



UF830

Power MOSFET

4.5A, 500V, 1.5Ω, N-CHANNEL POWER MOSFET

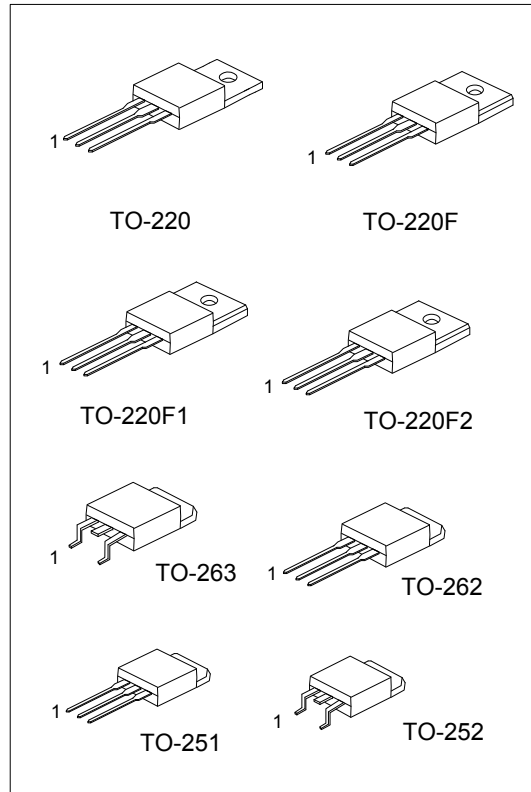
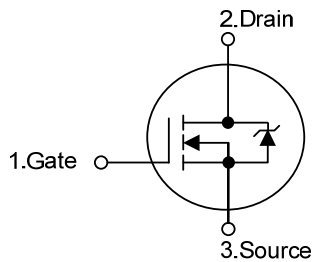
DESCRIPTION

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

- * $R_{DS(ON)}=1.5\Omega$
- * Single Pulse Avalanche Energy Rated
- * Rugged- SOA is Power Dissipation Limited
- * 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	
UF830L-TA3-T	UF830G-TA3-T	TO-220	G	D	S	Tube
UF830L-TF3-T	UF830G-TF3-T	TO-220F	G	D	S	Tube
UF830L-TF1-T	UF830G-TF1-T	TO-220F1	G	D	S	Tube
UF830L-TF2-T	UF830G-TF2-T	TO-220F2	G	D	S	Tube
UF830L-TM3-T	UF830G-TM3-T	TO-251	G	D	S	Tube
UF830L-TN3-R	UF830G-TN3-R	TO-252	G	D	S	Tape Reel
UF830L-T2Q-T	UF830G-T2Q-T	TO-262	G	D	S	Tube
UF830L-TQ2-R	UF830G-TQ2-R	TO-263	G	D	S	Tape Reel
UF830L-TQ2-T	UF830G-TQ2-T	TO-263	G	D	S	Tube

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

UF830L-TA3-T (1)Packing Type (2)Package Type (3)Lead Free	(1) T: Tube, R: Tape Reel (2) TA3: TO-220,TF3: TO-220F, TF1: TO-220F1 TF2: TO-220F2TM3: TO-251,TN3: TO-252, T2Q: TO-262,TQ2: TO-263 (3) G: Halogen Free, L: Lead Free
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■ ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, Unless Otherwise Specified.)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage (T _J =25°C ~125°C)		V _{DS}	500	V
Drain to Gate Voltage (R _{GS} =20kΩ, T _J =25°C ~125°C)		V _{DGR}	500	V
Gate to Source Voltage		V _{GS}	±30	V
Drain Current	Continuous	I _D	4.5	A
	Pulsed	I _{DM}	18	A
Power Dissipation (T _C = 25°C)	TO-220/TO-262/TO-263	P _D	73	W
	TO-220F/ TO-220F1		38	W
	TO-220F2		40	
	TO-251/TO-252		46	W
Single Pulse Avalanche Energy Rating (Note 2)		E _{AS}	300	mJ
Junction Temperature		T _J	+150	°C
Storage Temperature		T _{STG}	-55 ~ +150	°C

Note: 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. V_{DD}=50V, starting T_J=25°C, L=25mH, R_G=25Ω, peak I_{AS}=4.5A

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-262/TO-263	θ _{JA}	62.5	°C/W
	TO-220F/ TO-220F1		62.5	°C/W
	TO-220F2		62.5	
	TO-251/TO-252		100.3	°C/W
Junction to Case	TO-220/TO-262/TO-263	θ _{Jc...}	1.71	°C/W
	TO-220F/ TO-220F1		3.31	°C/W
	TO-220F2		3.125	
	TO-251/TO-252		2.7	°C/W

■ ELECTRICAL SPECIFICATIONS (T_A = 25°C, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	500			V
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250μA	2.0		4.0	V
On-State Drain Current (Note 1)	I _{D(ON)}	V _{DS} >I _{D(ON)} ×R _{DS(ON)MAX} , V _{GS} =10V	4.5			A
Drain-Source Leakage Current	I _{DSS}	V _{DS} = Rated BV _{DSS} , V _{GS} =0V			25	μA
		V _{DS} =0.8×Rated BV _{DSS}			250	μA
		V _{GS} =0V, T _J = 125°C				
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±30V			±100	nA
Static Drain-Source On-State Resistance	R _{DS(ON)}	I _D =2.5A, V _{GS} =10V (Note 2)		1.3	1.5	Ω
Forward Transconductance (Note 1)	g _{FS}	V _{DS} ≥10V, I _D =2.7A	2.5	4.2		S
Turn-On Delay Time	t _{D(ON)}	V _{DD} =250V, I _D ≈4.5A R _{GS} =12Ω, R _L =54Ω (Note 2)		10	17	ns
Turn-On Rise Time	t _R			15	23	ns
Turn-Off Delay Time	t _{D(OFF)}			33	53	ns
Turn-Off Fall Time	t _F			16	23	ns

Note: 1. Pulse Test: Pulse width≤300μs, Duty Cycle≤2%.

2. MOSFET Switching Times are Essentially Independent of Operating Temperature.

3. Gate Charge is Essentially Independent of Operating Temperature.

■ ELECTRICAL SPECIFICATIONS(Cont.) ($T_A=25^\circ\text{C}$, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Total Gate Charge	Q_G	$V_{GS}=10\text{V}$, $I_D=4.5\text{A}$		22	32	nC
Gate-Source Charge	Q_{GS}	$V_{DS}=0.8\times\text{Rated } BV_{DSS}$		3.5		nC
Gate-Drain Charge	Q_{GD}	$I_{G(REF)}=1.5\text{mA}$ (Note 3)		11		nC
Input Capacitance	C_{ISS}	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$		600		pF
Output Capacitance	C_{OSS}			100		pF
Reverse Transfer Capacitance	C_{RSS}			20		pF

Note: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

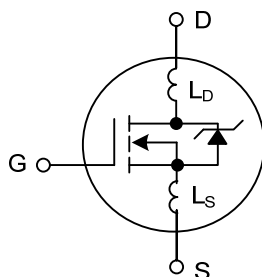
2. MOSFET Switching Times are Essentially Independent of Operating Temperature.

3. Gate Charge is Essentially Independent of Operating Temperature.

■ INTERNAL PACKAGE INDUCTANCE

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Internal Drain Inductance					
Measured from the contact screw on tab to center of die	L _D		3.5		nH
Measured from the drain lead(6mm from package) to center of die			4.5		nH
Internal Source Inductance					
Measured from the source lead(6mm from header) to source bond pad	L _S		7.5		nH

Remark: Modified MOSFET symbol showing the internal devices inductances as below.

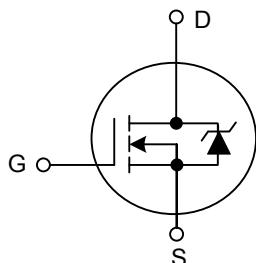


■ SOURCE TO DRAIN DIODE SPECIFICATIONS

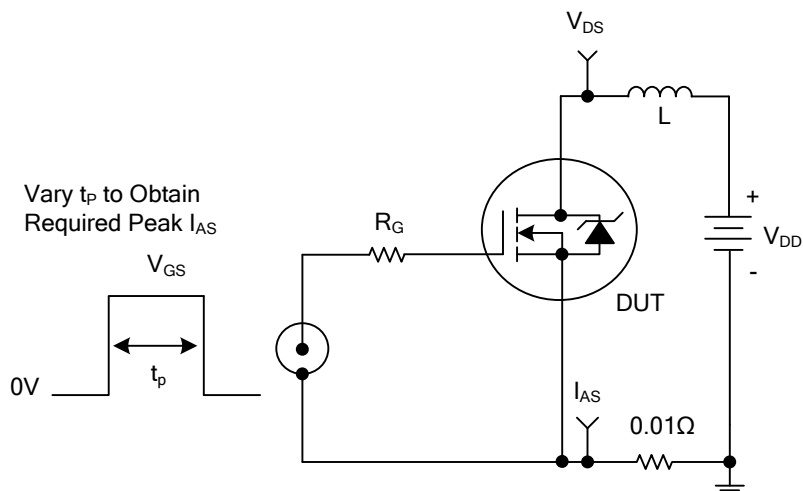
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Source to Drain Diode Voltage	V_{SD}	$T_J=25^\circ\text{C}$, $I_{SD}=4.5\text{A}$, $V_{GS}=0\text{V}$ (Note 1)			1.6	V
Continuous Source to Drain Current	I_{SD}	Note 2			5.5	A
Pulse Source to Drain Current	I_{SDM}				18	A
Reverse Recovery Time	t_{rr}	$T_J=25^\circ\text{C}$, $I_{SD}=4.5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$	180	350	760	ns
Reverse Recovery Charge	Q_{RR}	$T_J=25^\circ\text{C}$, $I_{SD}=4.5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$	0.96	2.2	4.3	μC

NOTE : 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

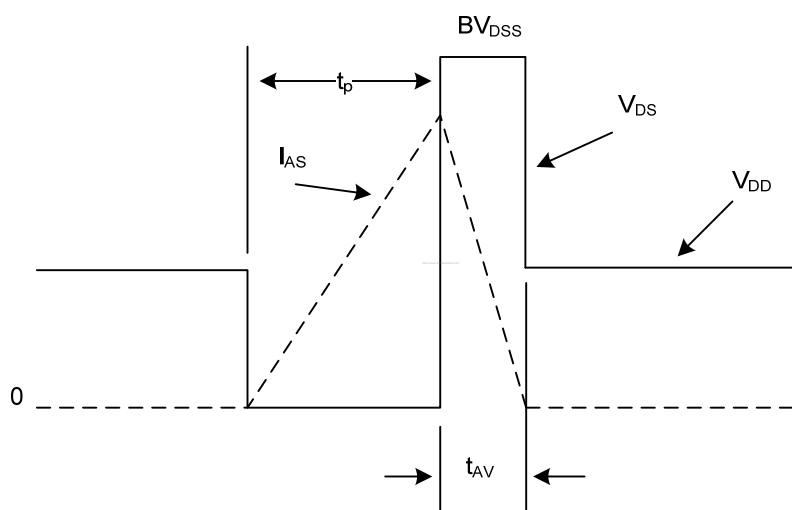
2. Modified MOSFET symbol showing the integral reverse P-N junction diode as below.



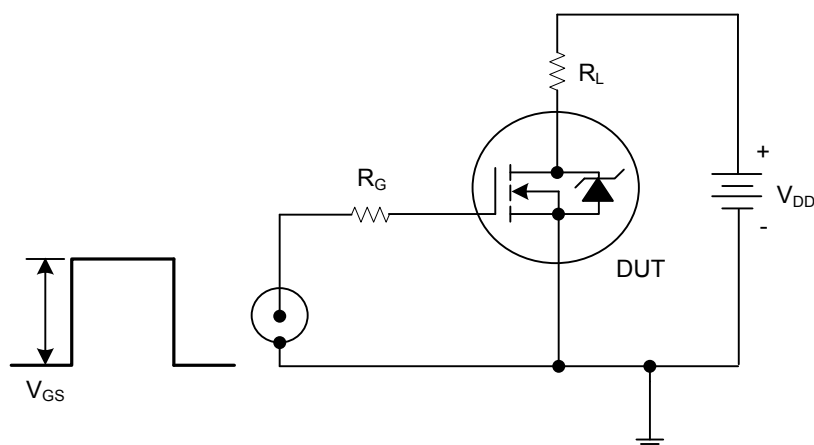
■ TEST CIRCUITS AND WAVEFORMS



Unclamped Energy Test Circuit

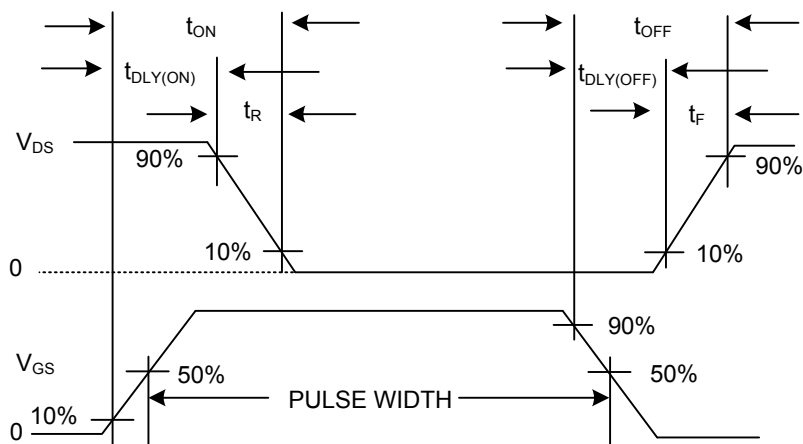


Unclamped Energy Waveforms

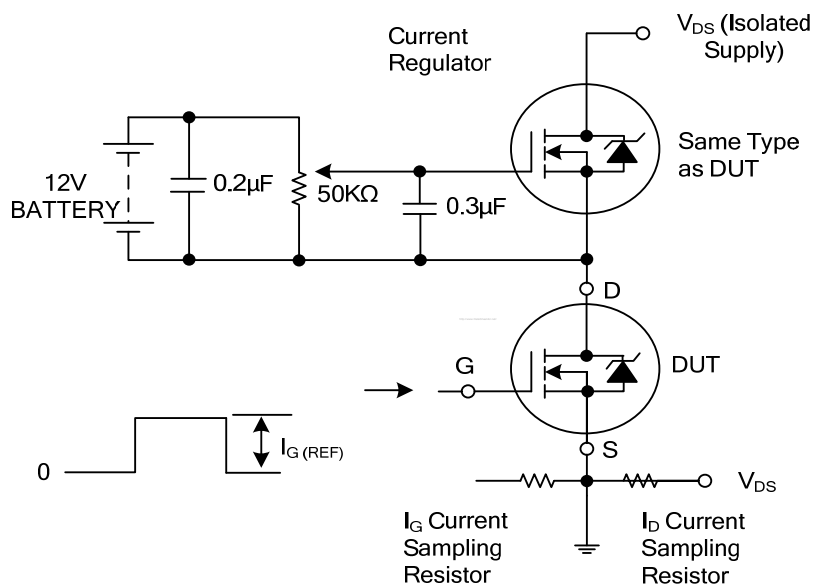


Switching Time Test Circuit

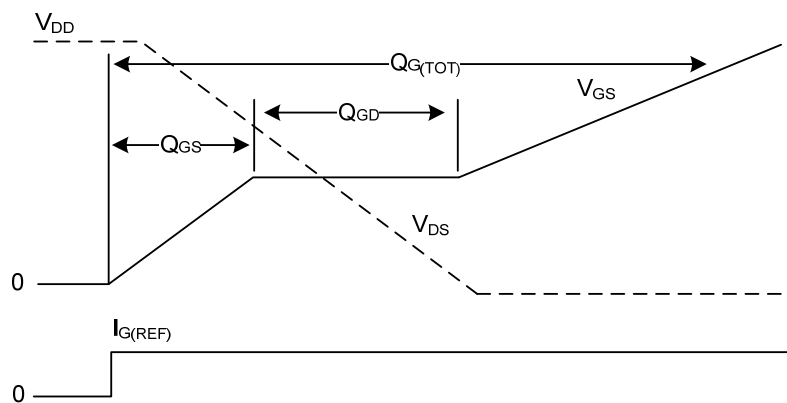
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



Resistive Switching Waveforms

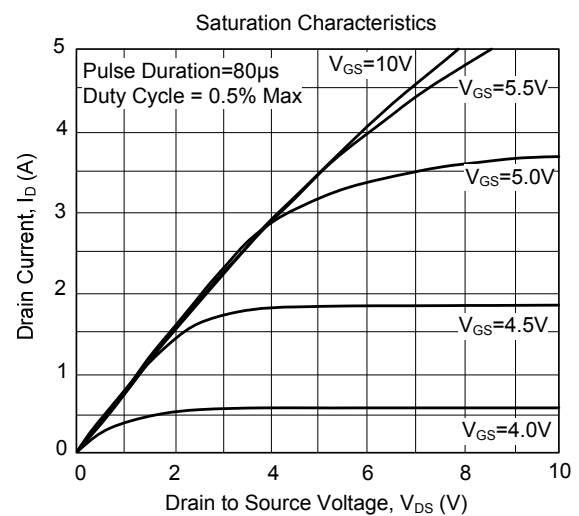
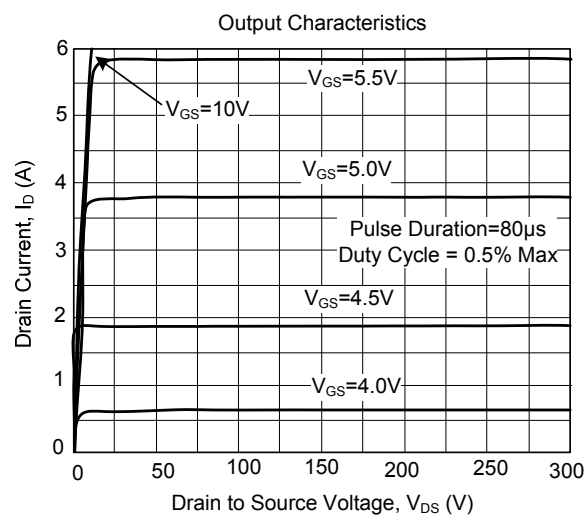
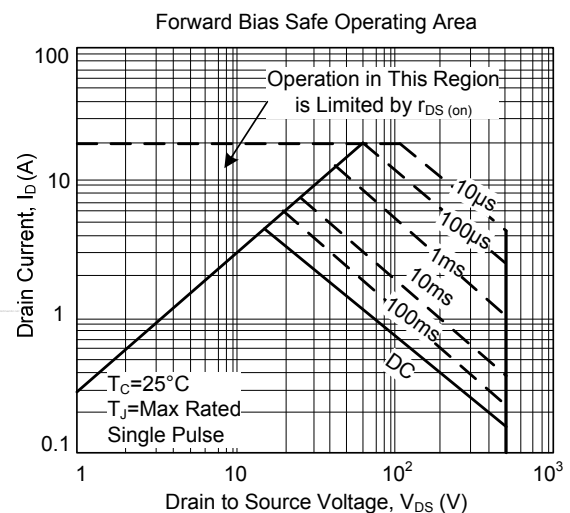
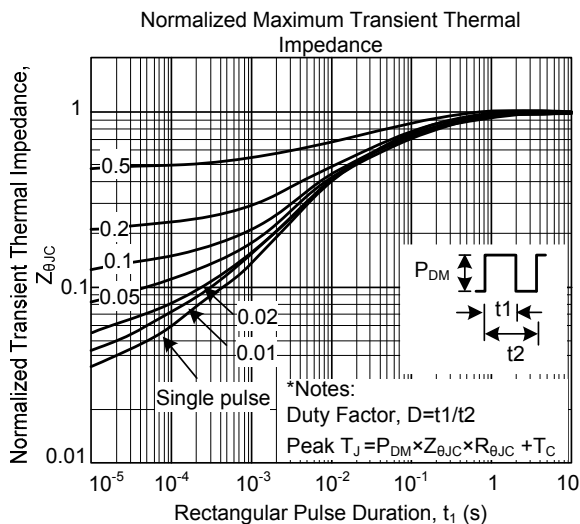
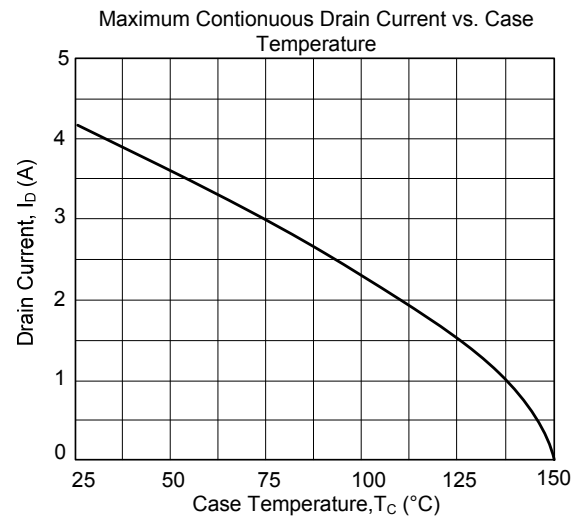
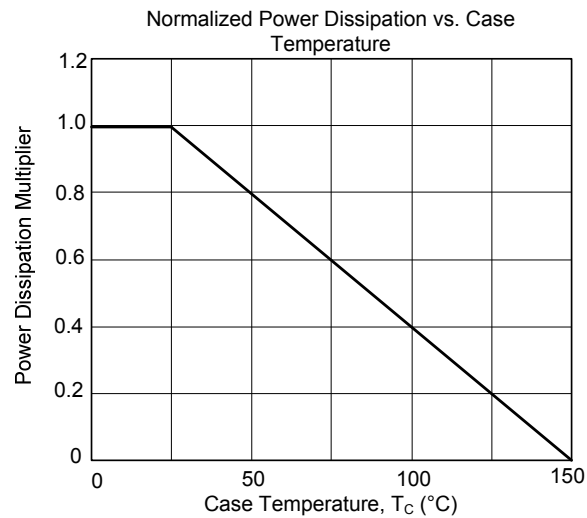


Gate Charge Test Circuit

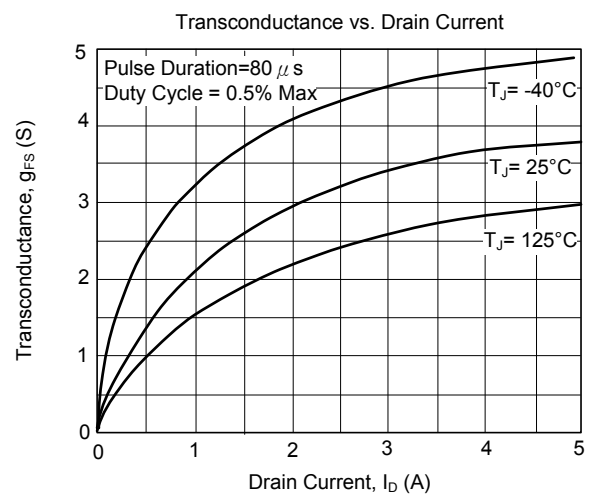
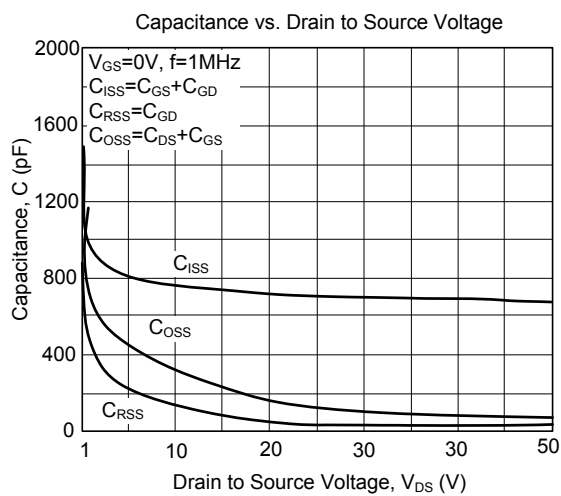
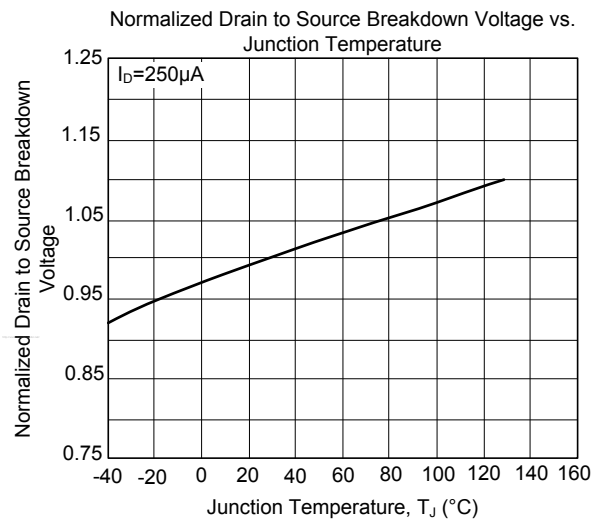
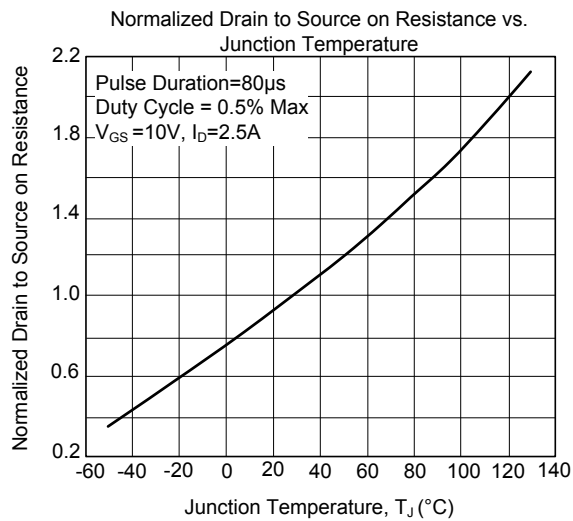
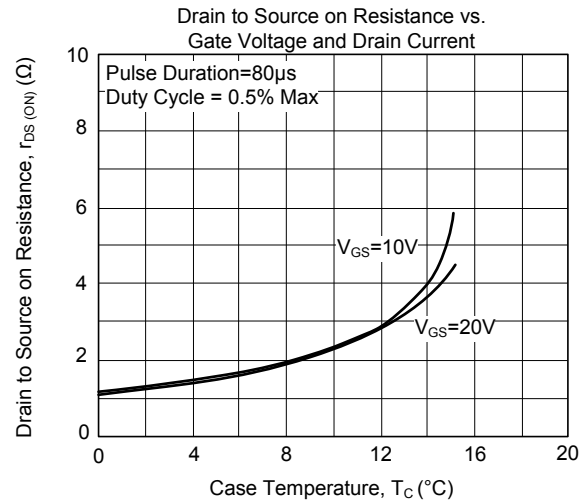
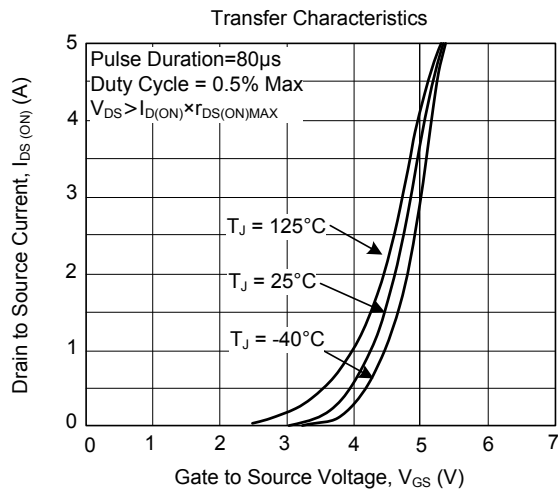


Gate Charge Waveforms

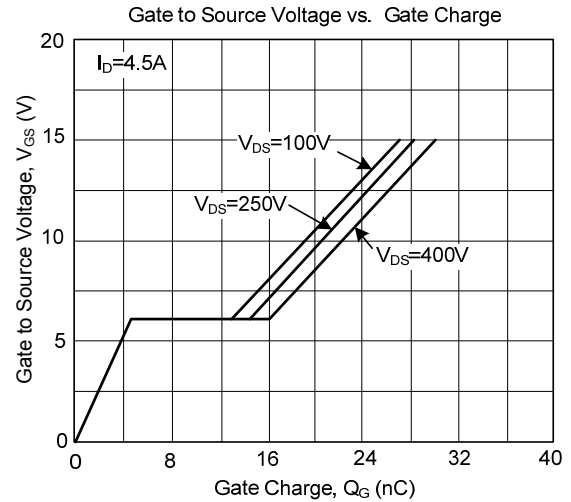
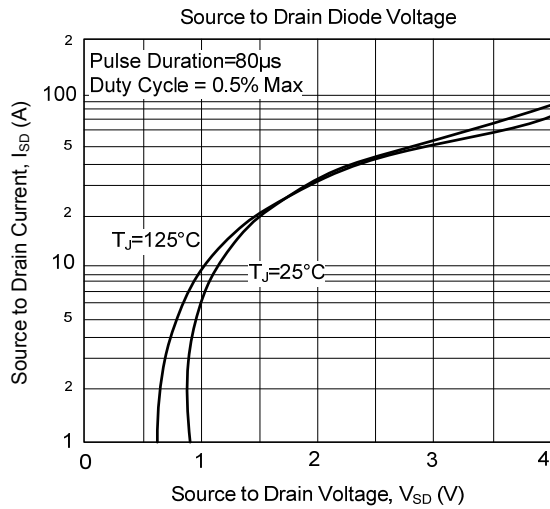
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



TYPICAL CHARACTERISTICS (Cont.)



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