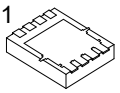
USG03R016ME

Power MOSFET

N-CHANNEL SGT ENHANCEMENT POWER MOSFET



PDFN5×6

■ DESCRIPTION

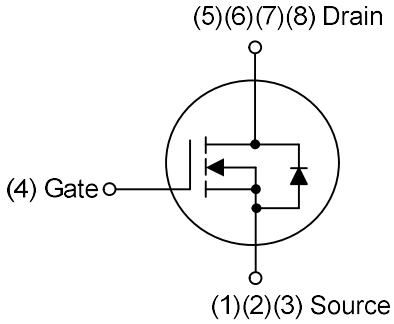
The UTC **USG03R016ME** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and low gate charge, etc.

The UTC **USG03R016ME** applies to primary side switch, synchronous rectifier, Motor Drives, etc.

■ FEATURES

* $R_{DS(ON)}$ ≤ 1.6 mΩ @ V_{GS} = 10V, I_D = 20A
  $R_{DS(ON)}$ ≤ 3.3 mΩ @ V_{GS} = 4.5V, I_D = 20A
* High Cell Density Trench Technology
* High Power and Current Handling Capability
* Green Product

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number	Package	Pin Assignment								Packing
		1	2	3	4	5	6	7	8	
USG03R016MEG-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

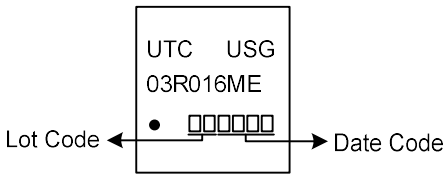
Note: Pin Assignment: S: Source G: Gate D: Drain

USG03R016MEG-P5060-R

(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) P5060: PDFN5×6
(3)Green Package	(3) G: Halogen Free and Lead Free

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■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	DC	I_D	150	A
	Pulsed (Note 2)	I_{DM}	300	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	425	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.09	V/ns
Power Dissipation		P_D	45	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. L = 0.1mH, I_{AS} = 92.2A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C.
4. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, T_J ≤ T_{JMAX}, T_J = 25°C.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	65	°C/W
Junction to Case	θ_{JC}	2.77	°C/W

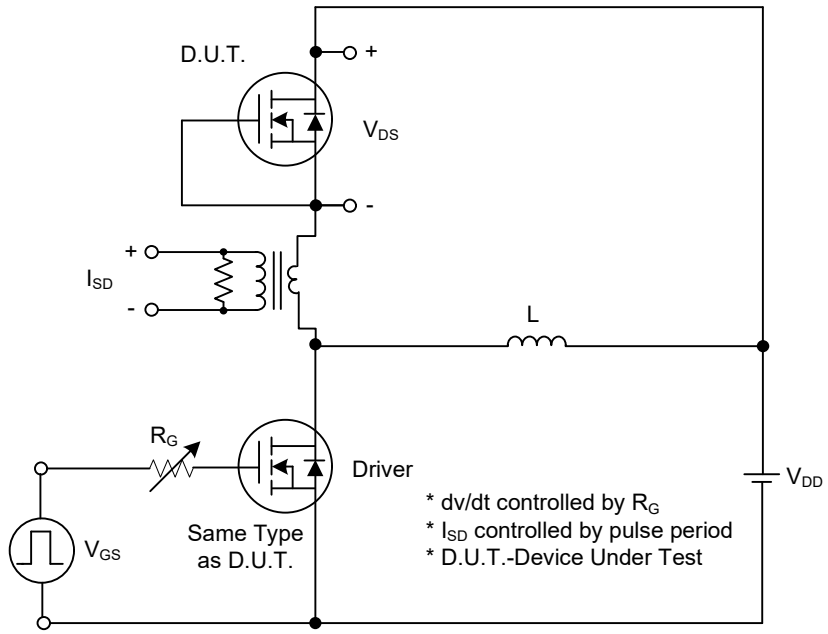
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

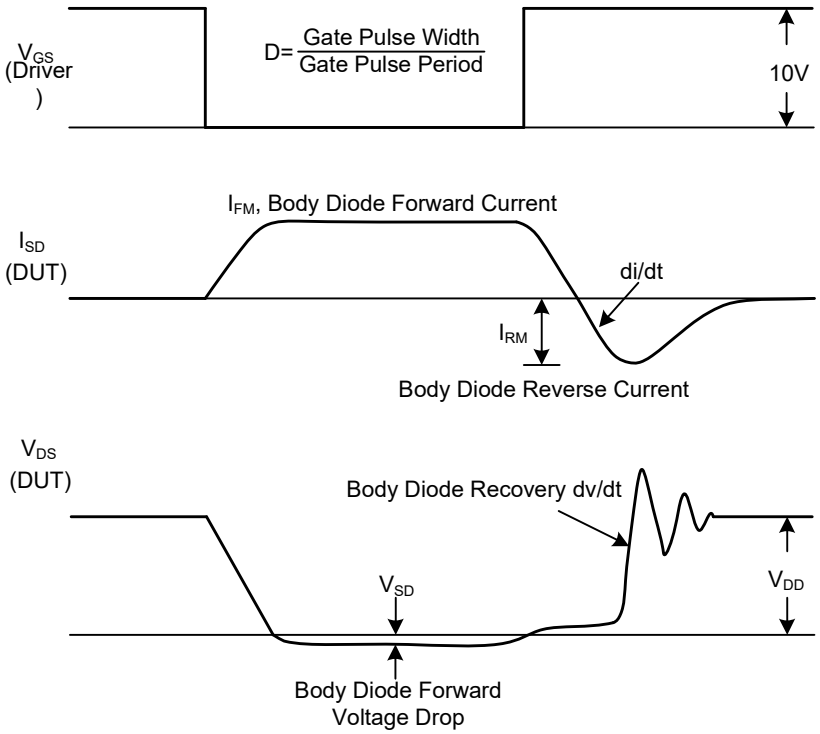
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	30			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}= V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS} =10V, I_D=20A			1.6	mΩ
			V_{GS} =4.5V, I_D=20A			3.3	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=15V, f=1.0MHz		7299		pF
Output Capacitance		C_{OSS}			3275		pF
Reverse Transfer Capacitance		C_{RSS}			486		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=24V, V_{GS}=10V, I_D=150A (Note 1, 2)		115		nC
Gate to Source Charge		Q_{GS}			25		nC
Gate to Drain Charge		Q_{GD}			33		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=15V, V_{GS}=10V, I_D=150A, R_G=3Ω (Note 1, 2)		13		ns
Rise Time		t_R			22		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			194		ns
Fall-Time		t_F			112		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I_S				150	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				300	A
Diode Forward Voltage		V_{SD}	I_F=150A, V_{GS}=0V			1.4	V
Reverse Recovery Time (Note 1)		t_{rr}	I_S=30A, V_{GS}=0V, dI_F/dt =100A/μs		180		nS
Reverse Recovery Charge		Q_{rr}			502		nC

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

■ TEST CIRCUITS AND WAVEFORMS

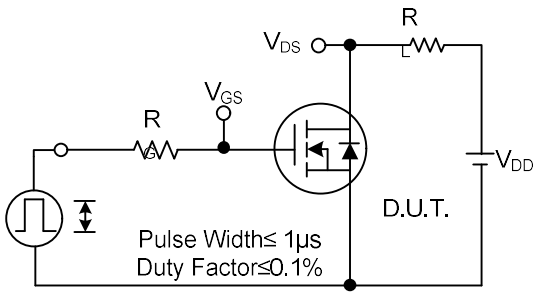


Peak Diode Recovery dv/dt Test Circuit

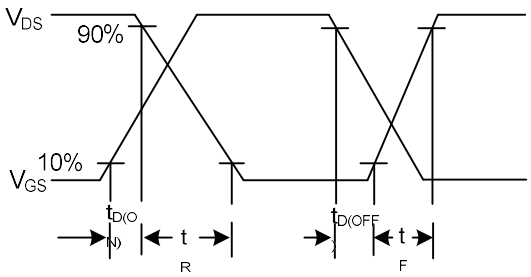


Peak Diode Recovery dv/dt Waveforms

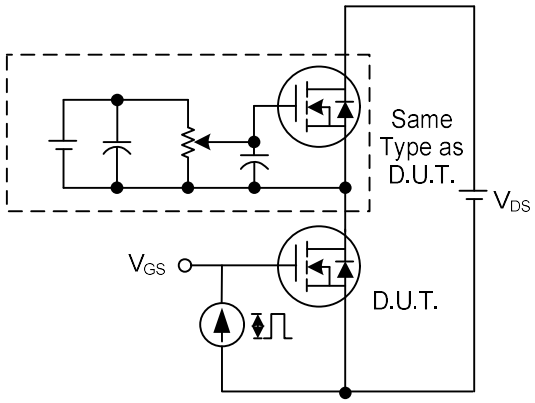
■ TEST CIRCUITS AND WAVEFORMS



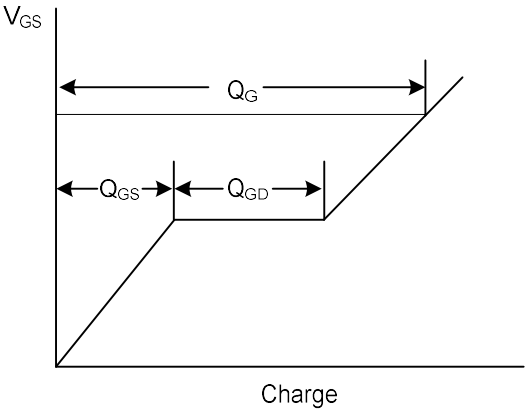
Switching Test Circuit



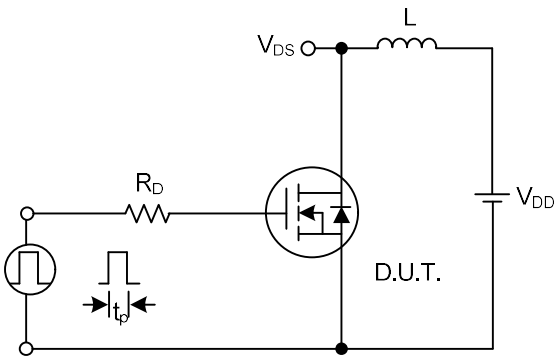
Switching Waveforms



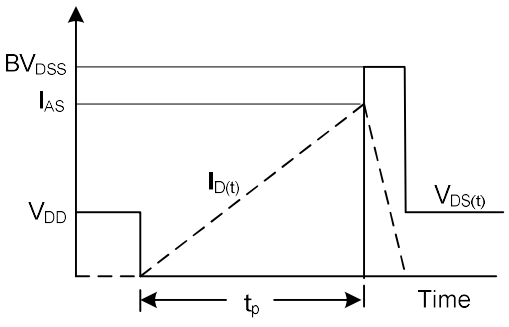
Gate Charge Test Circuit



Gate Charge Waveform

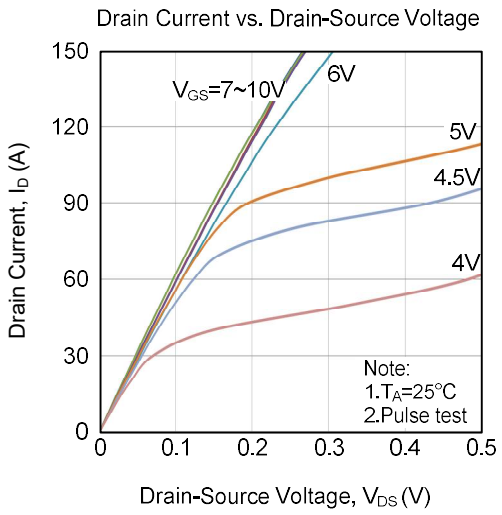


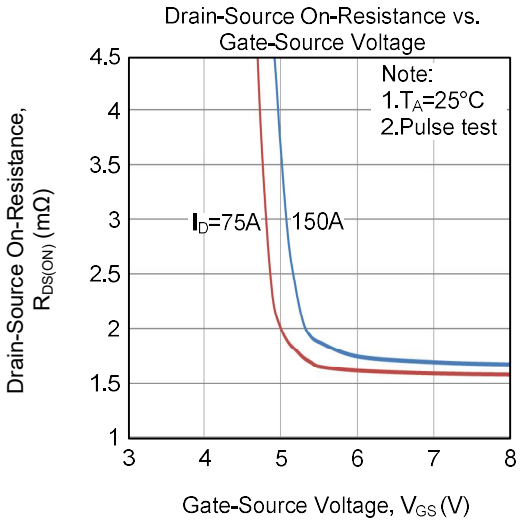
Unclamped Inductive Switching Test Circuit

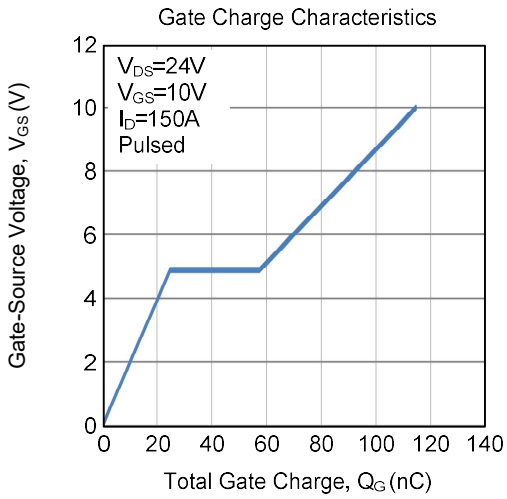


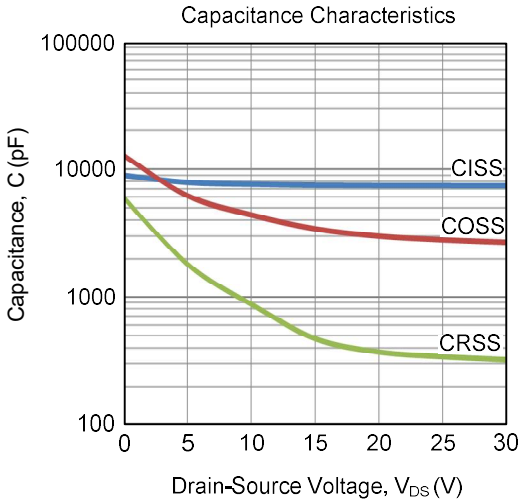
Unclamped Inductive Switching Waveforms

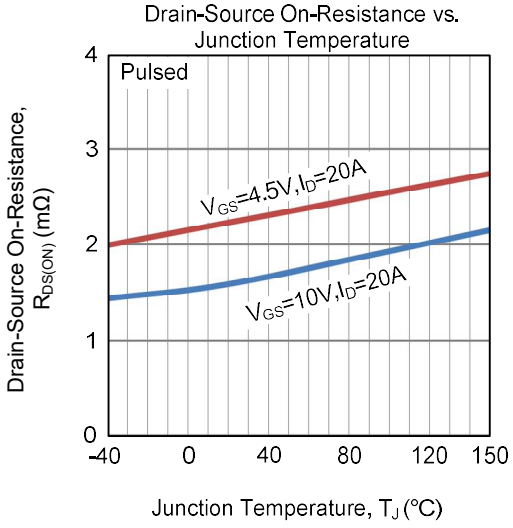
■ TYPICAL CHARACTERISTICS

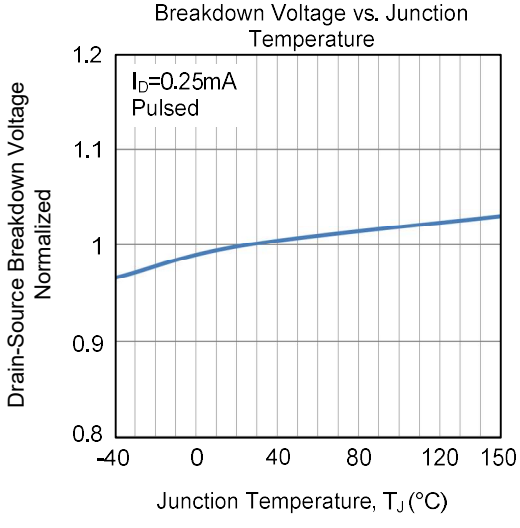






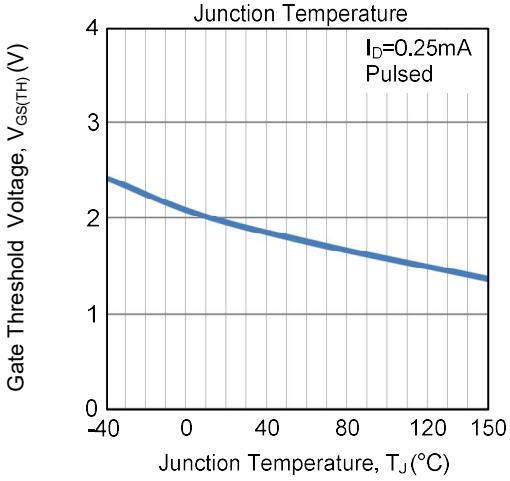




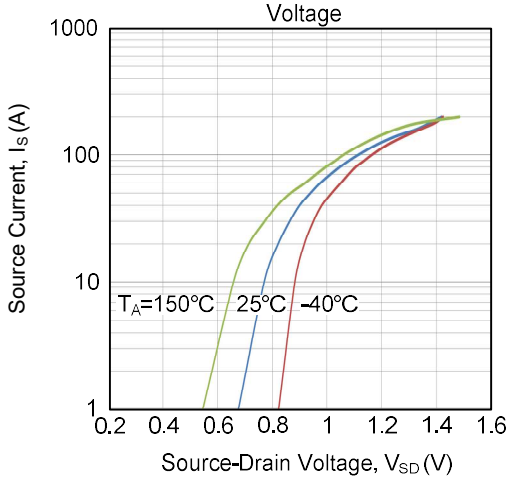


■ TYPICAL CHARACTERISTICS (Cont.)

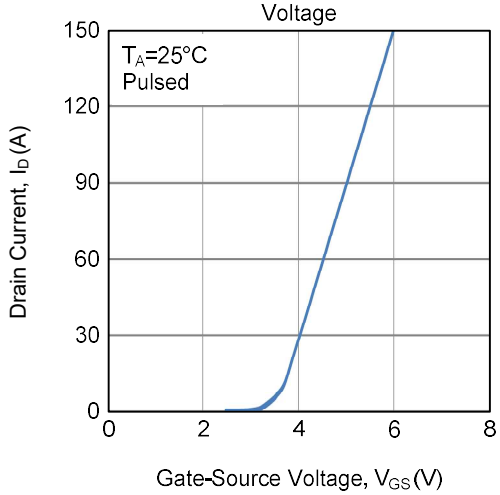
Gate Threshold Voltage vs. Junction Temperature



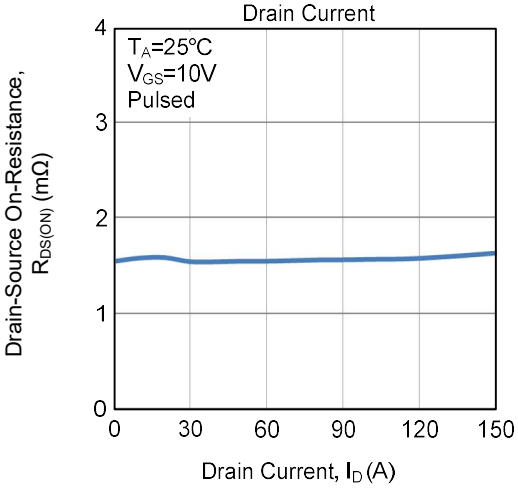
Source Current vs. Source-Drain Voltage



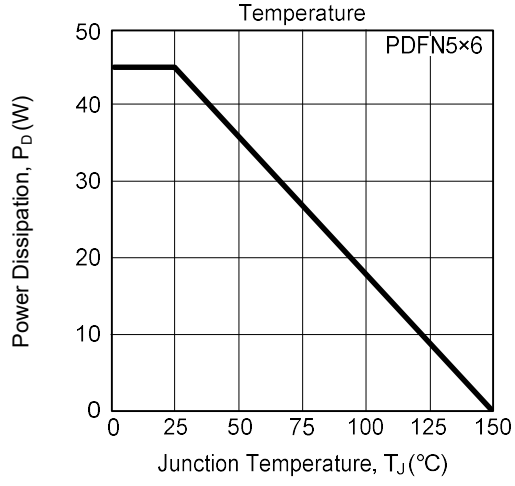
Drain Current vs. Gate-Source Voltage



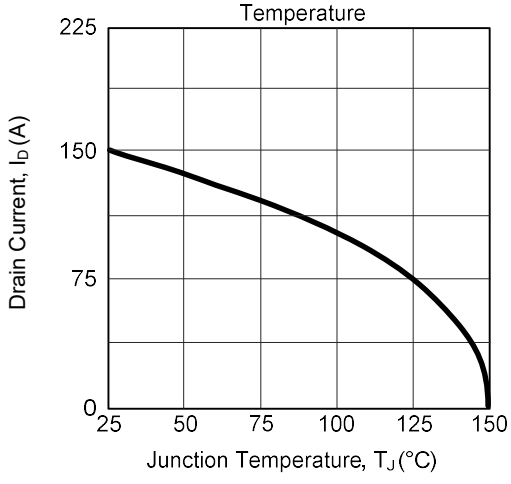
Drain-Source On-Resistance vs. Drain Current



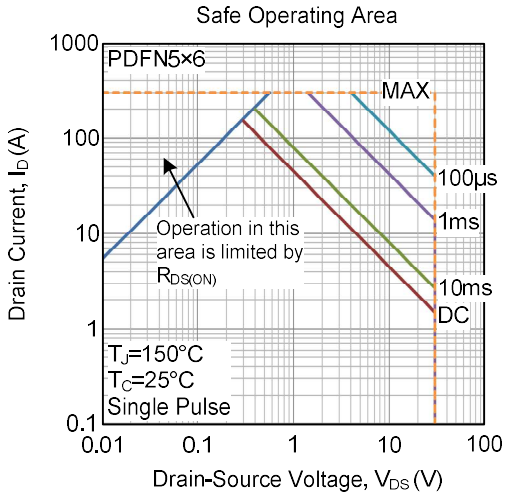
Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)



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