



# 18N25

**Power MOSFET**

## 18A, 250V N-CHANNEL POWER MOSFET

■ DESCRIPTION

The UTC **18N25** is a N-channel enhancement mode power MOSFET using UTC's advanced planar stripe and DMOS technology to provide perfect performance.

This technology can withstand high energy pulse in the avalanche and commutation mode. It can provide minimum on-state resistance and high switching speed.

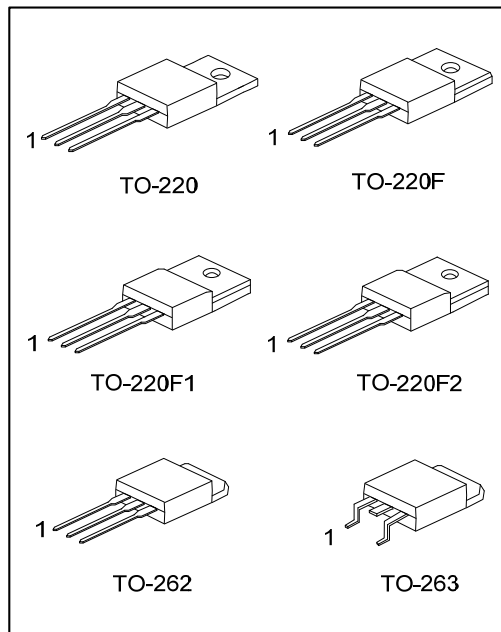
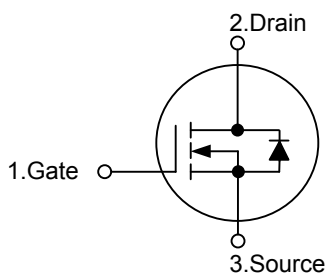
This device is generally applied in active power factor correction and high efficient switched mode power supplies.

■ FEATURES

\*  $R_{DS(ON)} < 0.24 \Omega @ V_{GS}=10V, I_D=9.0A$

\* High switching speed

■ SYMBOL



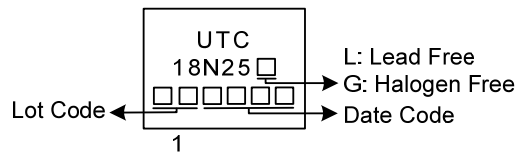
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
18N25L-TA3-T	18N25G-TA3-T	TO-220	G	D	S	Tube
18N25L-TF1-T	18N25G-TF1-T	TO-220F1	G	D	S	Tube
18N25L-TF2-T	18N25G-TF2-T	TO-220F2	G	D	S	Tube
18N25L-TF3-T	18N25G-TF3-T	TO-220F	G	D	S	Tube
18N25L-T2Q-T	18N25G-T2Q-T	TO-262	G	C	E	Tube
18N25L-TQ2-T	18N25G-TQ2-T	TO-263	G	D	S	Tube
18N25L-TQ2-R	18N25G-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>18N25G-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, TN3: TO-252, T2Q: TO-262, TQ2: TO-263</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain to Source Voltage		$V_{DSS}$	250	V	
Gate to Source Voltage		$V_{GSS}$	$\pm 20$	V	
Drain Current	Continuous	$I_D$	18	A	
	Pulsed (Note 2)	$I_{DM}$	36	A	
Avalanche Energy		Single Pulsed (Note 3)	$E_{AS}$	560	mJ
Power Dissipation	TO-220	$P_D$	102	W	
	TO-220F/TO-220F1		36	W	
	TO-220F2		110	$^\circ\text{C}$	
	TO-262/TO-263				
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.  $L=10\text{mH}$ ,  $I_{AS}=10.6\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		$\theta_{JA}$	62.5	$^\circ\text{C/W}$
Junction to Case	TO-220	$\theta_{JC}$	1.23	$^\circ\text{C/W}$
	TO-220F/TO-220F1		3.47	$^\circ\text{C/W}$
	TO-220F2		1.14	$^\circ\text{C/W}$
	TO-262/TO-263			

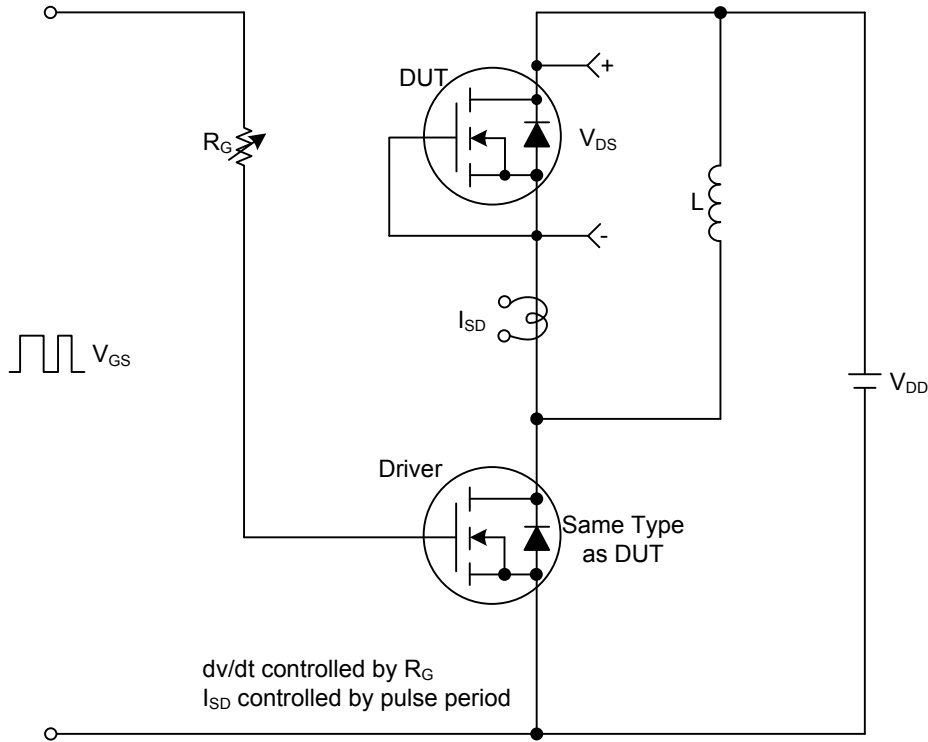
■ ELECTRICAL CHARACTERISTICS (T<sub>c</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	250			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =250V, V <sub>GS</sub> =0V			10	μA
Gate-Source Leakage Current	Forward	V <sub>GS</sub> =20V, V <sub>DS</sub> = 0V V <sub>GS</sub> = -20V, V <sub>DS</sub> = 0V			100	nA
	Reverse				-100	
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0		4.0	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =9.0A		0.16	0.24	Ω
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz		1320		pF
Output Capacitance	C <sub>OSS</sub>			200		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			24		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	Q <sub>G</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =10V, I <sub>D</sub> =18A (Note 1,2)		32		nC
Gate-Source Charge	Q <sub>GS</sub>			11		nC
Gate-Drain Charge	Q <sub>GD</sub>			9		nC
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =100V, I <sub>D</sub> =18A, R <sub>G</sub> =25Ω (Note 1,2)		21		ns
Turn-ON Rise Time	t <sub>R</sub>			22		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			85		ns
Turn-OFF Fall Time	t <sub>F</sub>			25		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	I <sub>S</sub>				18	A
Maximum Body-Diode Pulsed Current	I <sub>SM</sub>				36	A
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =18A, V <sub>GS</sub> =0V			1.4	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>S</sub> =3.0A, V <sub>R</sub> =30V, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/μs		204		ns
Reverse Recovery Charge	Q <sub>rr</sub>				1.65	

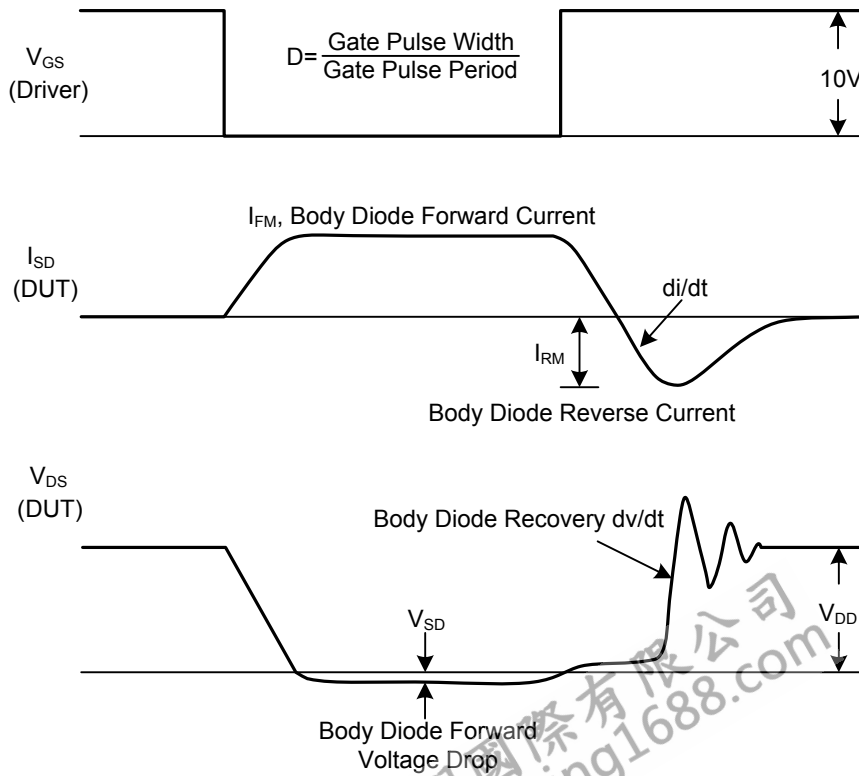
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

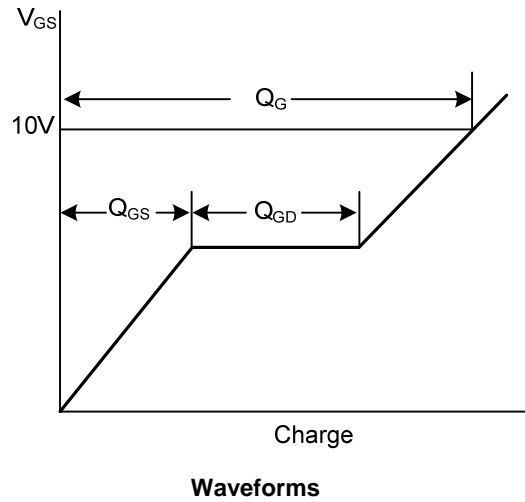
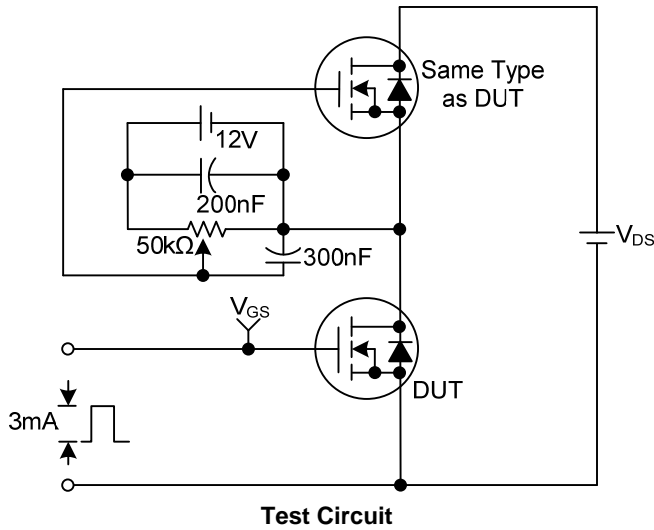


Peak Diode Recovery dv/dt Test Circuit & Waveforms

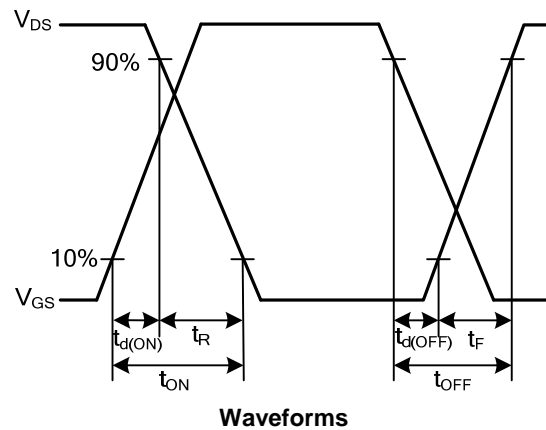
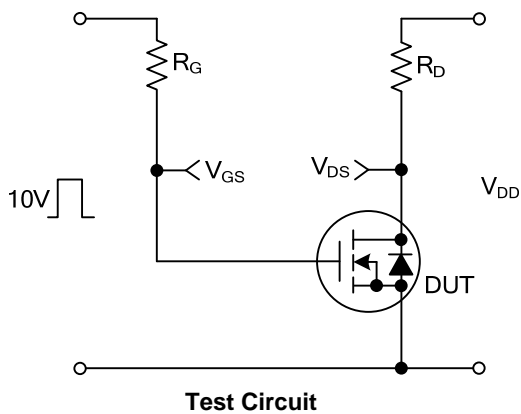


## TEST CIRCUITS AND WAVEFORMS(Cont.)

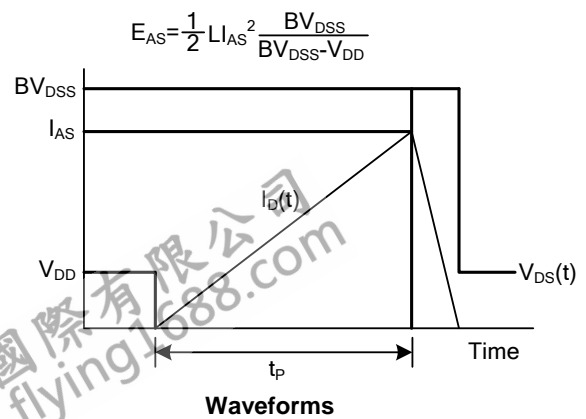
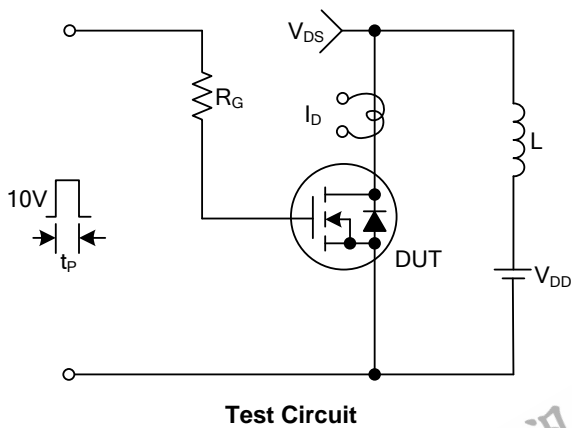
### Gate Charge



### Resistive Switching

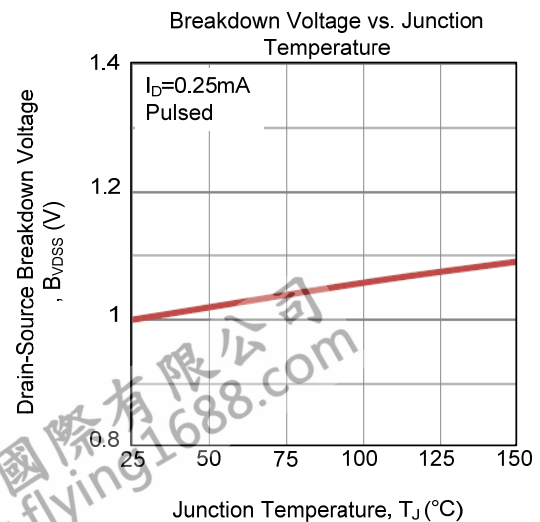
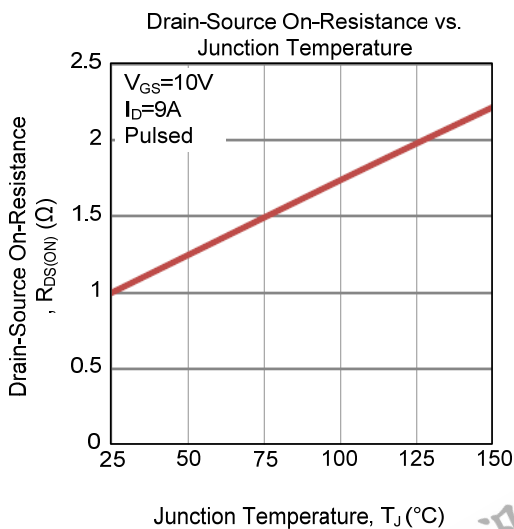
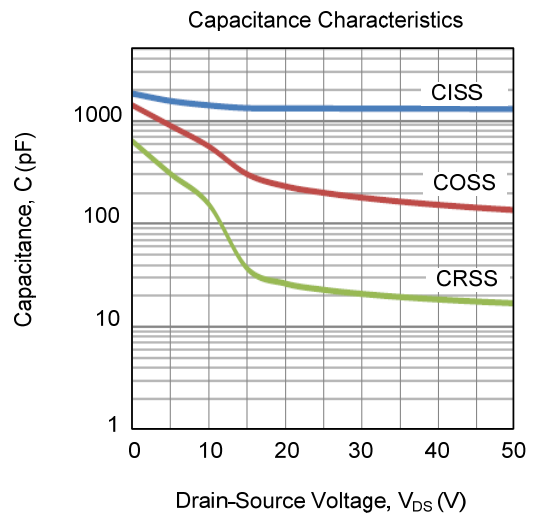
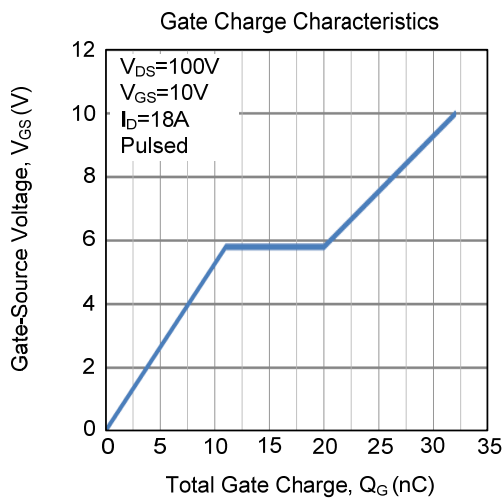
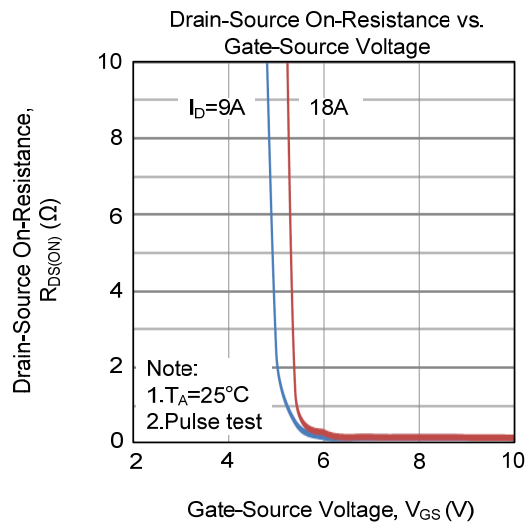
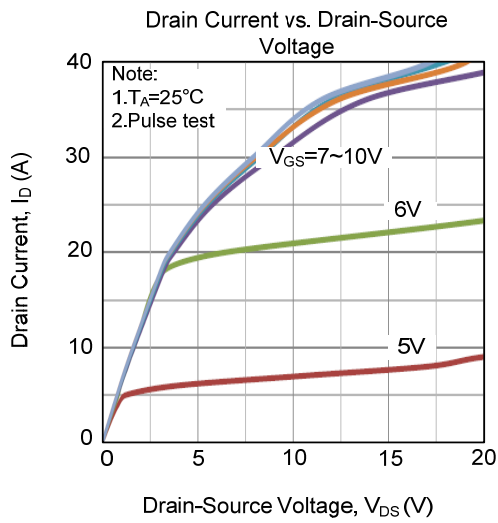


### Unclamped Inductive Switching

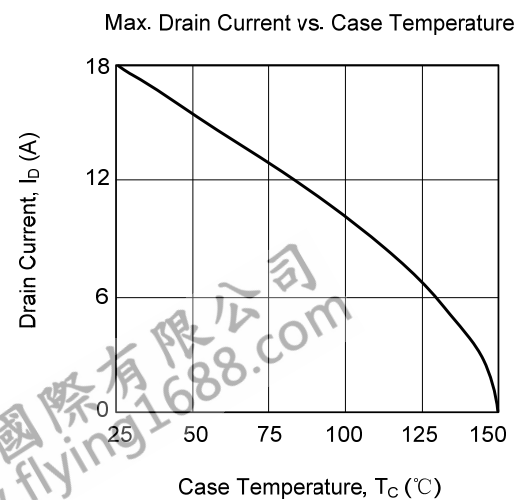
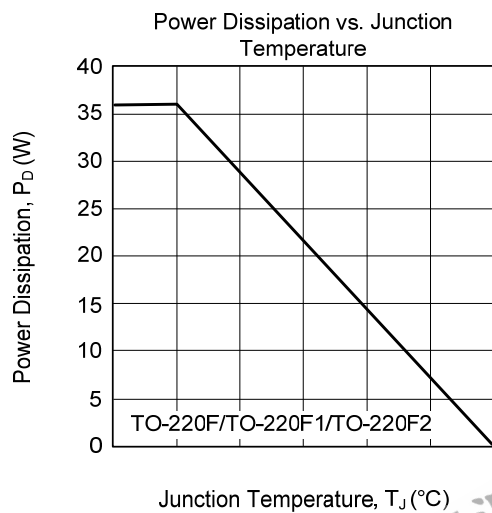
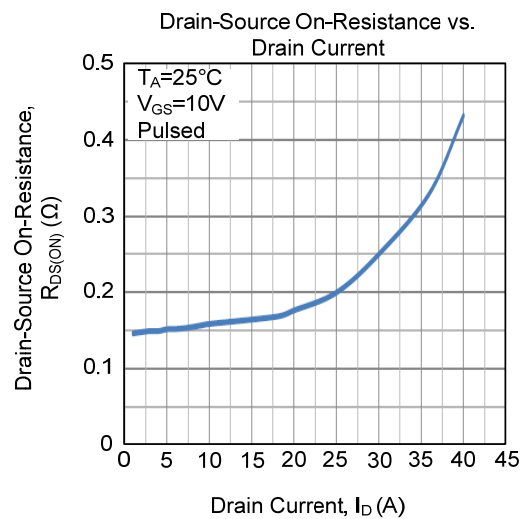
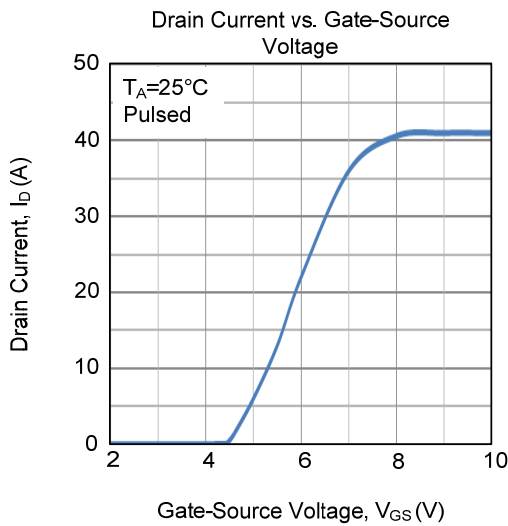
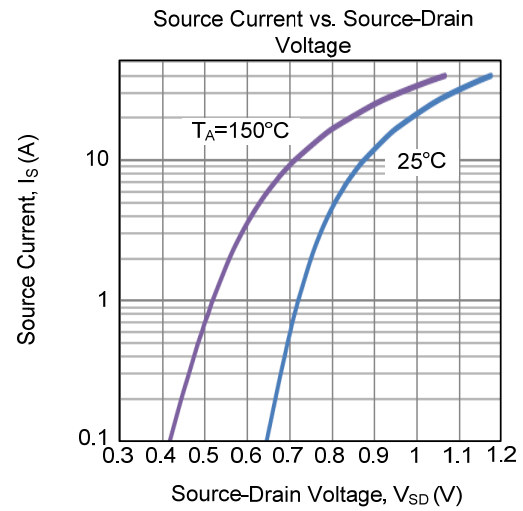
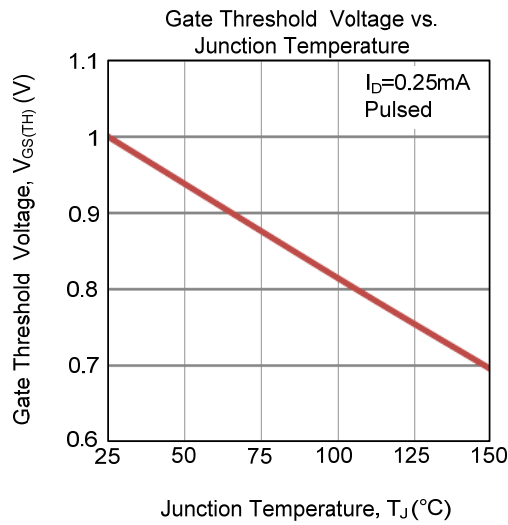


$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

■ TYPICAL CHARACTERISTICS

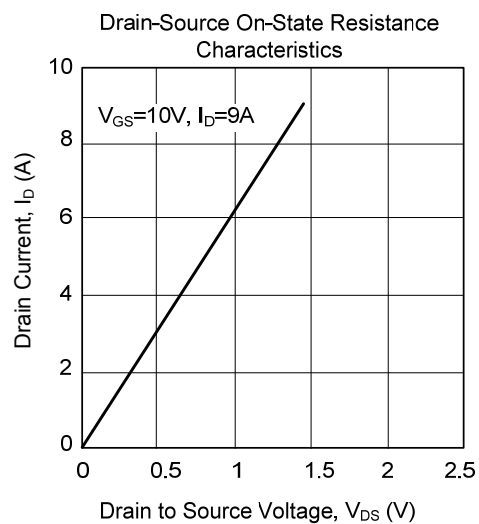
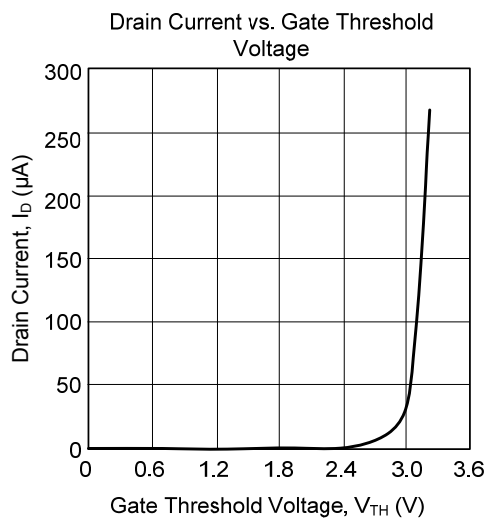
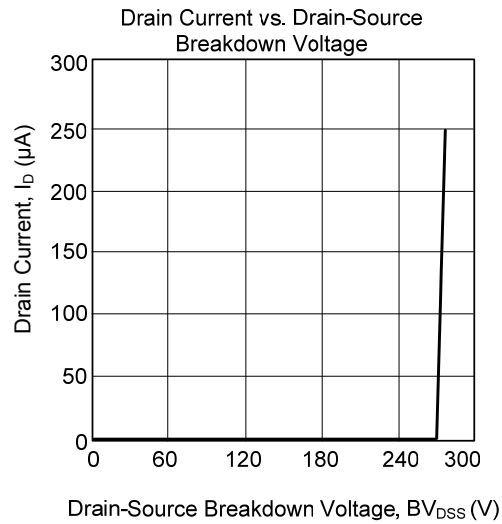
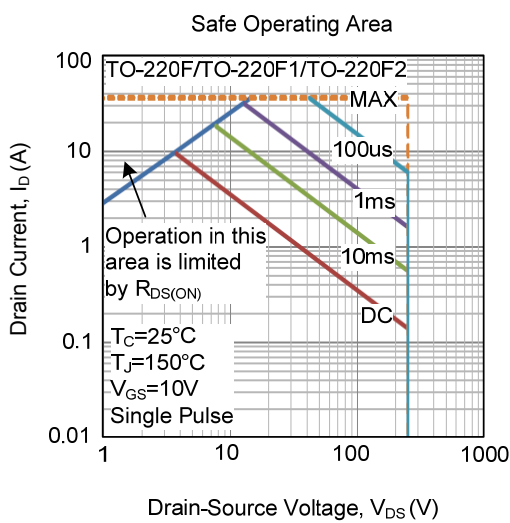


## TYPICAL CHARACTERISTICS (Cont.)





### TYPICAL CHARACTERISTICS (Cont.)



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