



UF640-HC

Power MOSFET

18A, 200V N-CHANNEL POWER MOSFET

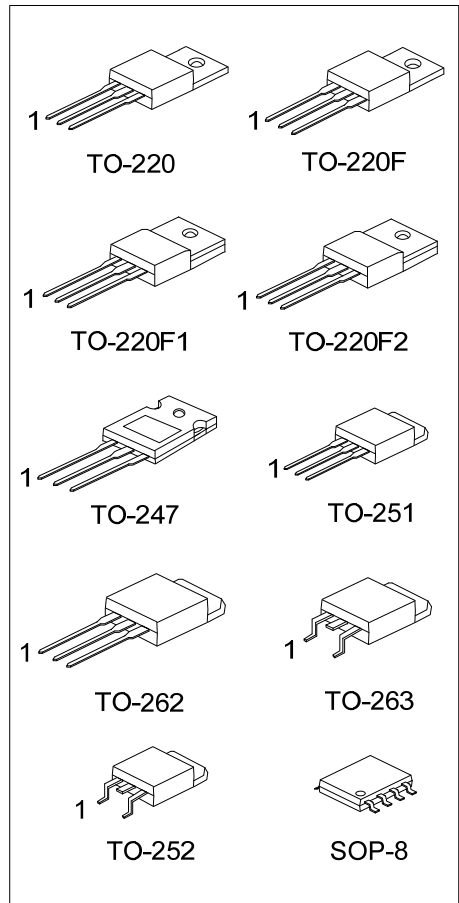
DESCRIPTION

The UTC **UF640-HC** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$, high switching speed, high current capacity and low gate charge.

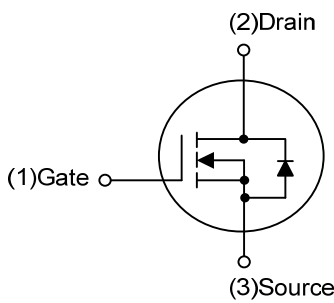
The UTC **UF640-HC** is universally applied in low voltage such as automotive, high efficiency switching for AC/DC converters and DC motor control, etc.

FEATURES

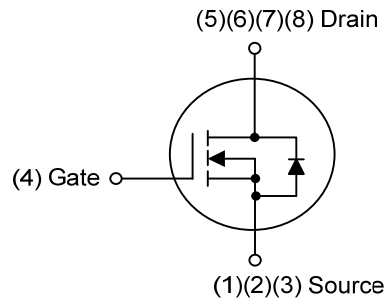
- * $R_{DS(ON)} \leq 0.18 \Omega @ V_{GS}=10V, I_D=9.0A$
- * High Switching Speed



SYMBOL



TO-220/TO-220F/TO-220F1
TO-220F2/TO-247/TO-251
TO-252/TO-262/TO-263

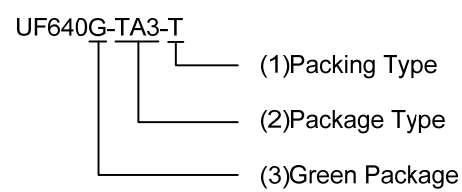


PDFN5x6

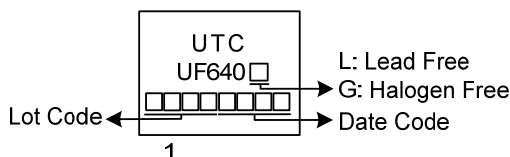
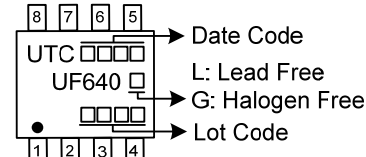
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UF640L-TA3-T	UF640G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UF640L-TF1-T	UF640G-TF1-T	TO-220F1	G	D	S	-	-	-	-	-	Tube
UF640L-TF2-T	UF640G-TF2-T	TO-220F2	G	D	S	-	-	-	-	-	Tube
UF640L-TF3-T	UF640G-TF3-T	TO-220F	G	D	S	-	-	-	-	-	Tube
UF640L-TM3-T	UF640G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
UF640L-TN3-R	UF640G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UF640L-T2Q-T	UF640G-T2Q-T	TO-262	G	D	S	-	-	-	-	-	Tube
UF640L-TQ2-T	UF640G-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
UF640L-TQ2-R	UF640G-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
UF640L-T47-T	UF640G-T47-T	TO-247	G	D	S	-	-	-	-	-	Tube
UF640L-S08-R	UF640G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

 <p>UF640G-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, TF1: TO-220F1, TF2: TO-220F2 TF3: TO-220F, TM3: TO-251, TN3: TO-252, T2Q: TO-262, TQ2: TO-263, T4747: TO-247, S08: SOP-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING

TO-220G/TO-220F/TO-220F1/TO-220F2 TO-247/TO-251/TO-252/TO-262/TO-263	SOP-8
 <p>UTC UF640</p> <p>L: Lead Free G: Halogen Free Date Code</p> <p>Lot Code</p> <p>1</p>	 <p>UTC UF640</p> <p>Date Code L: Lead Free G: Halogen Free Lot Code</p> <p>1 2 3 4</p>

■ ABSOLUTE MAXIMUM RATINGS ($T_c=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	200	V
Gate-Source Voltage		V_{GSS}	± 30	V
Continuous Drain Current	Continuous	I_D	18	A
	Pulsed	I_{DM}	72	A
Single Pulsed Avalanche Current		I_{AS}	5.7	A
Single Pulsed Avalanche Energy		E_{AS}	487	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.3	V/ns
Power Dissipation	TO-220/TO-262 TO-263	P_D	98	W
	TO-220F/TO-220F1 TO-220F2		39	W
	TO-251/TO-252		54	W
	TO-247		120	W
	SOP-8		6	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. $L=30\text{mH}$, $I_{AS}=5.7\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 18\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-220F2 TO-262/TO-263	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-251/TO-252		110	$^{\circ}\text{C}/\text{W}$
	TO-247		50	$^{\circ}\text{C}/\text{W}$
	SOP-8		90	$^{\circ}\text{C}/\text{W}$
	Junction to Case		θ_{JC}	1.27
TO-220/TO-262 TO-263	3.2	$^{\circ}\text{C}/\text{W}$		
TO-220F/TO-220F1 TO-220F2	2.31 (Note)	$^{\circ}\text{C}/\text{W}$		
TO-251/TO-252	1.04	$^{\circ}\text{C}/\text{W}$		
TO-247	20.8 (Note)	$^{\circ}\text{C}/\text{W}$		
SOP-8				

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

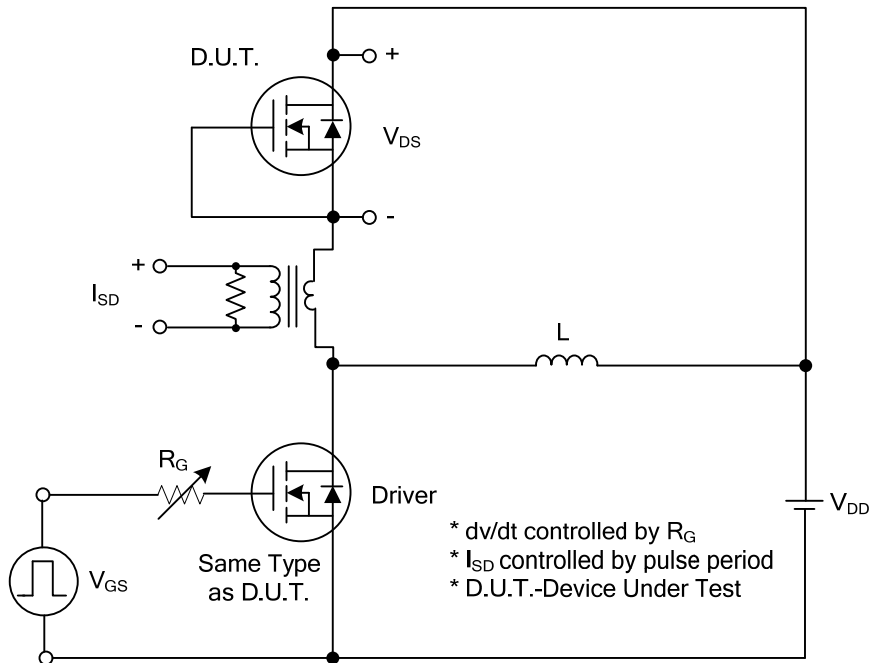
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	200			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =200V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS} V _{GS} =+30V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-100
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =9.0A			0.18	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		840		pF
Output Capacitance	C _{OSS}			150		pF
Reverse Transfer Capacitance	C _{RSS}			10		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =160V, V _{GS} =10V, I _D =18A I _G =1mA (Note 1, 2)		20		nC
Gate to Source Charge	Q _{GS}			5		nC
Gate to Drain Charge	Q _{GD}			4		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =100V, I _D =18A, R _G =25Ω (Note 1, 2)		10		ns
Rise Time	t _R			18		ns
Turn-OFF Delay Time	t _{D(OFF)}			52		ns
Fall-Time	t _F			21		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				18	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				72	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S =18A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time	t _{rr}	I _S =18A, V _{GS} =0V, dI _F /dt=100A/μs (Note 1)		140		ns
Reverse Recovery Charge	Q _{rr}				0.7	

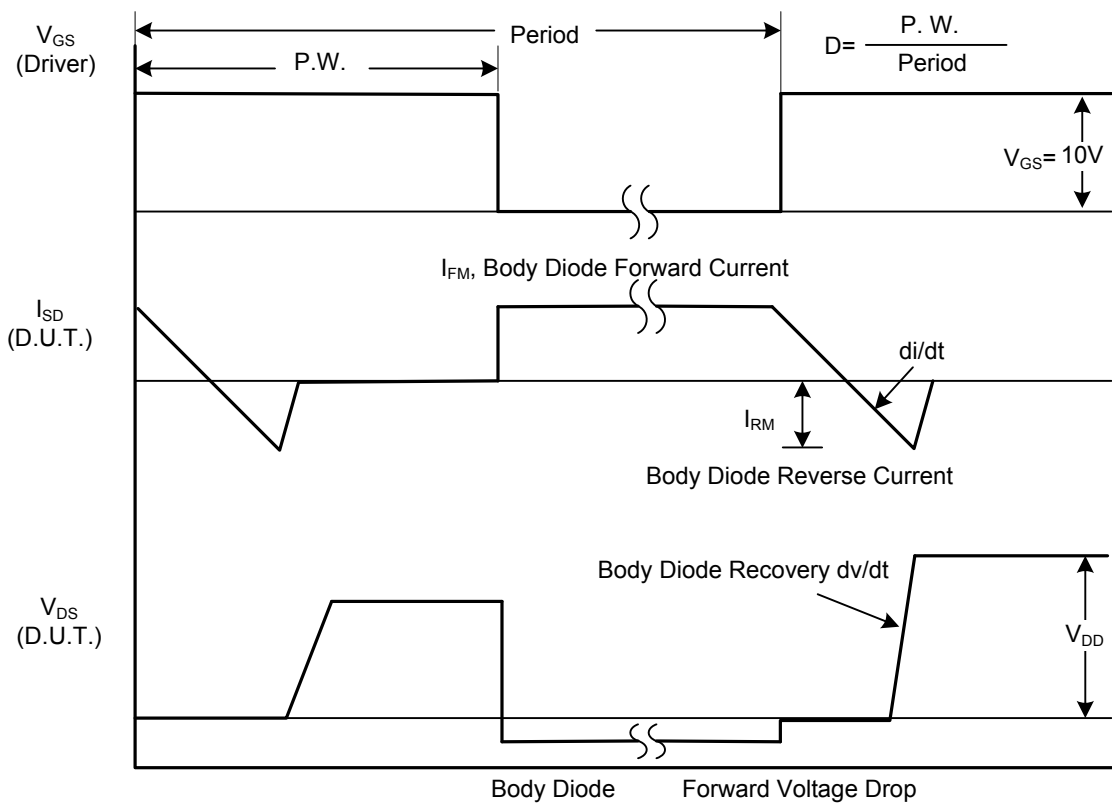
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

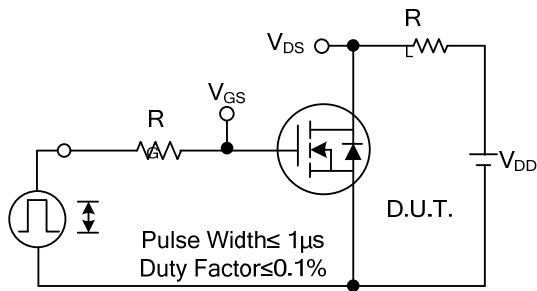


Peak Diode Recovery dv/dt Test Circuit

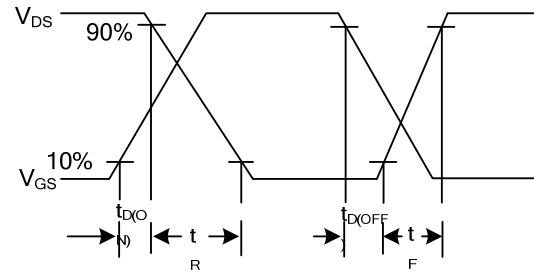


Peak Diode Recovery dv/dt Waveforms

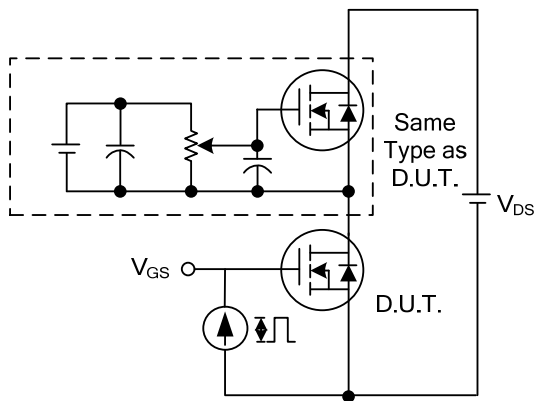
TEST CIRCUITS AND WAVEFORMS



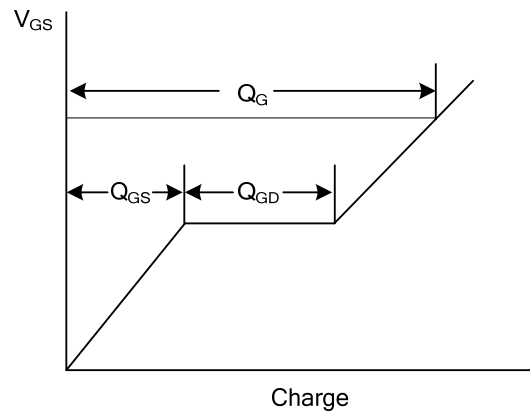
Switching Test Circuit



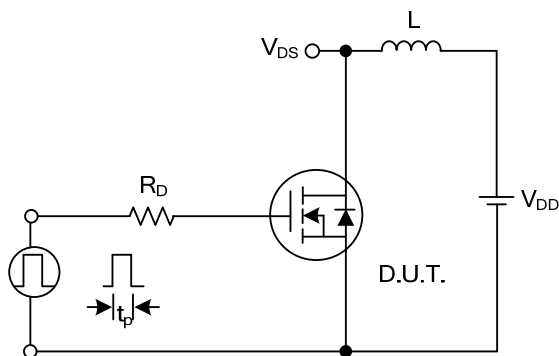
Switching Waveforms



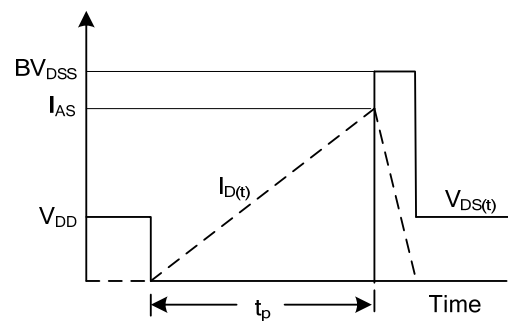
Gate Charge Test Circuit



Gate Charge Waveform

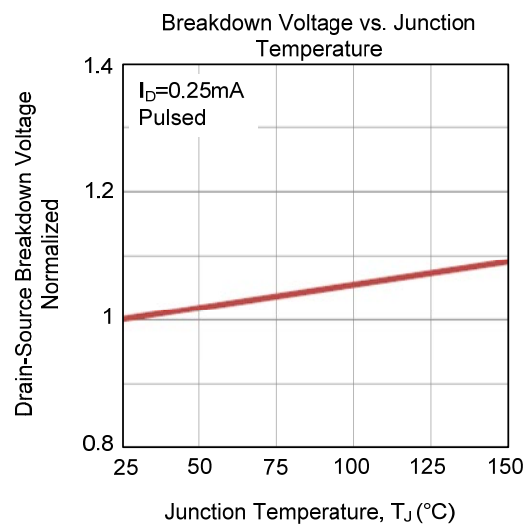
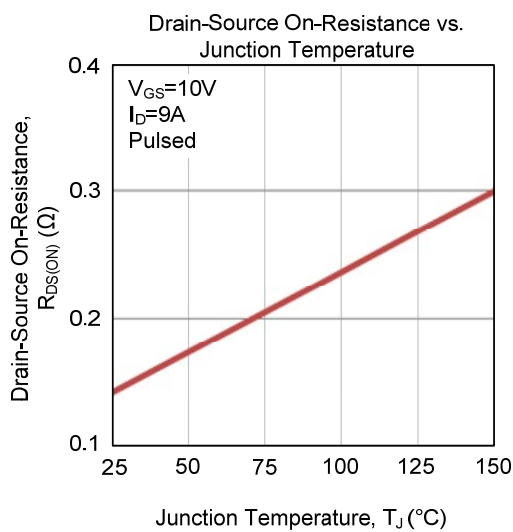
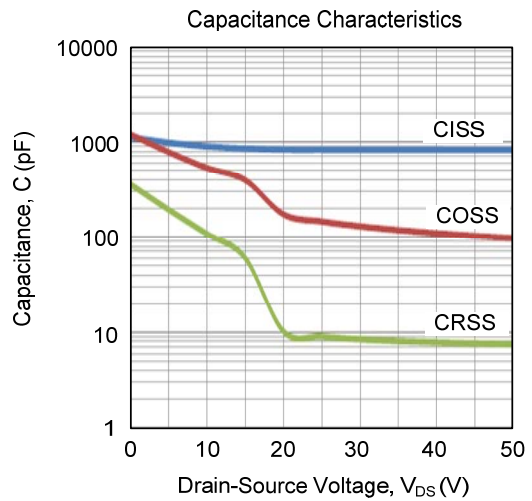
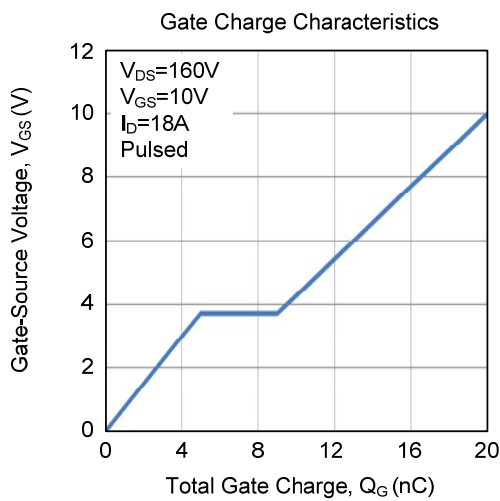
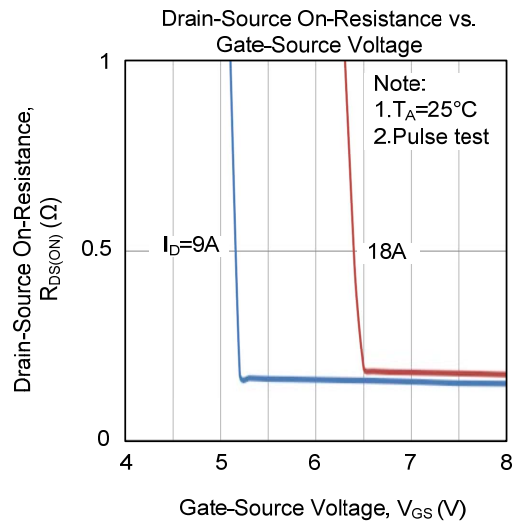
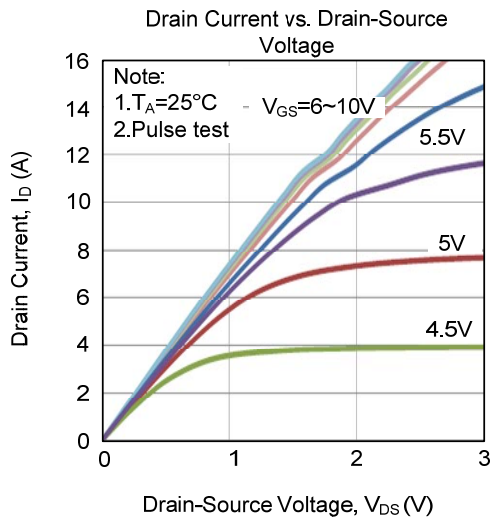


Unclamped Inductive Switching Test Circuit

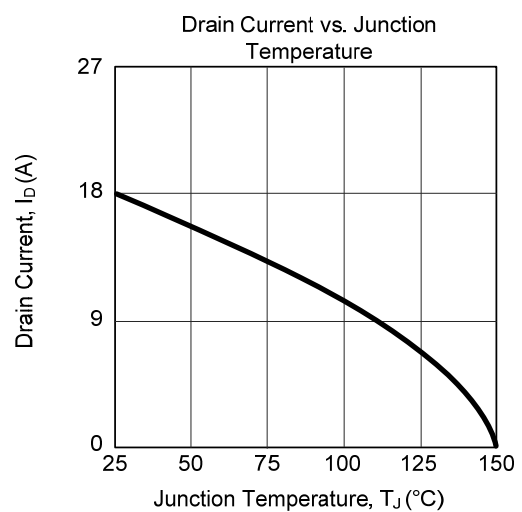
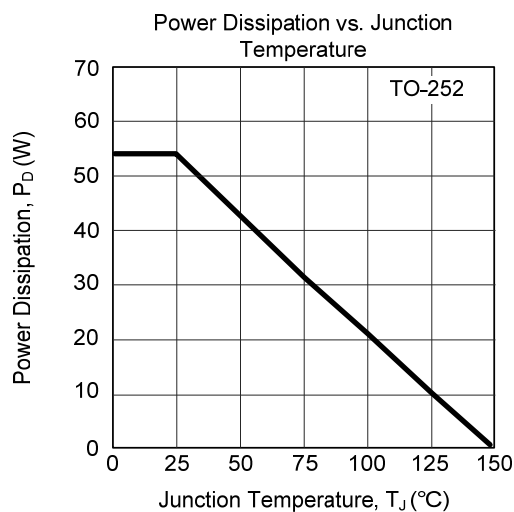
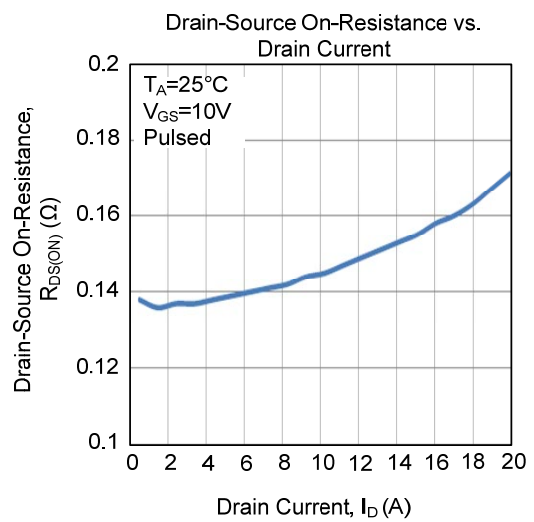
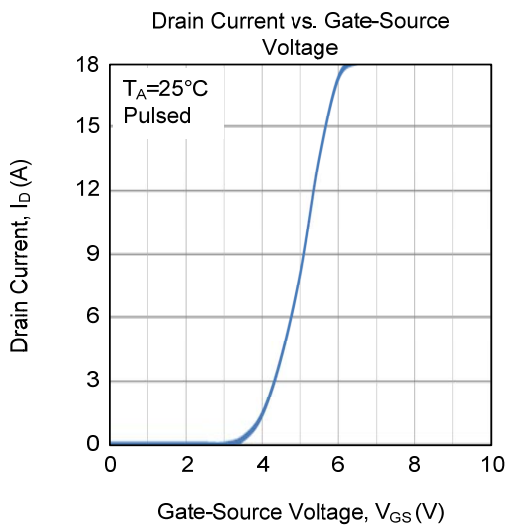
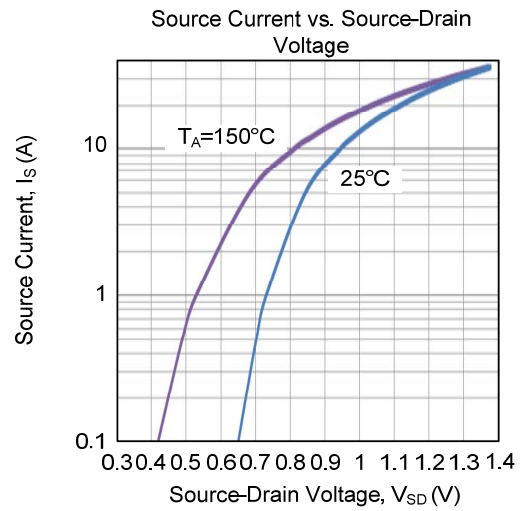
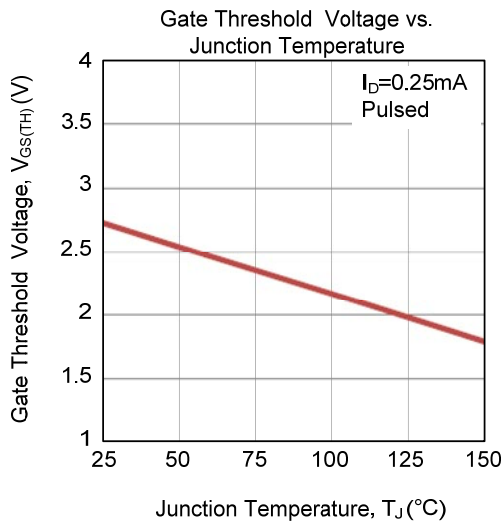


Unclamped Inductive Switching Waveforms

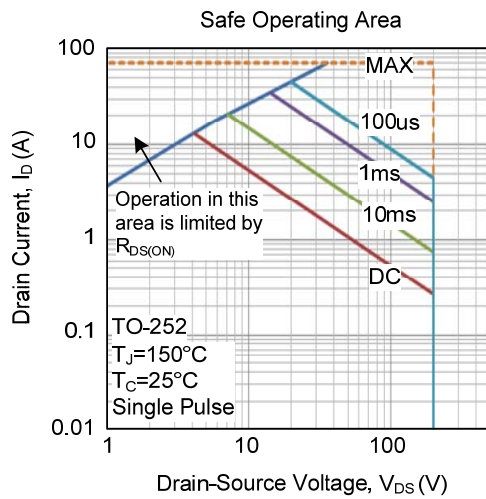
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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