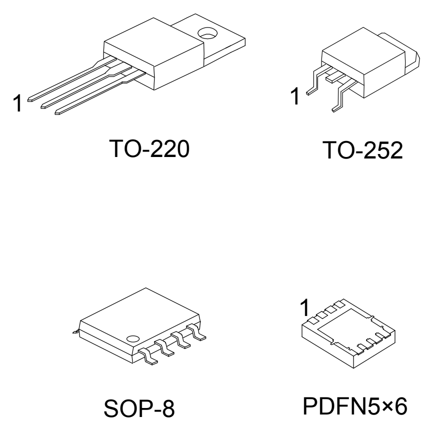
32A, 100V N-CHANNEL POWER MOSFET



■ DESCRIPTION

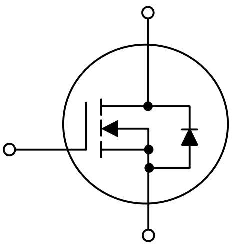
The UTC **UT32N10** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$ and high switching speed.

The UTC **UT32N10** is suitable for all commercial-industrial applications at power dissipation levels to approximately 50 watts, etc.

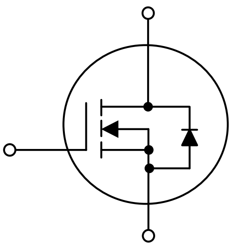
■ FEATURES

* $R_{DS(ON)} \le 18\ m\Omega$ @ V_{GS}=10V, I_D=16A
  $R_{DS(ON)} \le 25\ m\Omega$ @ V_{GS}=4.5V, I_D=16A
* High Switching Speed
* Simple drive requirement

■ SYMBOL



TO-220/TO-252



SOP-8/PDFN5×6

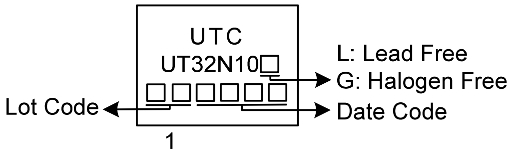
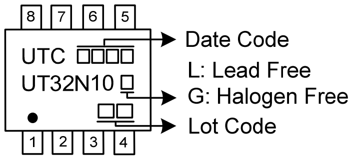
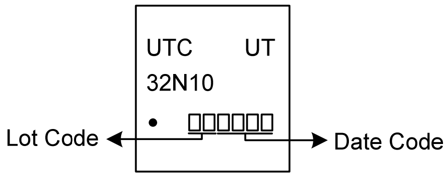
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT32N10L-TA3-T	UT32N10G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UT32N10L-TN3-R	UT32N10G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT32N10L-S08-R	UT32N10G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UT32N10L-P5060-R	UT32N10G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

UT32N10G-TA3-R (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TN3: TO-252, S08: SOP-8 P5060: PDFN5×6 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

PACKAGE	MARKING
TO-220 TO-252	
SOP-8	
PDFN5×6	

■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	32	A
	Pulsed (Note 2)	I_{DM}	64	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	43	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	22	V/ns
Power Dissipation	TO-220	P_D	120	W
	TO-252		45	W
	SOP-8		5	W
	PDFN5×6		37	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°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=0.1mH, I_{AS}=29A, V_{DD}=50V, R_G=25Ω, Starting T_J = 25°C
4. I_{SD}≤30A, di/dt≤200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	°C/W
	TO-252		50 (Note)	°C/W
	TO-252		125 (Note)	°C/W
	SOP-8		65 (Note)	°C/W
Junction-to-Case	TO-220	θ_{JC}	1.04	°C/W
	TO-252		2.77 (Note)	°C/W
	SOP-8		25 (Note)	°C/W
	PDFN5×6		3.37 (Note)	°C/W

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

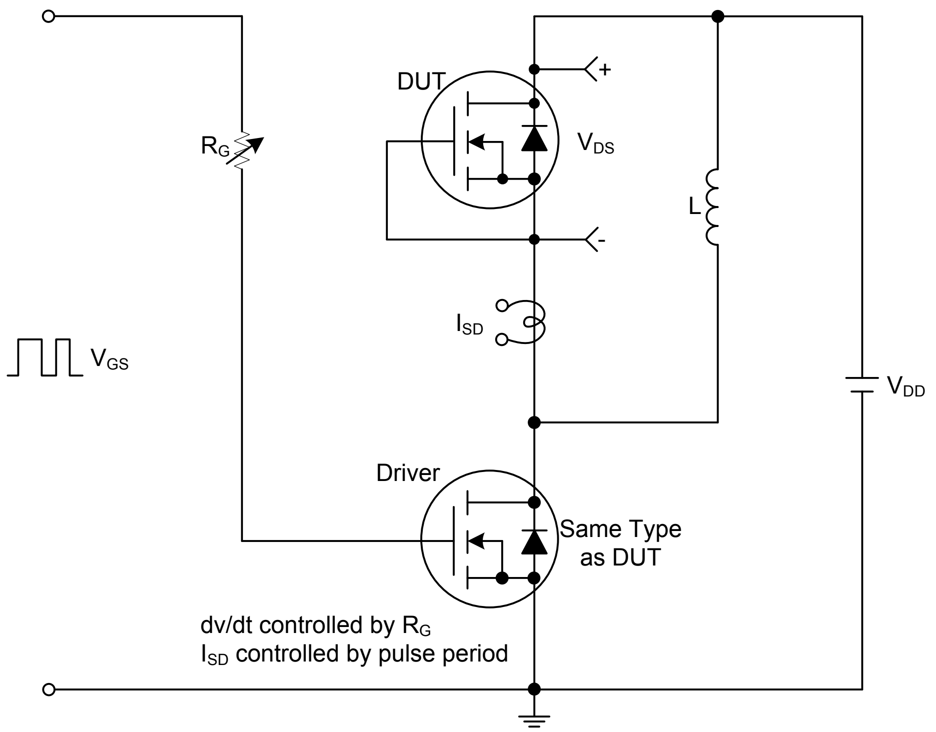
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	100			V
Drain-Source Leakage Current	I_{DSS}	V_{DS} =100V,V_{GS} =0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Drain to Source On-state Resistance	$R_{DS(ON)}$	V_{GS} =10V, I_D =16A			18	mΩ
		V_{GS} =4.5V, I_D =16A			25	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		5000		pF
Output Capacitance	C_{OSS}			260		pF
Reverse Transfer Capacitance	C_{RSS}			235		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q_G	V_{DS}=80V, V_{GS}=10V, I_D=32A, I_G=1mA (Note 1, 2)		130		nC
Gate Source Charge	Q_{GS}			22		nC
Gate Drain Charge	Q_{GD}			33		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	V_{DD}=50V, V_{GS}=10V, I_D=32A, R_G =3Ω (Note 1, 2)		14		ns
Turn-ON Rise Time	t_R			21		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			72		ns
Turn-OFF Fall-Time	t_F			27		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				32	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				64	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	I_S =32A, V_{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)	t_{rr}	I_S=30A,V_{GS}=0V, dI/dt=100A/μs		128		ns
Reverse Recovery Charge	Q_{rr}			260		nC

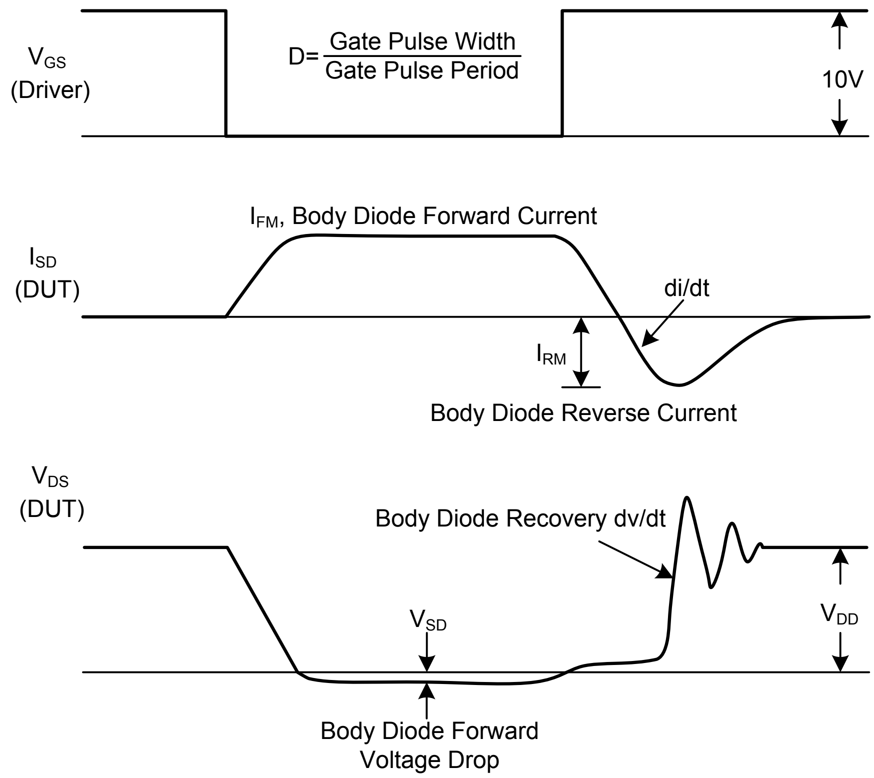
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



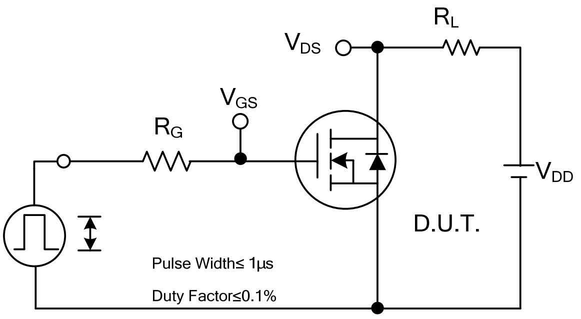
Peak Diode Recovery dv/dt Test Circuit



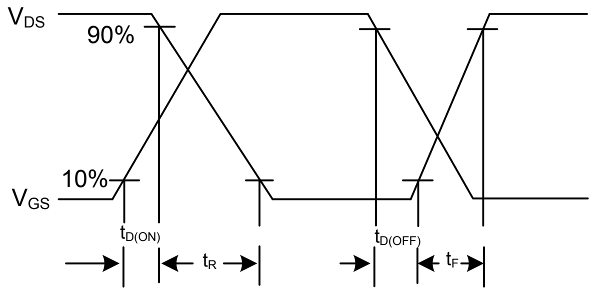
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

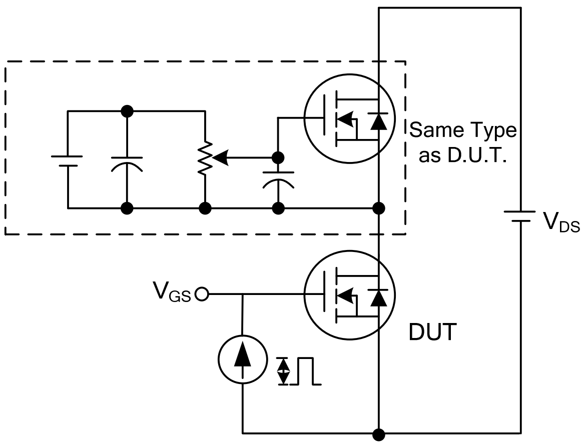
■ TEST CIRCUITS AND WAVEFORMS



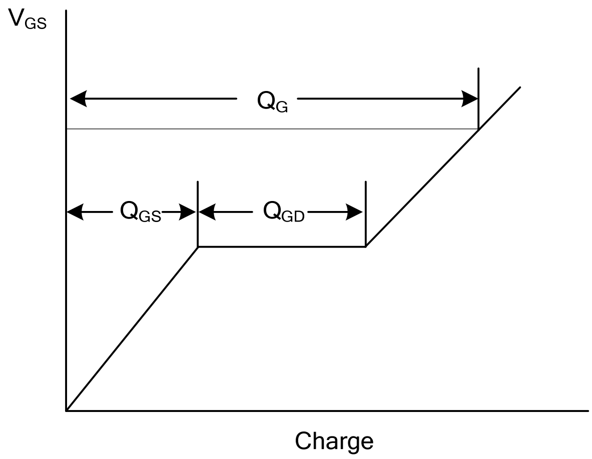
Switching Test Circuit



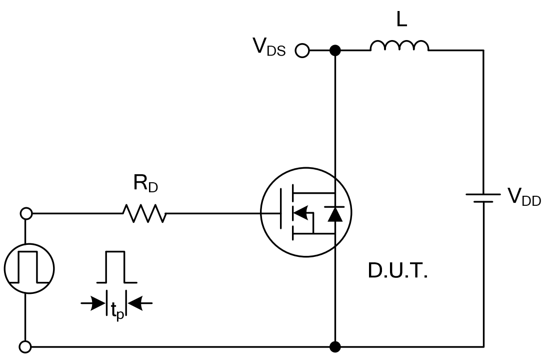
Switching Waveforms



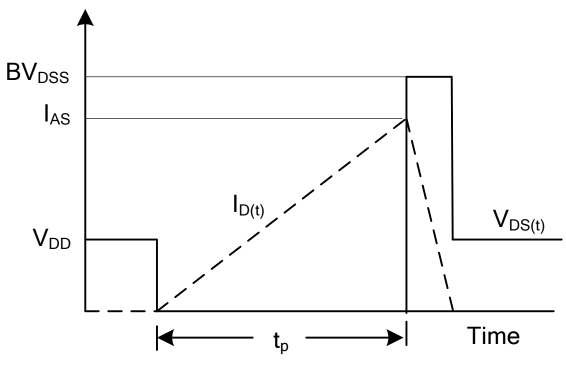
Gate Charge Test Circuit



Gate Charge Waveform



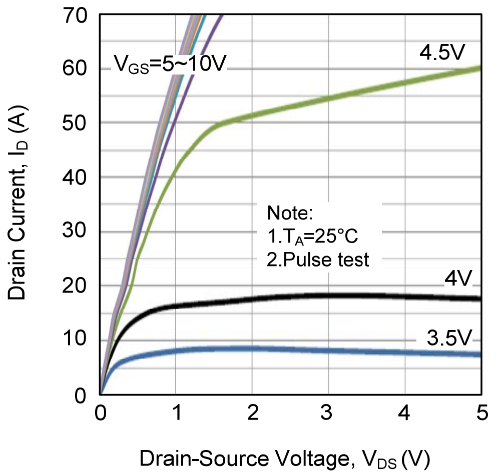
Unclamped Inductive Switching Test Circuit



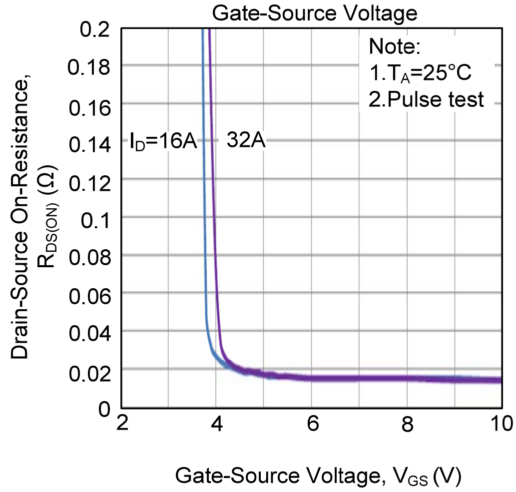
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

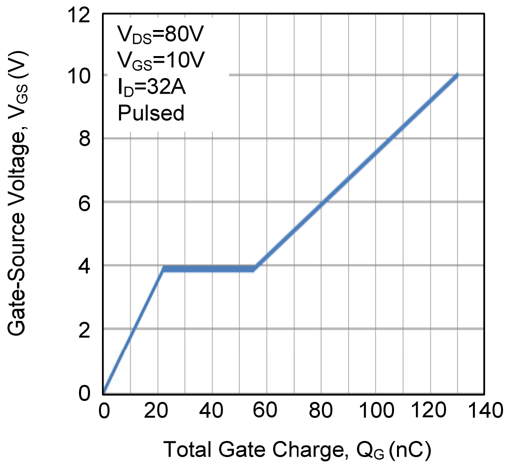
Drain Current vs. Drain-Source Voltage



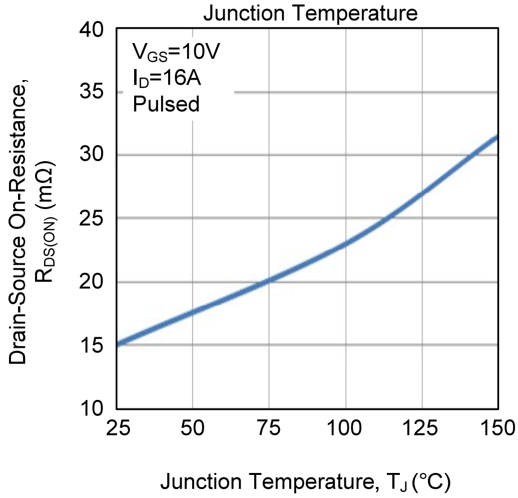
Drain-Source On-Resistance vs. Gate-Source Voltage



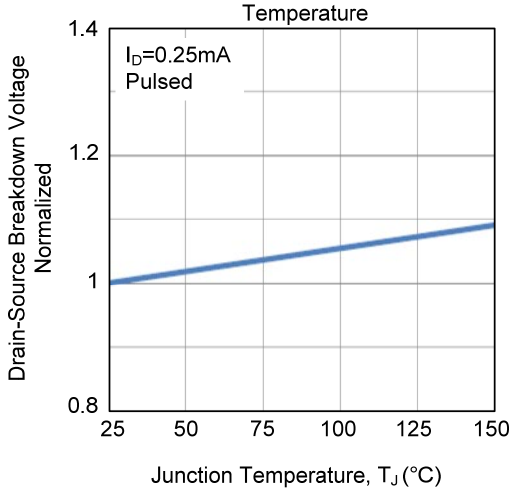
Gate Charge Characteristics



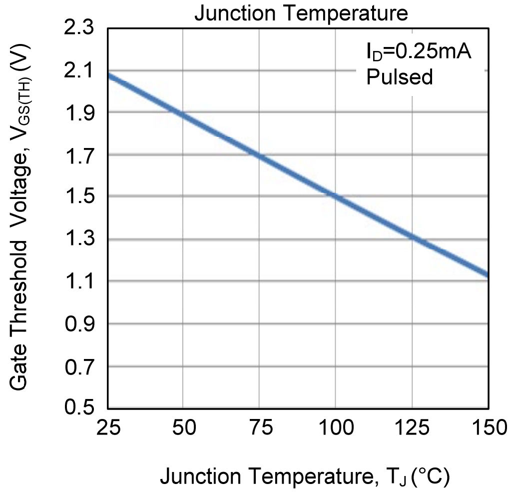
Drain-Source On-Resistance vs. Junction Temperature



Breakdown Voltage vs. Junction Temperature

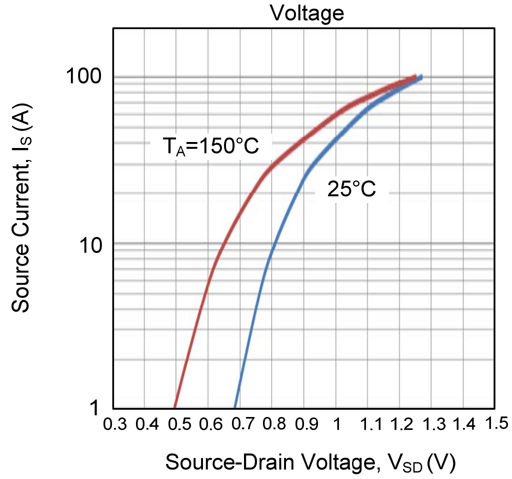


Gate Threshold Voltage vs. Junction Temperature

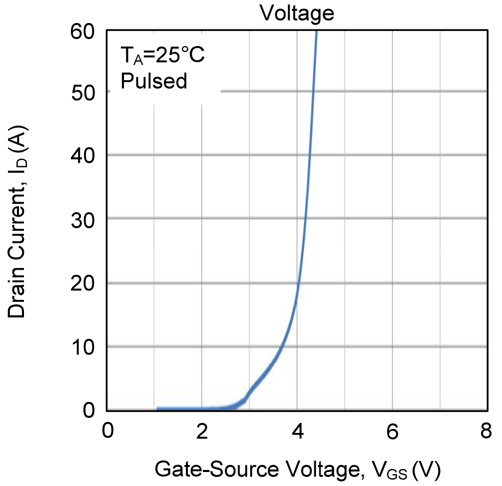


■ TYPICAL CHARACTERISTICS (Cont.)

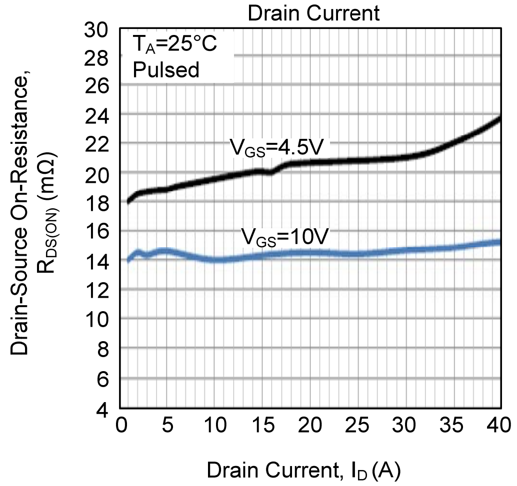
Source Current vs. Source-Drain Voltage



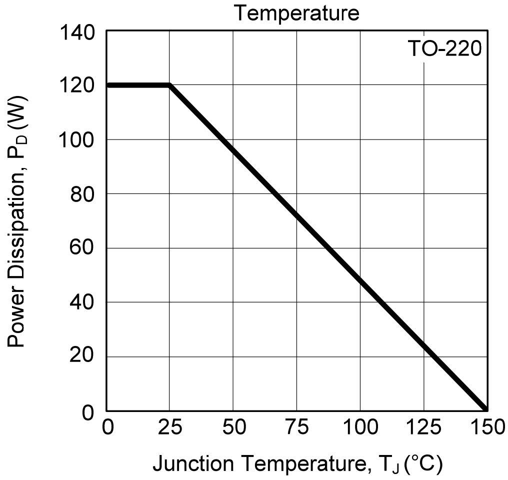
Drain Current vs. Gate-Source Voltage



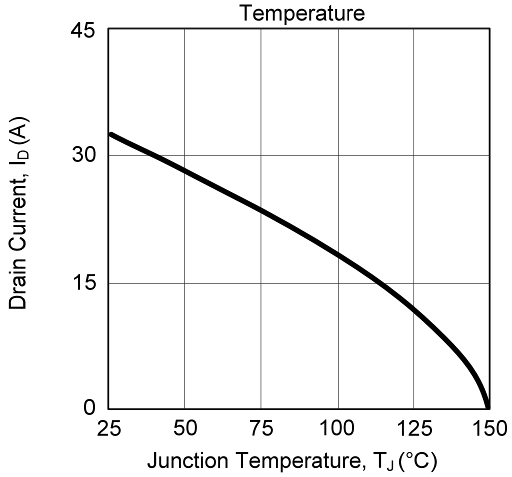
Drain-Source On-Resistance vs. Drain Current



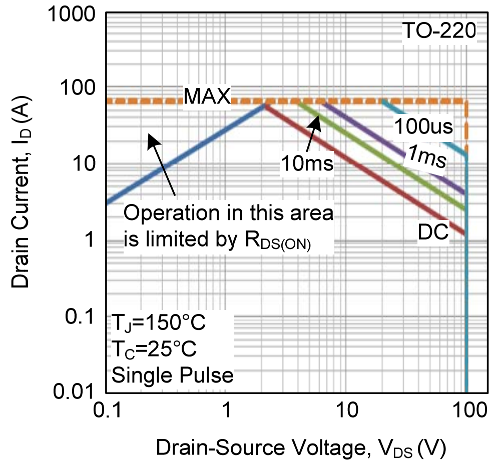
Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



Safe Operating Area



■ TYPICAL CHARACTERISTICS (Cont.)