



UTT120N04

Power MOSFET

120A, 40V N-CHANNEL POWER MOSFET

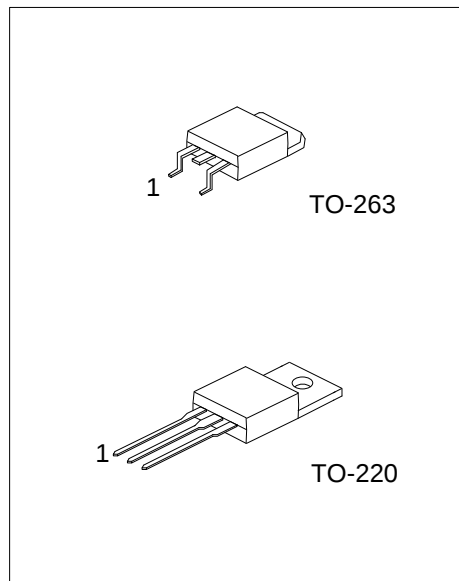
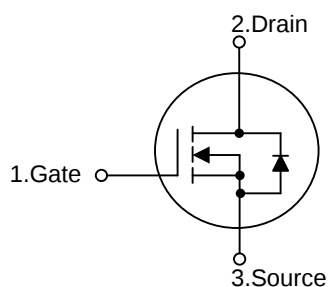
DESCRIPTION

The UTC **UTT120N04** is an N-channel enhancement mode Power FET, it uses UTC's advanced technology to provide customers a minimum on-state resistance and high switching speed.

FEATURES

- * $R_{DS(ON)} \leq 3.8m\Omega$ @ $V_{GS}=10V$, $I_D=60A$
- * High switching speed
- * Improved dv/dt capability

SYMBOL



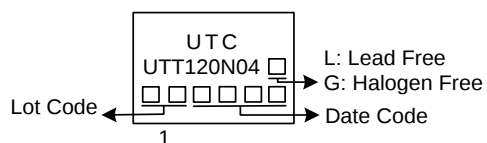
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT120N04L-TA3-T	UTT120N04G-TA3-T	TO-220	G	D	S	Tube
UTT120N04L-TQ2-T	UTT120N04G-TQ2-T	TO-263	G	D	S	Tube
UTT120N04L-TQ2-R	UTT120N04G-TQ2-R	TO-263	G	D	S	Tape Reel

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

UTT120N04G-TA3-T	(1) Packing Type	(1) T: Tube, R: Tape Reel
	(2) Package Type	(2) TA3: TO-220, TQ2: TO-263
	(3) Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

MARKING



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	40	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous	I_D	120	A
	Pulsed	I_{DM}	240	A
Avalanche Energy	Single Pulsed	E_{AS}	420	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	2.5	V/ns
Power Dissipation		P_D	100	W
Junction Temperature		T_J	+150	°C
Storage Temperature Range		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. $I_{SD} \leq 30A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ C$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case	θ_{JC}	0.75	°C/W

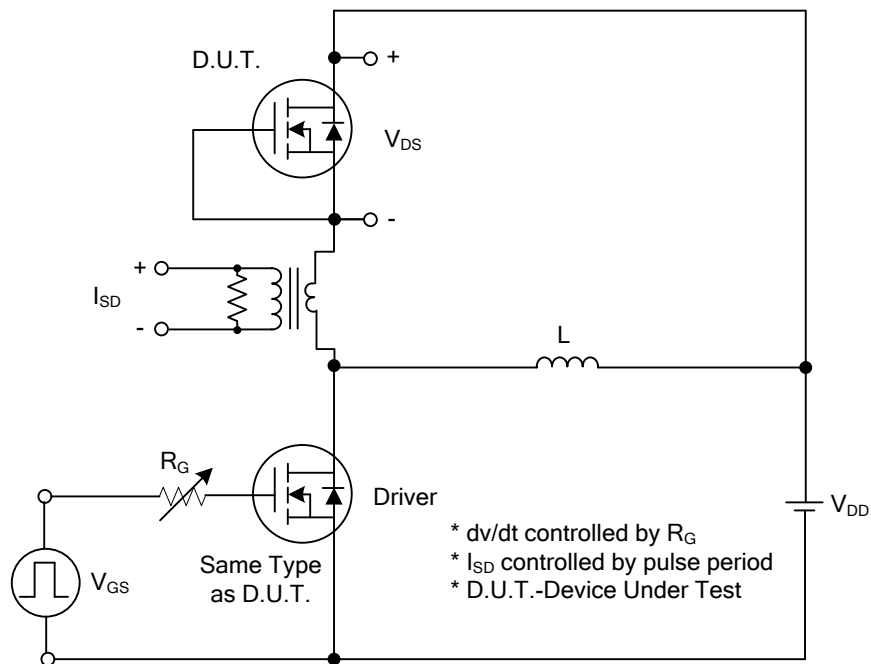
ELECTRICAL CHARACTERISTICS

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	40			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =32V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	I _D =250μA, V _{DS} =V _{GS}	1.0		3.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =60A			3.8	mΩ
			V _{GS} =4.5V, I _D =60A			5.1	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		6500		pF
Output Capacitance		C _{OSS}			740		pF
Reverse Transfer Capacitance		C _{RSS}			400		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DD} =20V, V _{GS} =10V, I _D =120A, I _G =1mA (Note 1, 2)		160		nC
Gate to Source Charge		Q _{GS}			20		nC
Gate to Drain Charge		Q _{GD}			38		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =20V, V _{GS} =10V I _D =120A, R _G =3Ω (Note 1, 2)		12		ns
Rise Time		t _R			21		ns
Turn-OFF Delay Time		t _{D(OFF)}			120		ns
Fall-Time		t _F			60		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				120	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				240	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =120A			1.28	V
Body Diode Reverse Recovery Time (Note 1)		t _{rr}	I _S =30A, V _{GS} =0V		73		nS
Body Diode Reverse Recovery Charge		Q _{rr}	dI _F /dt=100A/μs		140		nC

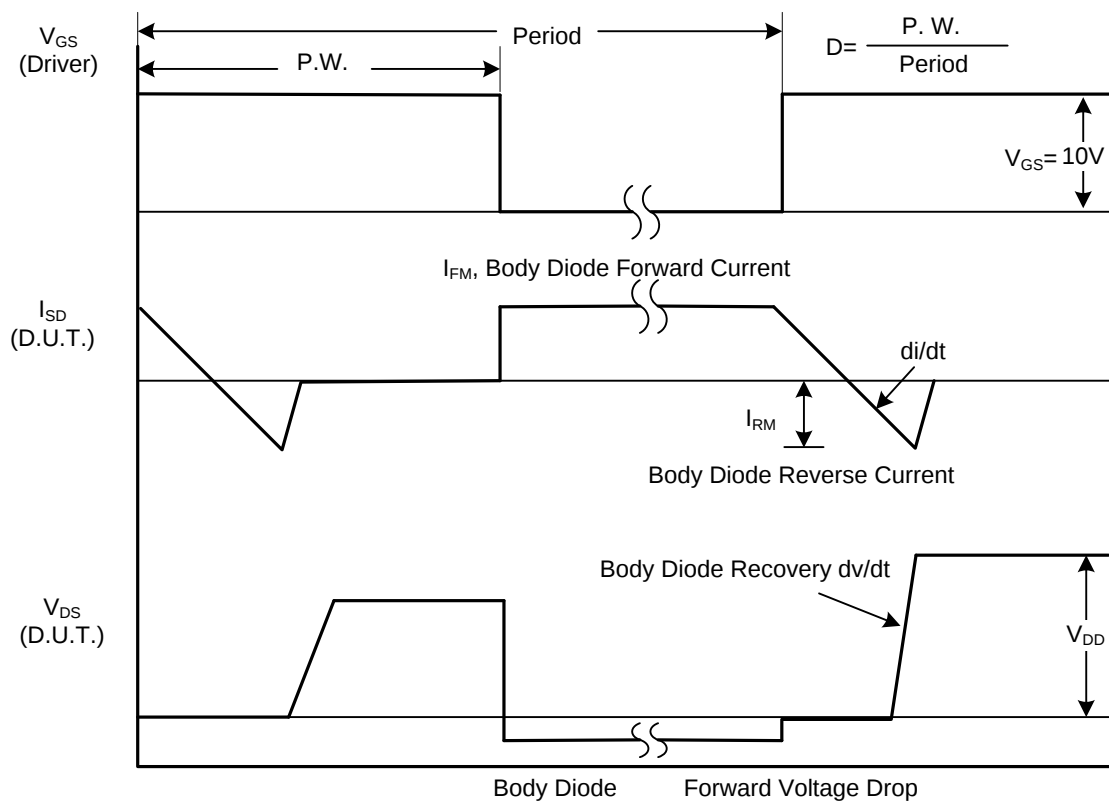
Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS

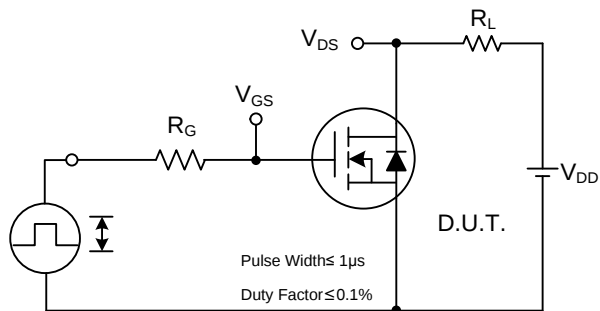


Peak Diode Recovery dv/dt Test Circuit

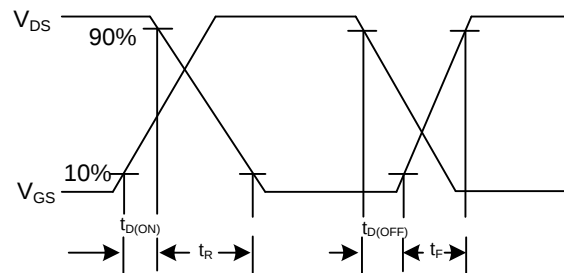


Peak Diode Recovery dv/dt Waveforms

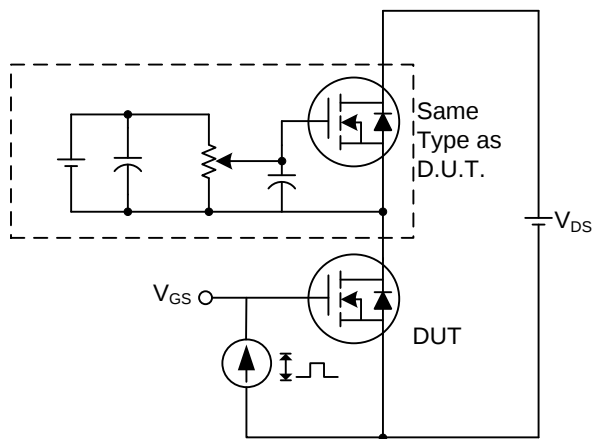
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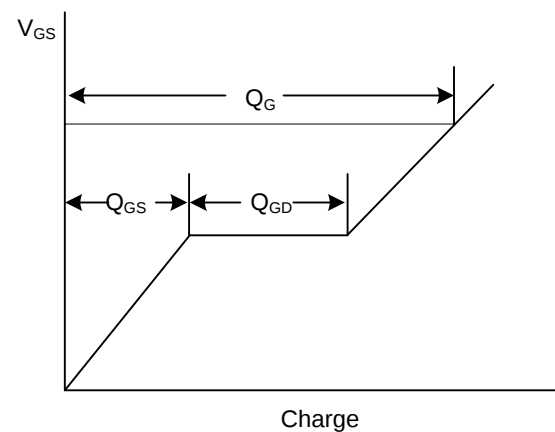
Switching Test Circuit



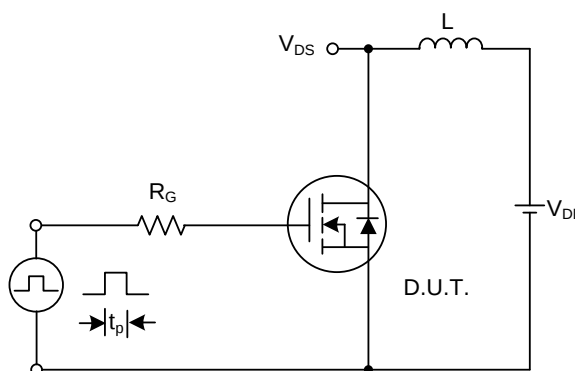
Switching Waveforms



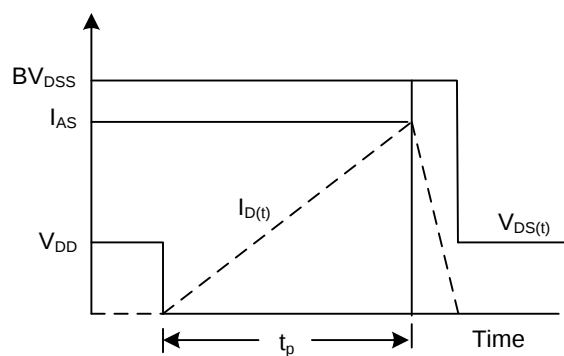
Gate Charge Test Circuit



Gate Charge Waveform

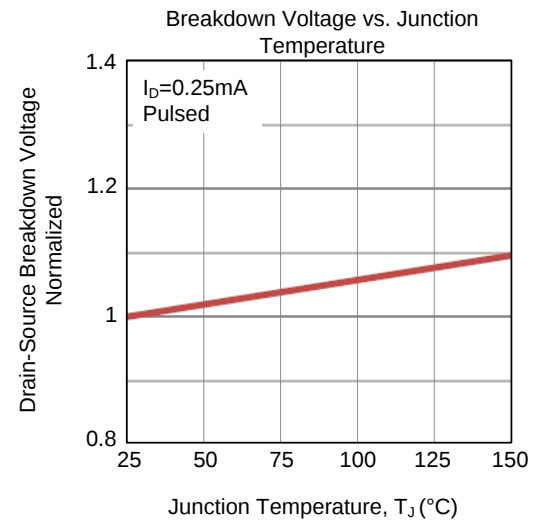
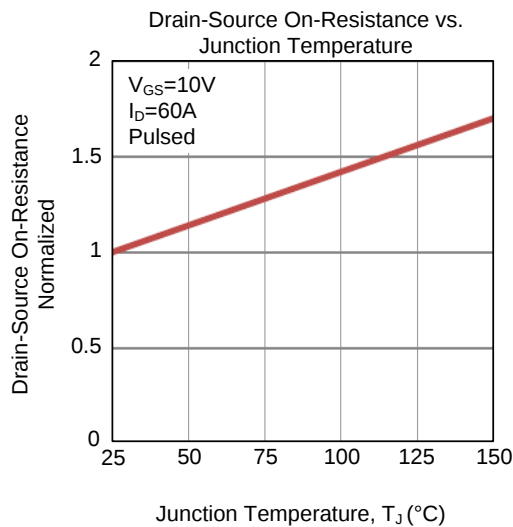
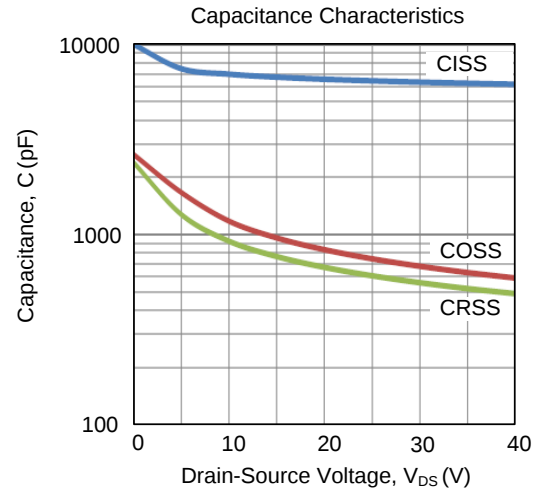
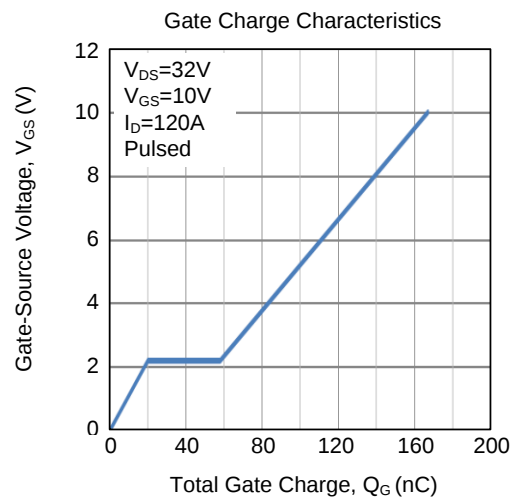
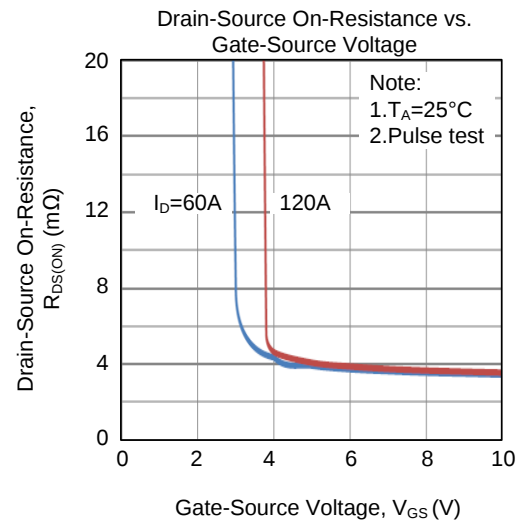
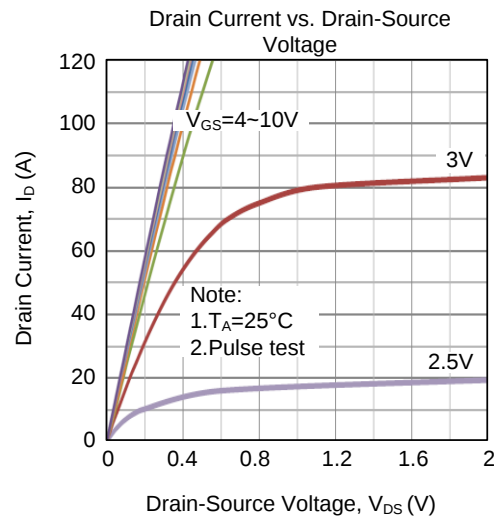


Unclamped Inductive Switching Test Circuit

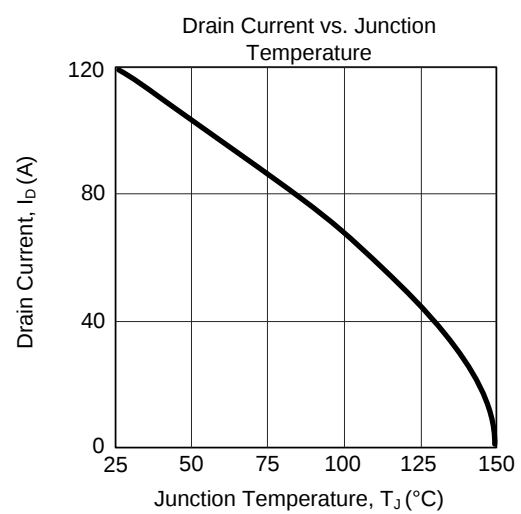
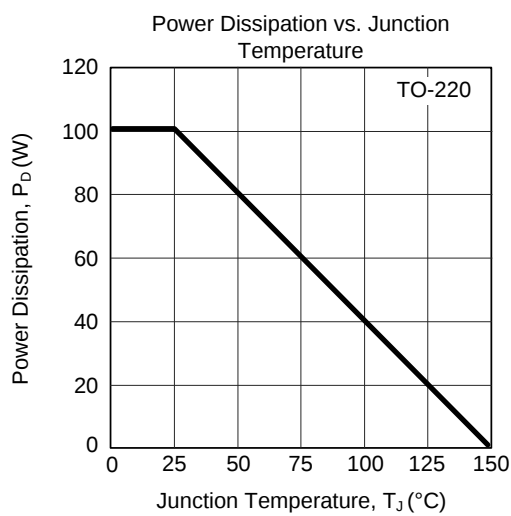
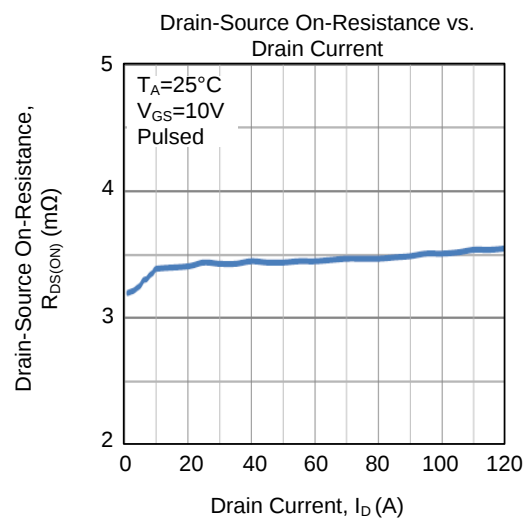
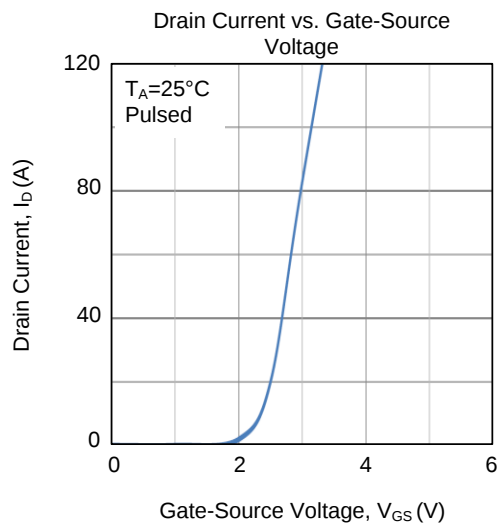
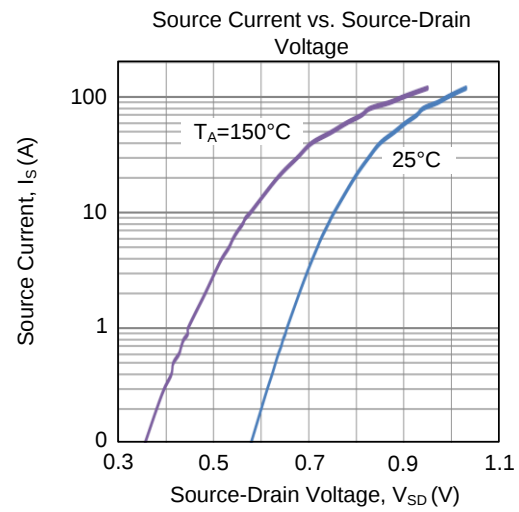
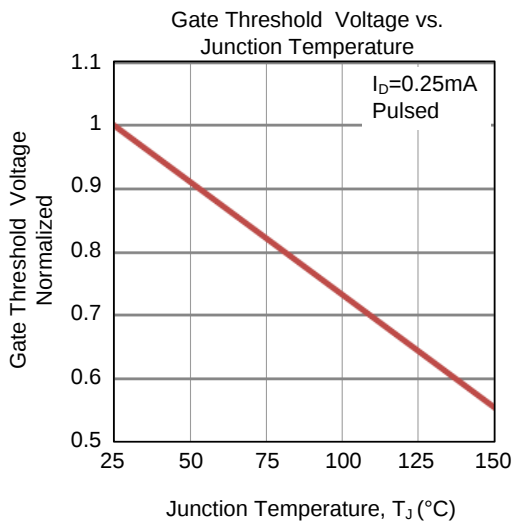


Unclamped Inductive Switching Waveforms

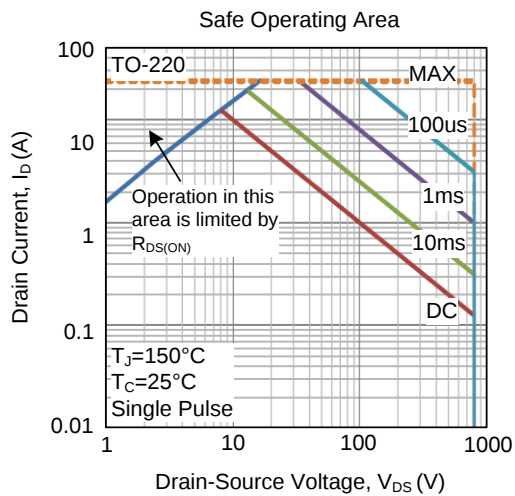
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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