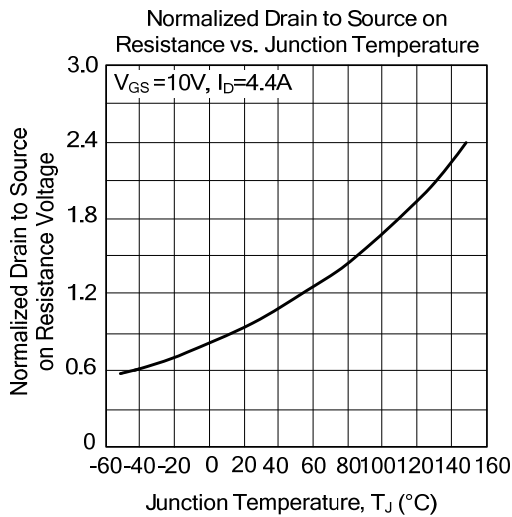
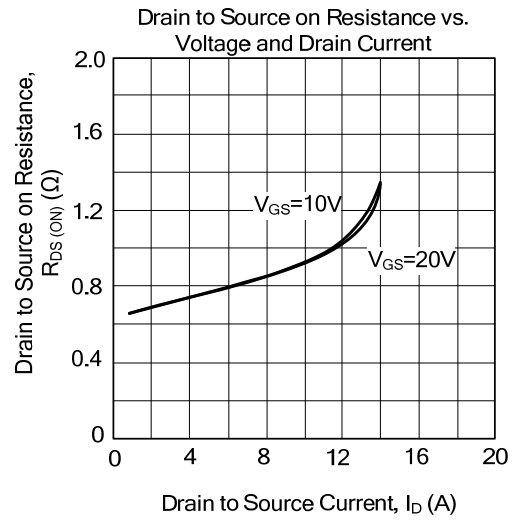
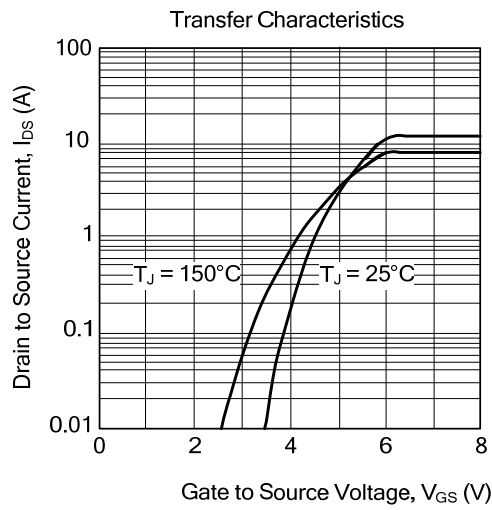


Gate Charge Waveforms

TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



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