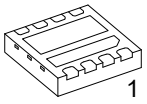
UT18NN03M

Power MOSFET

18A, 30V DUAL N-CHANNEL ENHANCEMENT MODE POWER MOSFET



DFN3030-8B

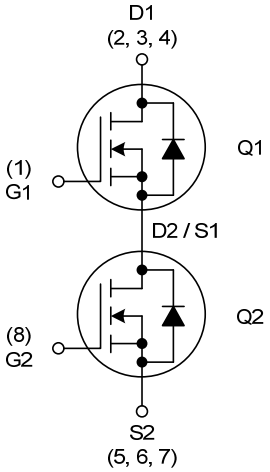
■ DESCRIPTION

The UTC **UT18NN03M** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with low Rdson characteristic by high cell density trench technology.

■ FEATURES

* $R_{DS(ON)} \leq 10\ m\Omega$ @ V_{GS}=10V, I_D=13A
  $R_{DS(ON)} \leq 15\ m\Omega$ @ V_{GS}=4.5V, I_D=10A
* Fast Switching Speed
* Simple Drive Requirement

■ SYMBOL



■ ORDERING INFORMATION

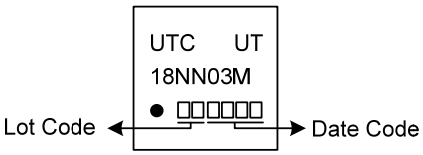
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UT18NN03ML-KAU-R	UT18NN03MG-KAU-R	DFN3030-8	Tape Reel

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

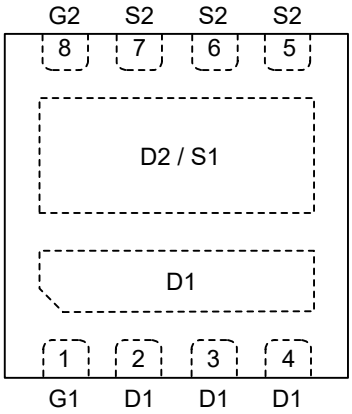
UT18NN03MG-KAU-R

(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) KAU: DFN3030-8B
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ PIN CONFIGURATION



(Top View)

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

PARAMETER		SYMBOL	RATINGS		UNIT
			Q1	Q2	
Drain-Source Voltage		V_{DSS}	30	30	V
Gate-Source Voltage		V_{GSS}	±20	±20	V
Drain Current	Continuous	I_D	18	18	A
	Pulsed (Note 2)	I_{DM}	54	54	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	2	2.8	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3	2.9	V/ns
Power Dissipation		P_D	25	25	W
Junction Temperature		T_J	+150	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	-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} = 7.5A, V_{DD} = 30V, R_G = 25Ω, Starting T_J = 25°C.
4. I_{SD} ≤ 18A, di/dt ≤ 200A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J = 25°C.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	75	°C/W
Junction to Case	θ_{JC}	5	°C/W

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

■ Q1 ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

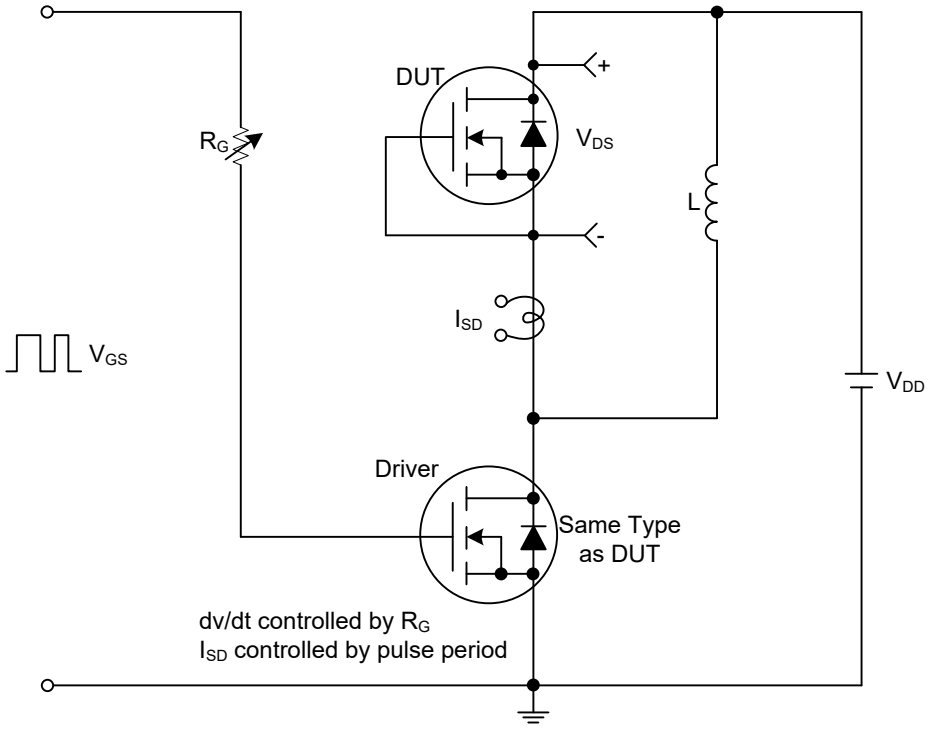
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	1.0		3.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=13A			10	mΩ
		V_{GS}=4.5V, I_D=10A			15	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS}=15V, f=1.0MHz		733		pF
Output Capacitance	C_{OSS}			166		pF
Reverse Transfer Capacitance	C_{RSS}			129		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q_G	V_{DS}=24V, V_{GS}=10V, I_D=18A		26		nC
Gate-Source Charge	Q_{GS}			2		nC
Gate-Drain Charge	Q_{GD}			7		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	V_{DS}=15V, V_{GS}=10V, I_D=18A, R_G=3.3Ω		4		ns
Turn-ON Rise Time	t_R			9		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			22		ns
Turn-OFF Fall Time	t_F			11		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				18	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				54	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S=18A, V_{GS}=0V			1.4	V
Reverse Recovery Time	t_{rr}	I_{DS}=18A, dI/dt=100A/μs		288		ns
Reverse Recovery Charge	Q_{rr}			363		nC

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

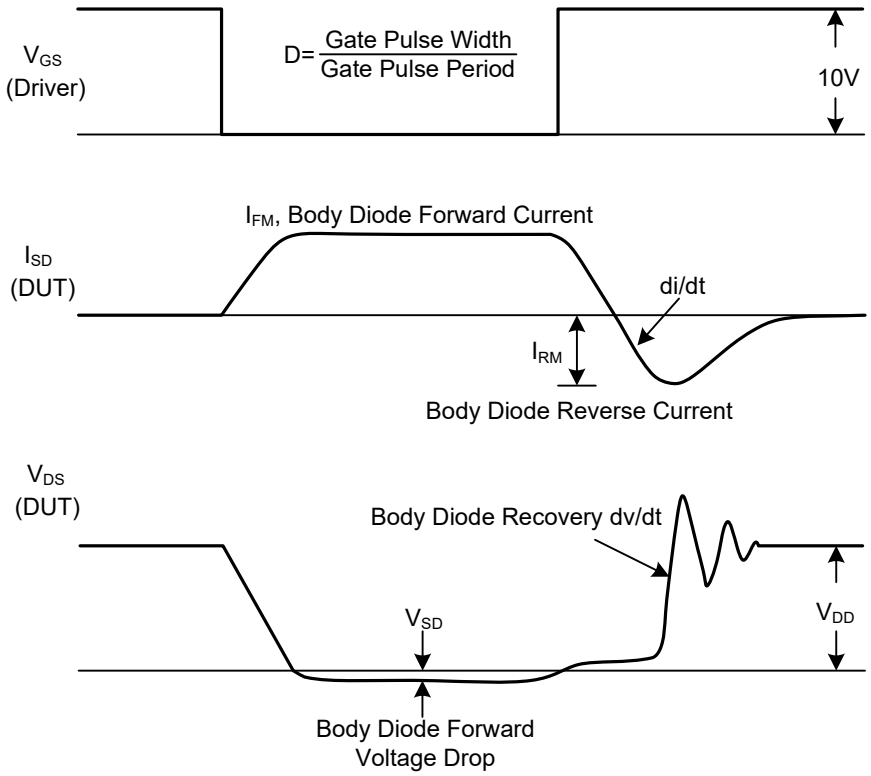
■ Q2 ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	1.0		3.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=13A			10	mΩ
		V_{GS}=4.5V, I_D=10A			15	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS}=15V, f=1.0MHz		738		pF
Output Capacitance	C_{OSS}			166		pF
Reverse Transfer Capacitance	C_{RSS}			129		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q_G	V_{DS}=24V, V_{GS}=10V, I_D=18A		26		nC
Gate-Source Charge	Q_{GS}			3		nC
Gate-Drain Charge	Q_{GD}			8		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	V_{DS}=15V, V_{GS}=10V, I_D=18A, R_G=3.3Ω		4		ns
Turn-ON Rise Time	t_R			10		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			26		ns
Turn-OFF Fall Time	t_F			13		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				18	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				54	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S=18A, V_{GS}=0V			1.4	V
Reverse Recovery Time	t_{rr}	I_{DS}=18A, dI/dt=100A/μs		314		ns
Reverse Recovery Charge	Q_{rr}			354		nC

■ TEST CIRCUITS AND WAVEFORMS



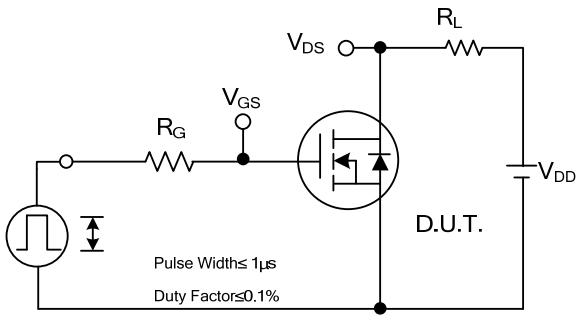
Peak Diode Recovery dv/dt Test Circuit



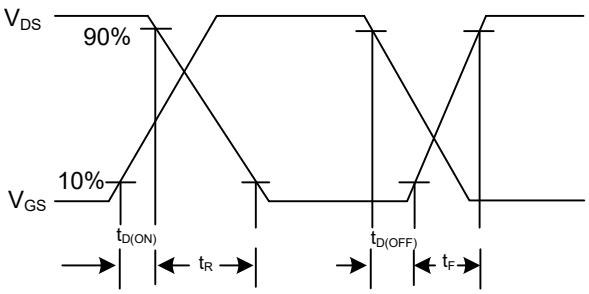
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

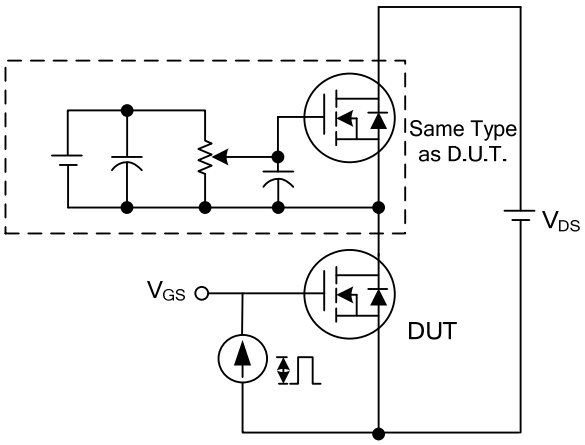
■ TEST CIRCUITS AND WAVEFORMS



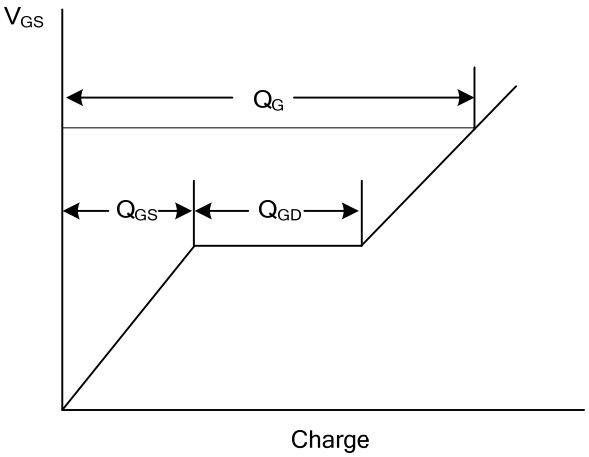
Switching Test Circuit



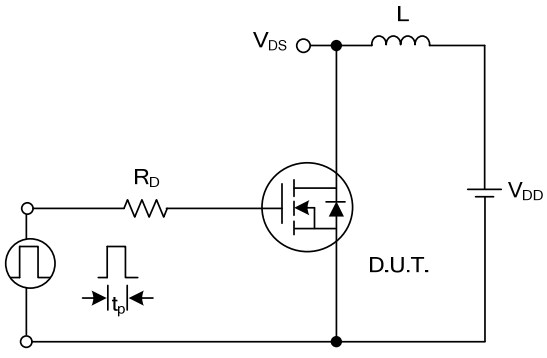
Switching Waveforms



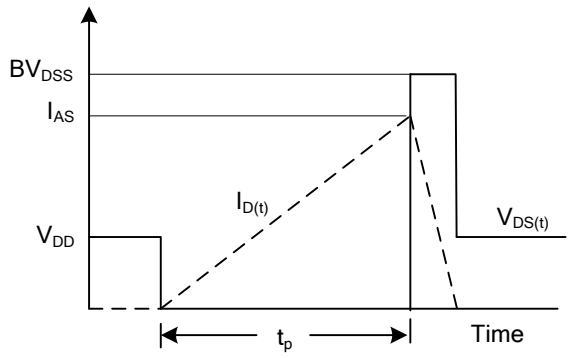
Gate Charge Test Circuit



Gate Charge Waveform



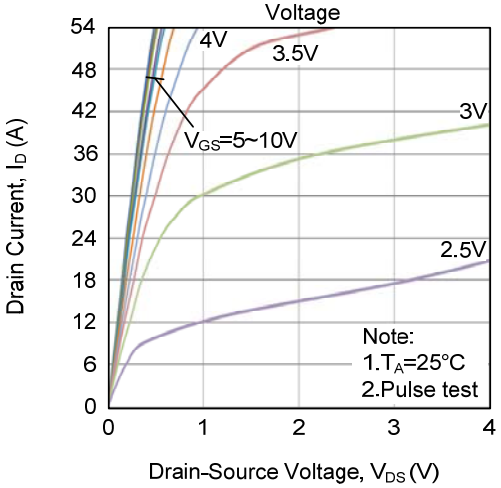
Unclamped Inductive Switching Test Circuit



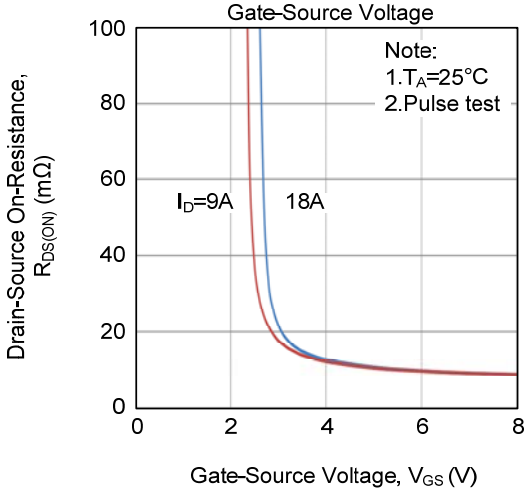
Unclamped Inductive Switching Waveforms

■ Q1 TYPICAL CHARACTERISTICS

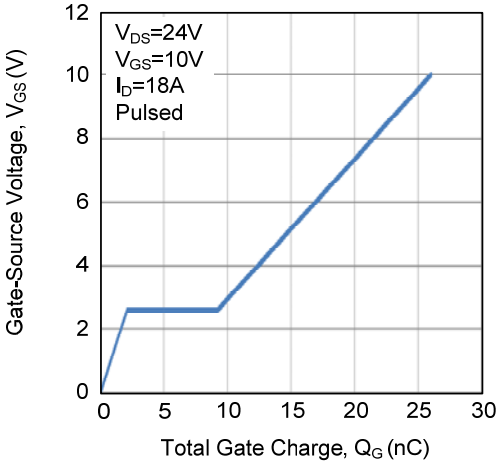
Drain Current vs. Drain-Source Voltage



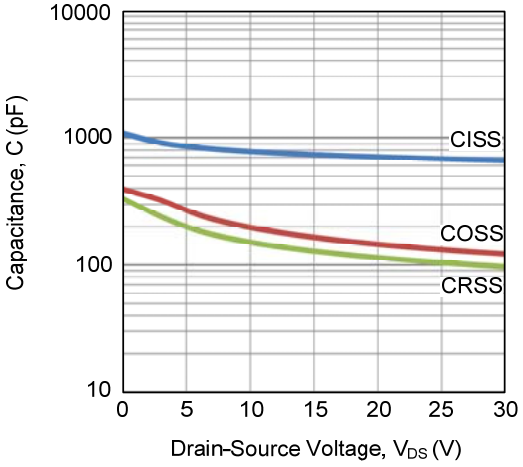
Drain-Source On-Resistance vs. Gate-Source Voltage



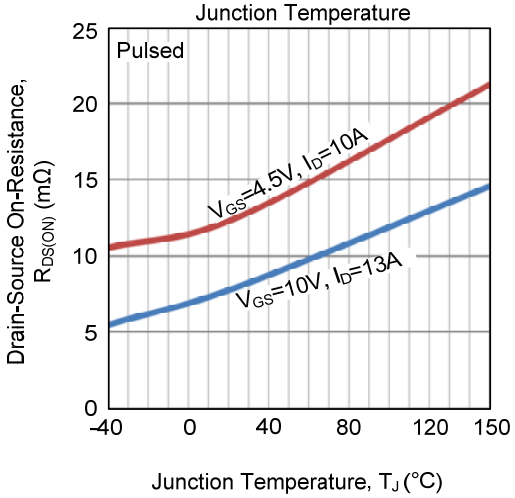
Gate Charge Characteristics



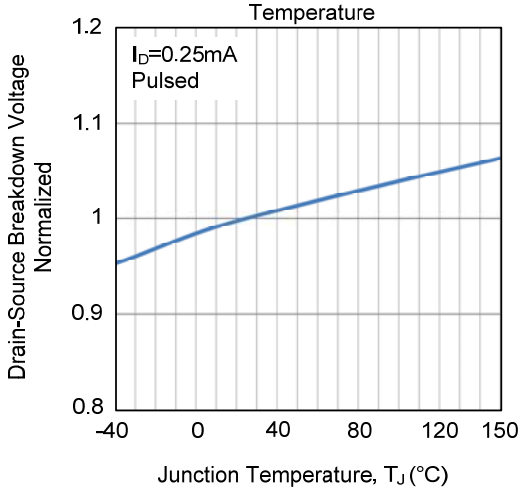
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

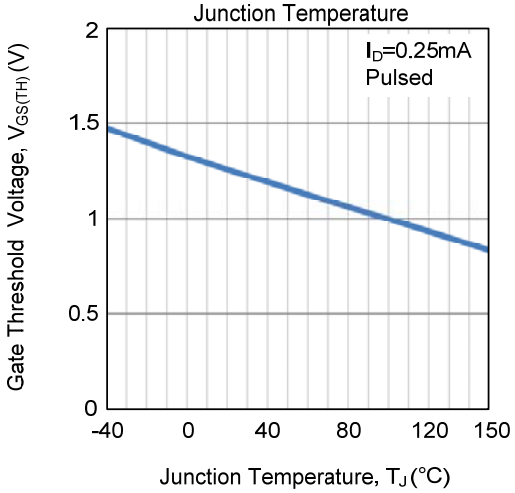


Breakdown Voltage vs. Junction Temperature

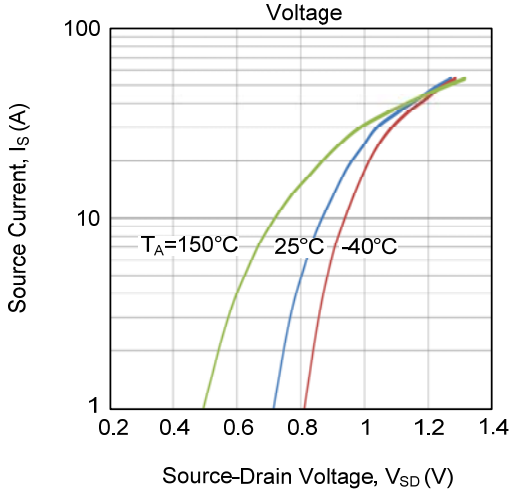


■ Q1 TYPICAL CHARACTERISTICS (Cont.)

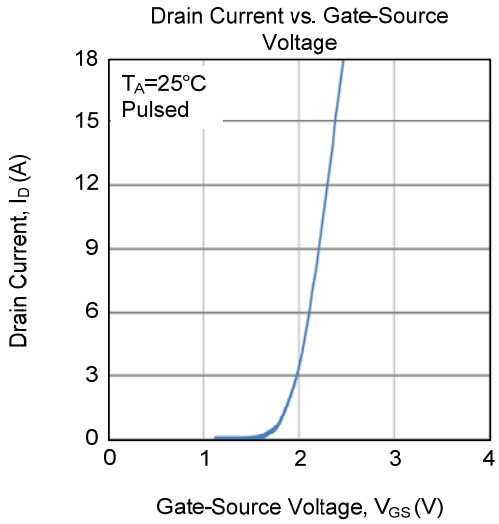
Gate Threshold Voltage vs. Junction Temperature



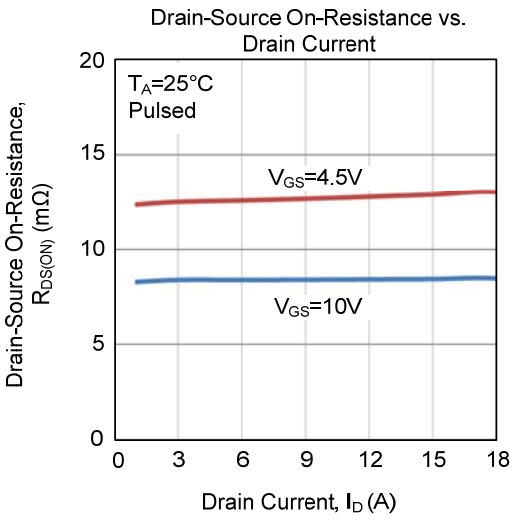
Source Current vs. Source-Drain Voltage



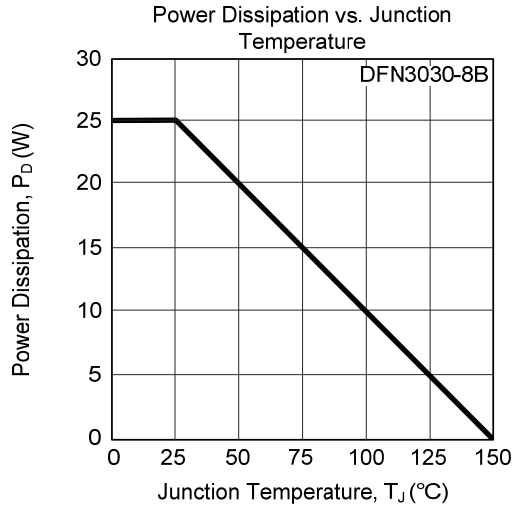
Drain Current vs. Gate-Source Voltage



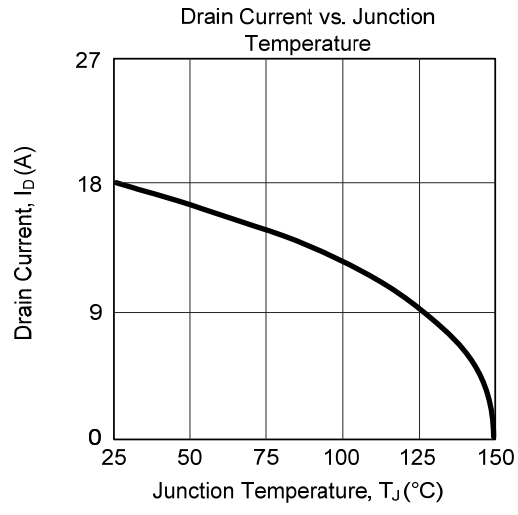
Drain-Source On-Resistance vs. Drain Current



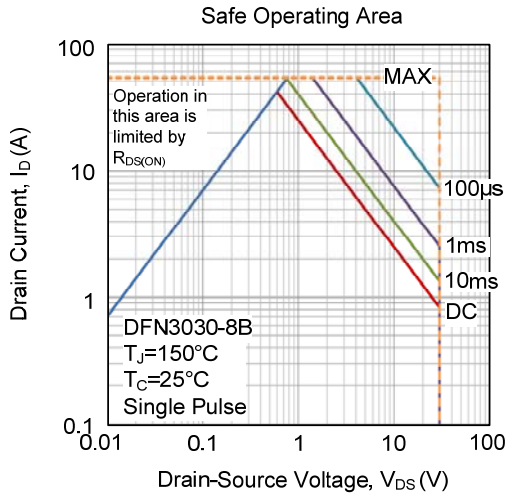
Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature

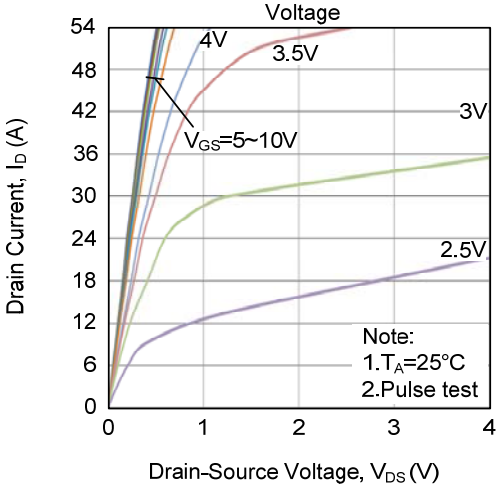


■ Q1 TYPICAL CHARACTERISTICS (Cont.)

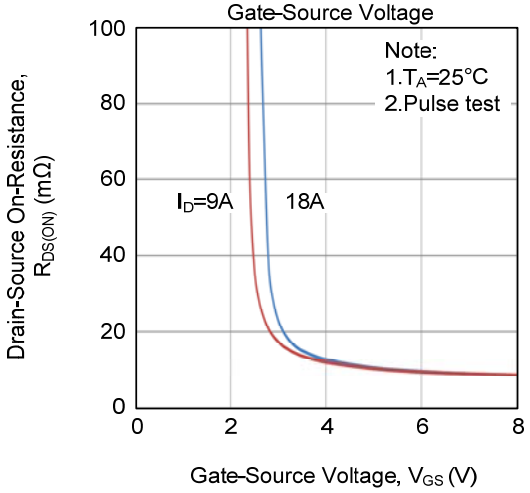


■ Q2 TYPICAL CHARACTERISTICS

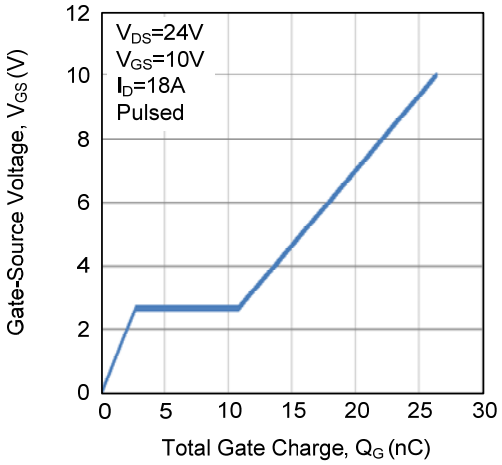
Drain Current vs. Drain-Source Voltage



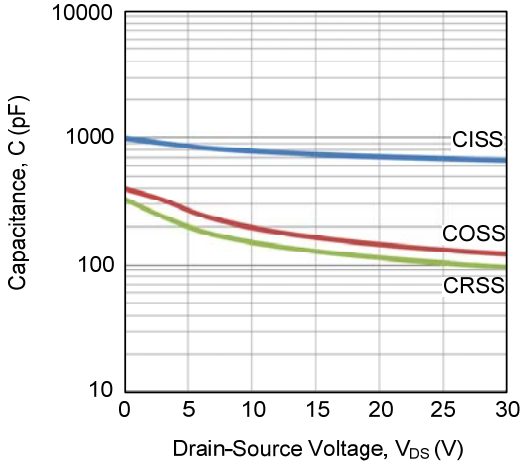
Drain-Source On-Resistance vs. Gate-Source Voltage



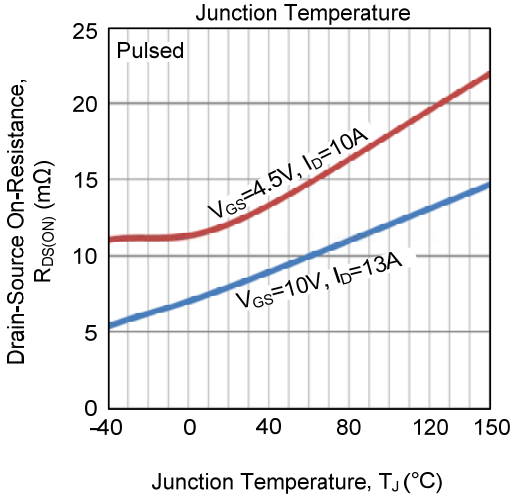
Gate Charge Characteristics



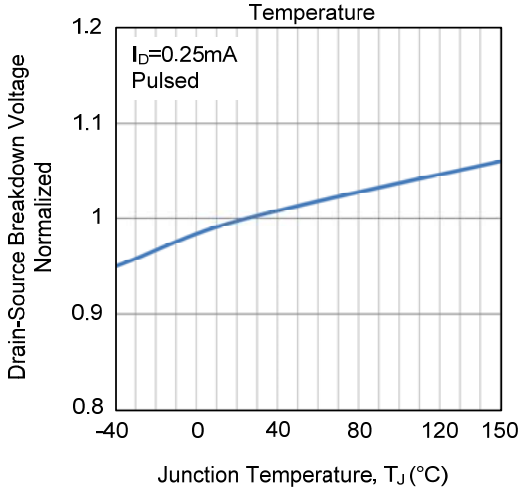
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

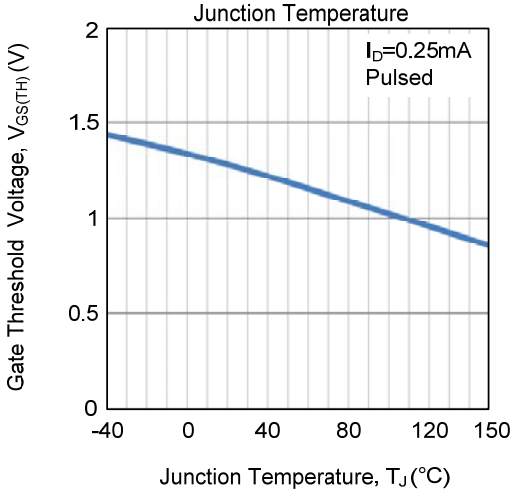


Breakdown Voltage vs. Junction Temperature

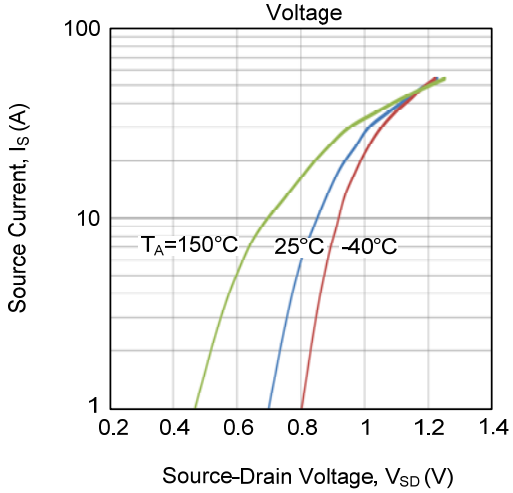


■ Q2 TYPICAL CHARACTERISTICS (Cont.)

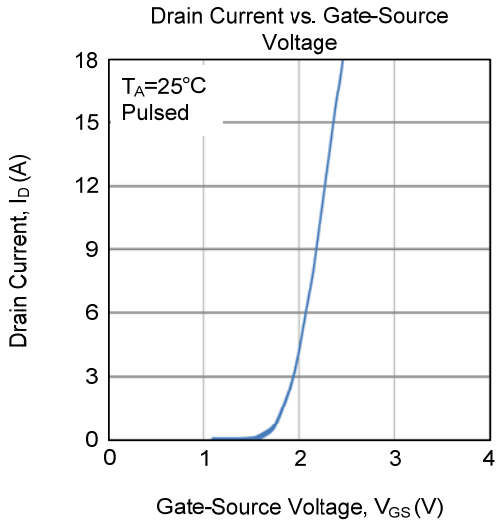
Gate Threshold Voltage vs. Junction Temperature



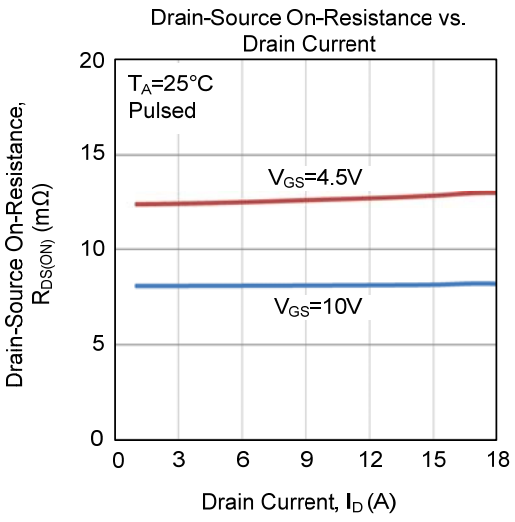
Source Current vs. Source-Drain Voltage



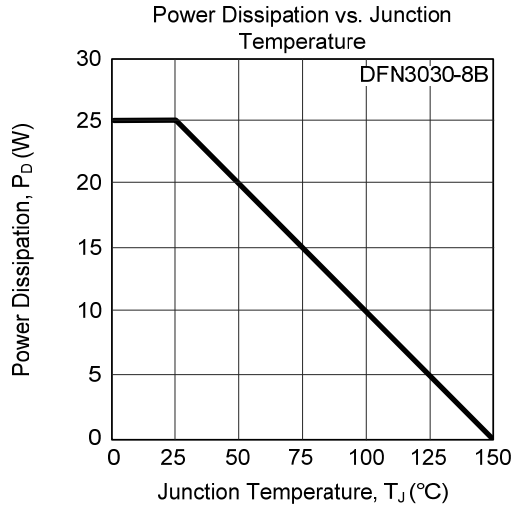
Drain Current vs. Gate-Source Voltage



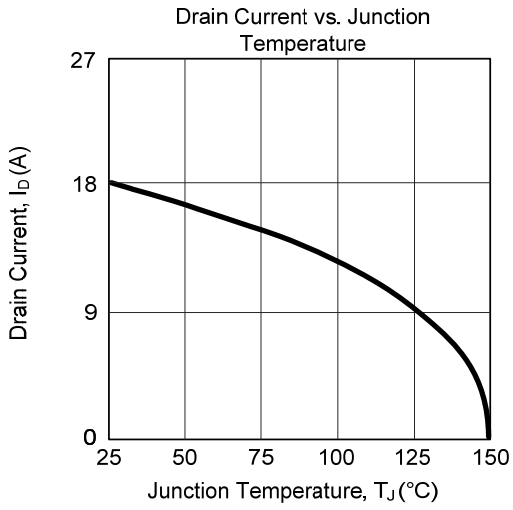
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ Q2 TYPICAL CHARACTERISTICS (Cont.)