



UF830-E

Power MOSFET

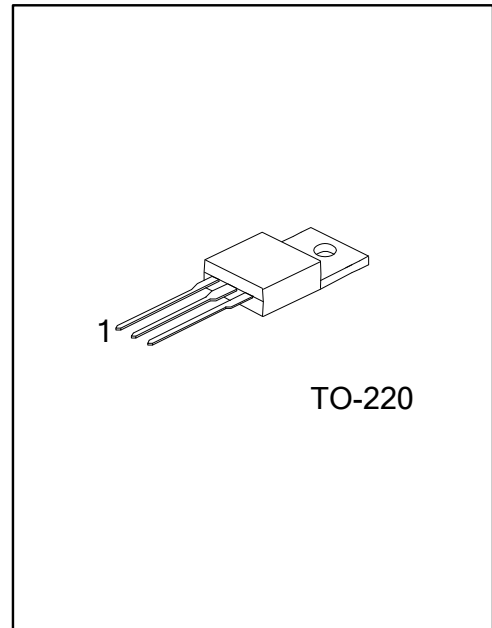
4.5A, 500V, 1.5Ω, N-CHANNEL POWER MOSFET

DESCRIPTION

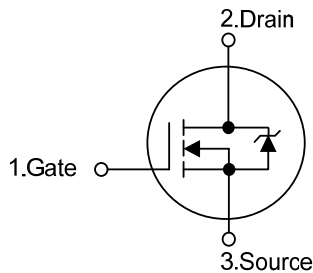
The N-Channel enhancement mode silicon gate power MOSFET is designed for high voltage, high speed power switching applications such as switching regulators, switching converters, solenoid, motor drivers, relay drivers.

FEATURES

- * $R_{DS(ON)} < 1.5\Omega @ V_{GS}=10V, I_D=2.5A$
- * Single Pulse Avalanche Energy Rated
- * Rugged- SOA is Power Dissipation Limited
- * Fast Switching Speeds
- * Linear Transfer Characteristics
- * High Input Impedance



SYMBOL



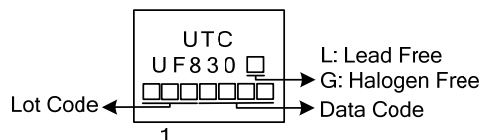
ORDERING INFORMATION

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

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

<p>UF830L-TA3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube</p> <p>(2) TA3: TO-220</p> <p>(3) L: Lead Free, G: Halogen Free and Lead Free</p>
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MARKING



■ 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)		P _D	73	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	θ _{JA}	62.5	°C/W
Junction to Case	θ _{Jc}	1.71	°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} V _{GS} =0V, T _J = 125°C			250	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±30V			±100	nA
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =2.5A (Note 2)		1.3	1.8	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		900	1000	pF
Output Capacitance	C _{OSS}			95	105	pF
Reverse Transfer Capacitance	C _{RSS}			35	45	pF
Forward Transconductance (Note 1)	g _{FS}	V _{DS} ≥10V, I _D =2.7A	2.5	4.2		S
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =250V, I _D ≈4.5A R _{GS} =12Ω, R _L =54Ω (Note 2)		90	110	ns
Turn-On Rise Time	t _R			100	120	ns
Turn-Off Delay Time	t _{D(OFF)}			230	250	ns
Turn-Off Fall Time	t _F			140	160	ns
Total Gate Charge	Q _G	V _{GS} =10V, I _D =4.5A		22	32	nC
Gate-Source Charge	Q _{GS}	V _{DS} =0.8×Rated BV _{DSS}		3.5		nC
Gate-Drain Charge	Q _{GD}	I _{G(REF)} =1.5mA (Note 3)		11		nC

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

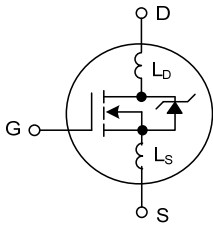
2. MOSFET Switching Times are Essentially Independent of Operating Temperature.

3. Gate Charge is Essentially Independent of Operating Temperature.

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.

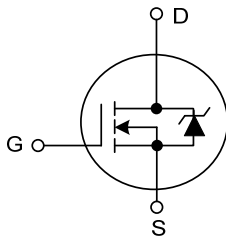


SOURCE TO DRAIN DIODE SPECIFICATIONS

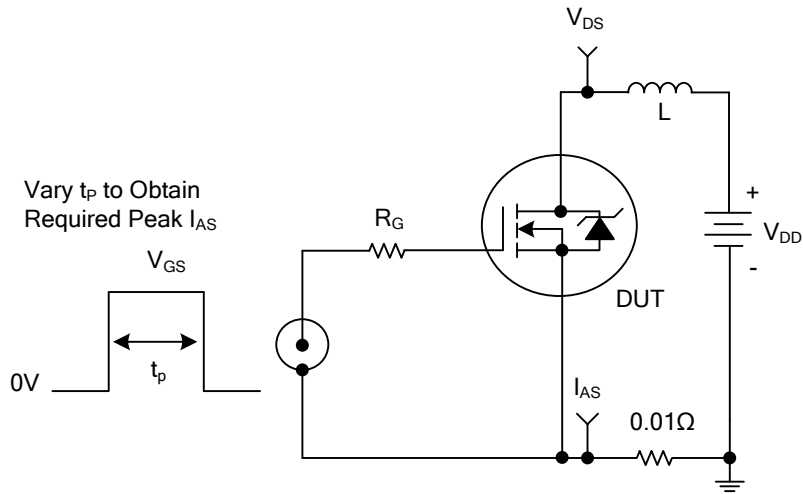
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Source to Drain Diode Voltage	V_{SD}	$T_J=25^\circ\text{C}, I_{SD}=4.5\text{A}, V_{GS}=0\text{V}(\text{Note 1})$			1.6	V
Continuous Source to Drain Current	I_{SD}	Note 2			5.5	A
Pulse Source to Drain Current	I_{SDM}				18	A
Reverse Recovery Time	t_{rr}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

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

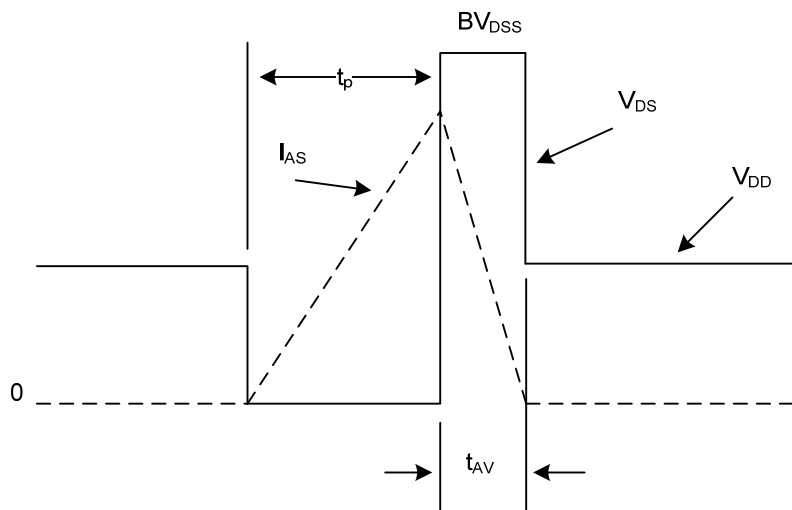
2. Modified MOSFET symbol showing the integral reverse P-N junction diode as below.



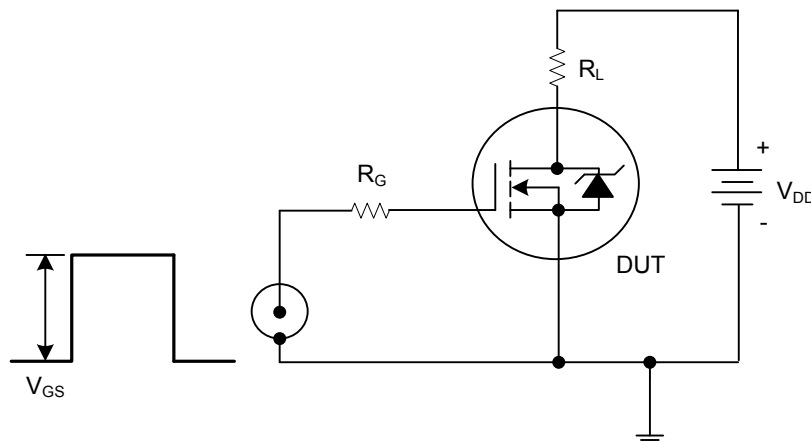
■ TEST CIRCUITS AND WAVEFORMS



Unclamped Energy Test Circuit

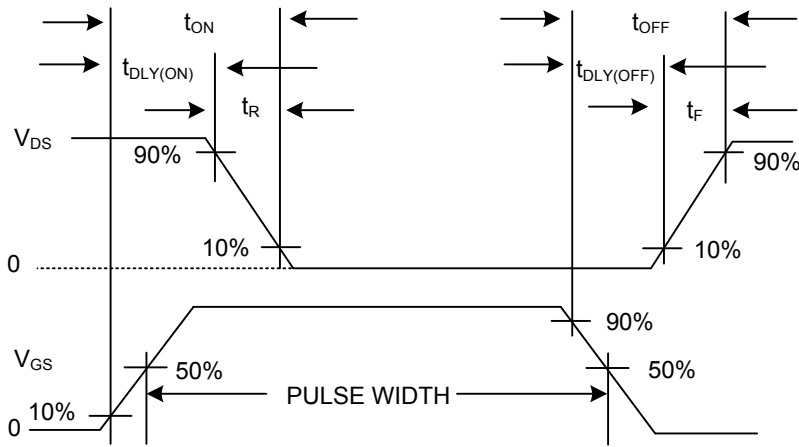


Unclamped Energy Waveforms

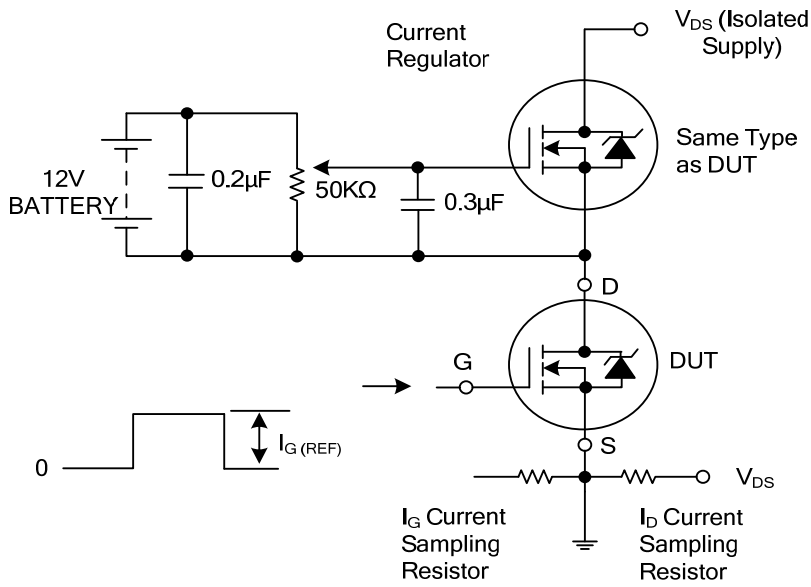


Switching Time Test Circuit

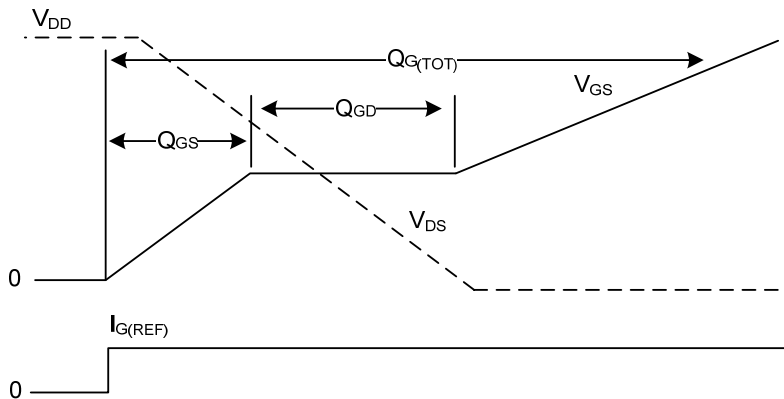
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



Resistive Switching Waveforms

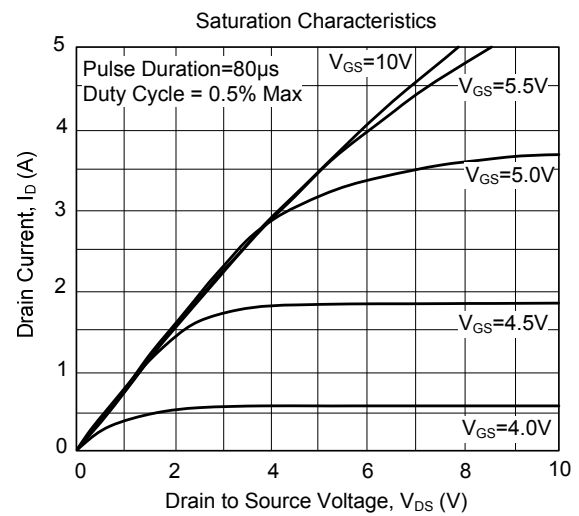
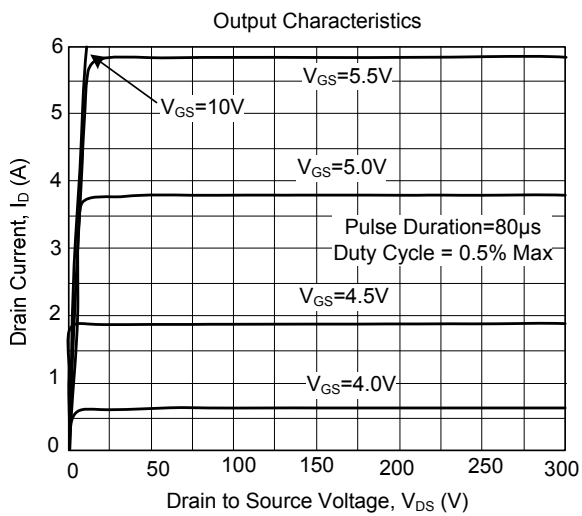
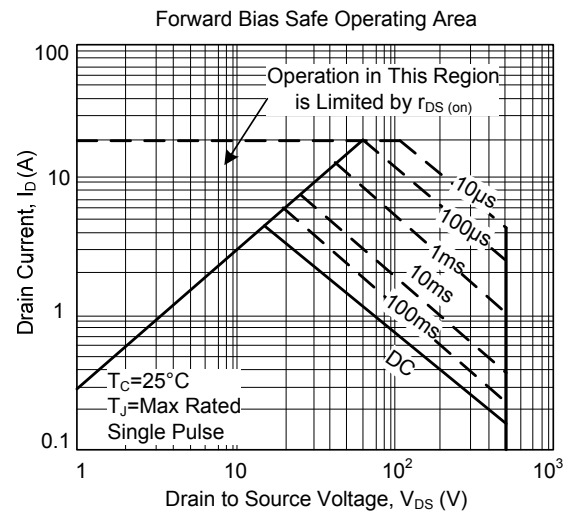
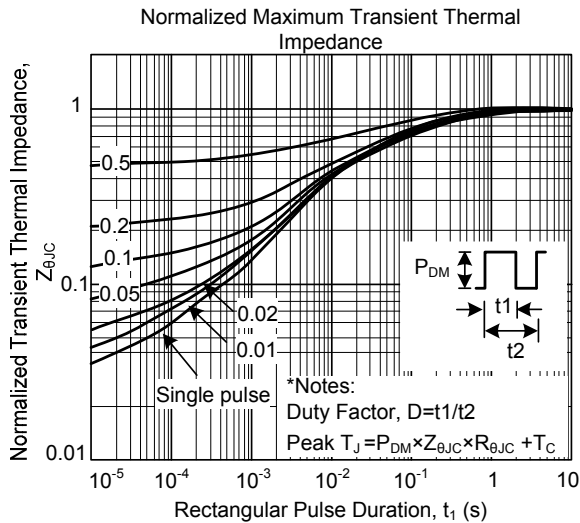
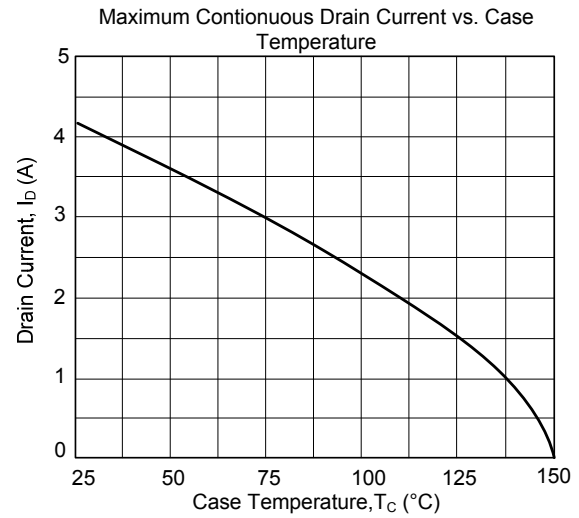
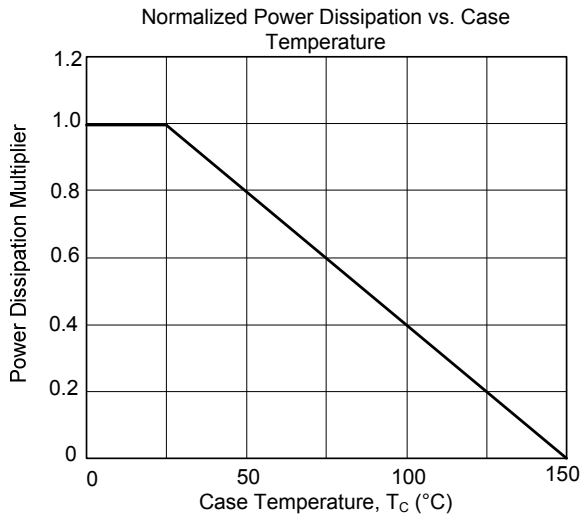


Gate Charge Test Circuit

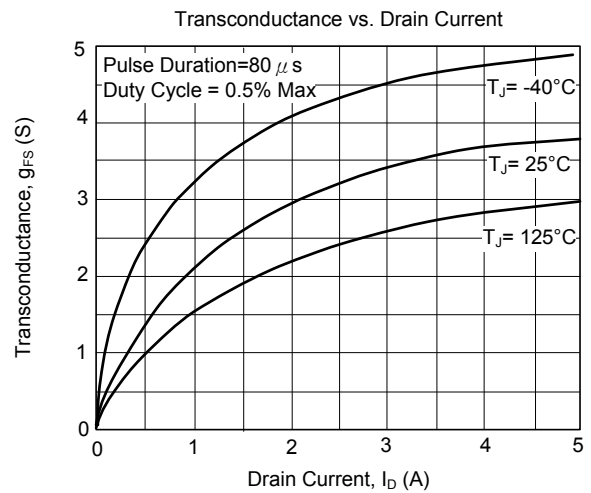
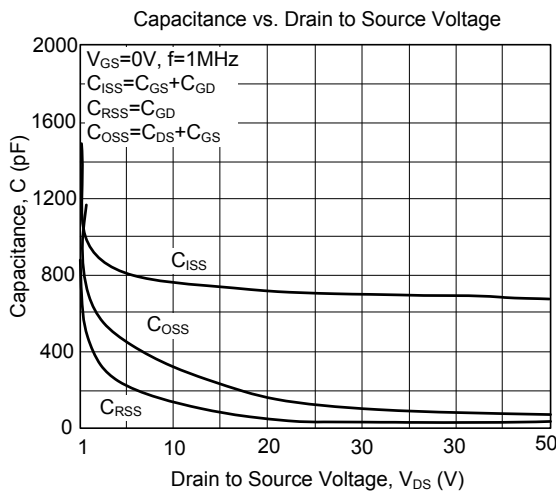
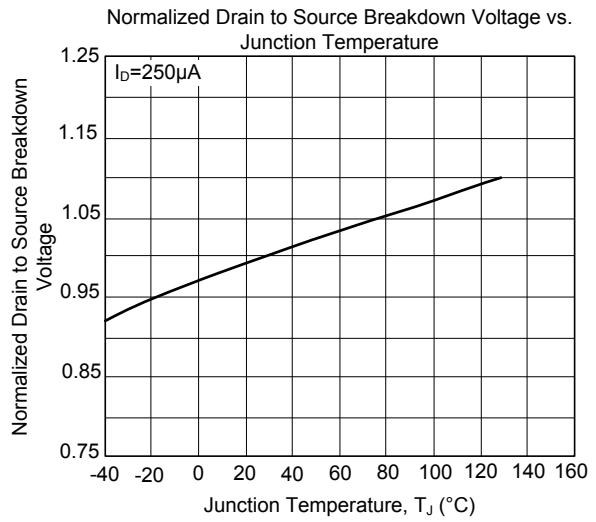
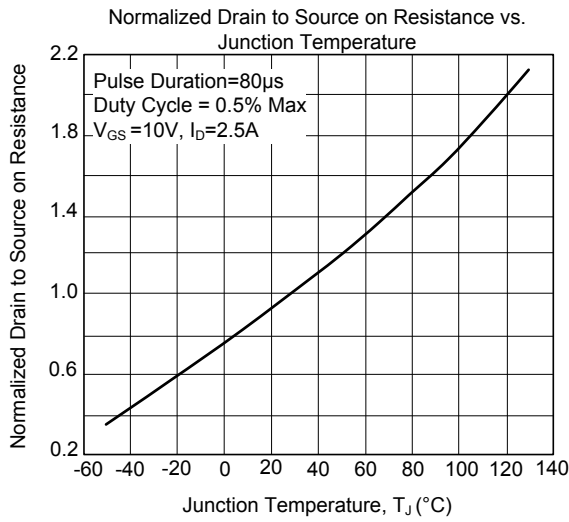
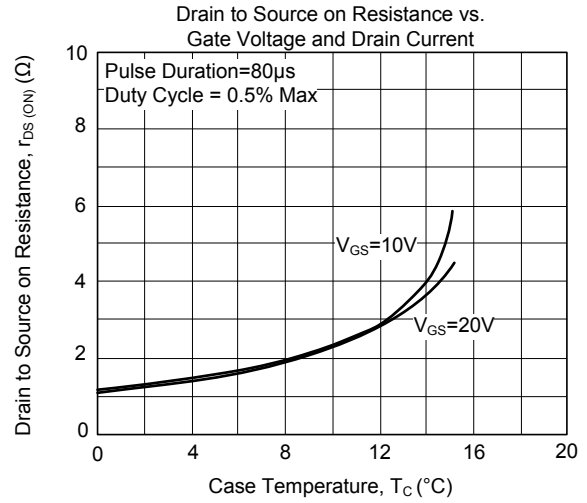
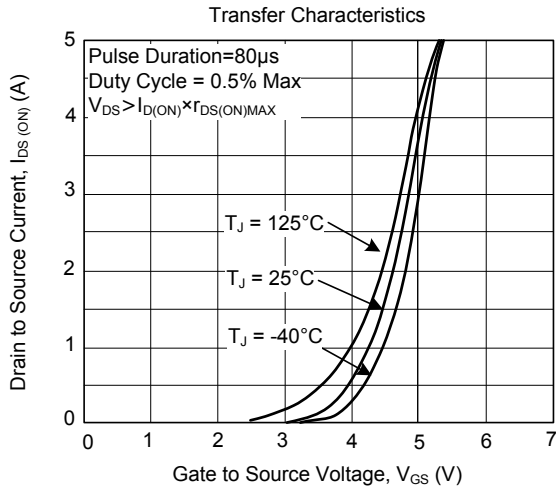


Gate Charge Waveforms

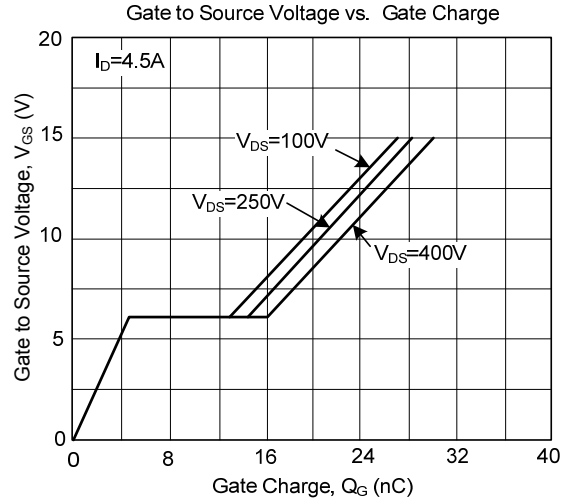
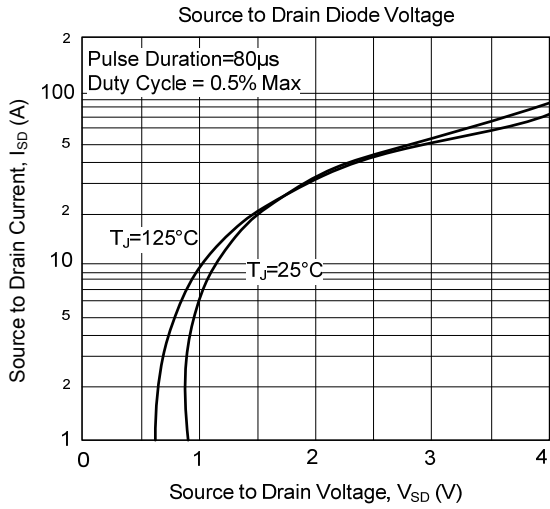
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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