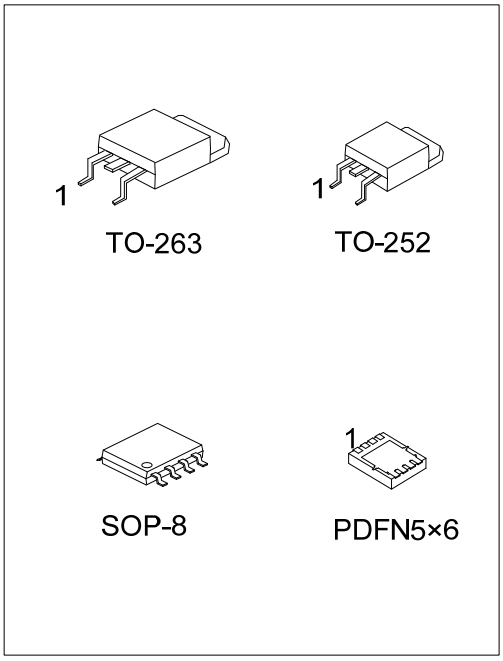
UTT15N06

Power MOSFET

15A, 60V N-CHANNEL MOSFET



■ DESCRIPTION

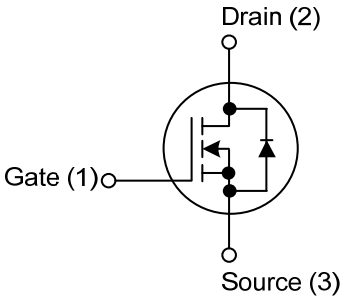
The UTC **UTT15N06** is a N-channel MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed, low gate charge and a minimum on-state resistance.

The UTC **UTT15N06** is suitable for synchronous rectifier and load switch.

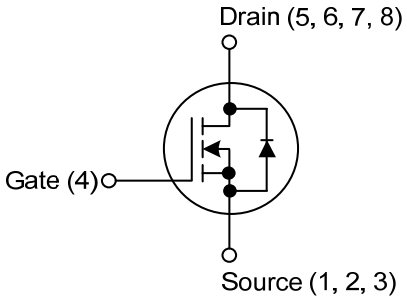
■ FEATURES

* $R_{DS(ON)}$ ≤ 28 mΩ @ V_{GS}=10V, I_D=15A
  $R_{DS(ON)}$ ≤ 40 mΩ @ V_{GS}=4.5V, I_D=15A
* High switching speed
* Low gate charge

■ SYMBOL



TO-252/TO-263

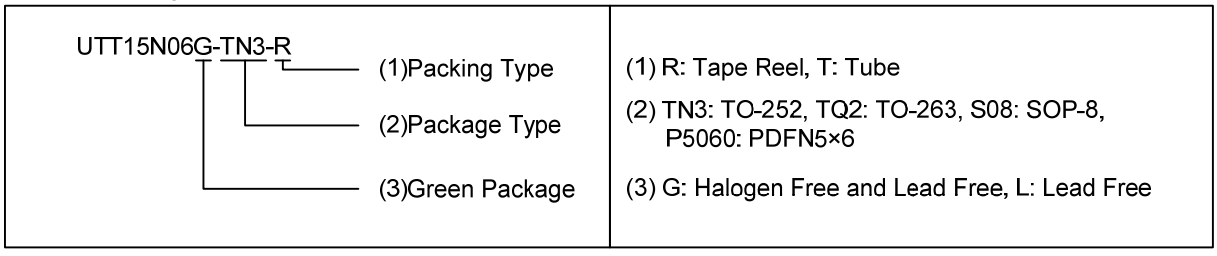


SOP-8/DFN5060-8

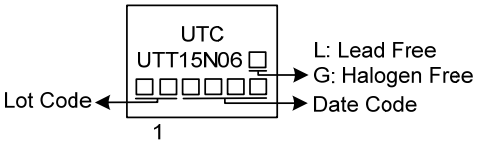
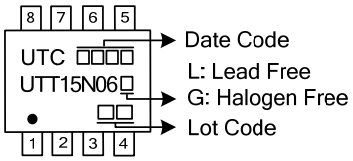
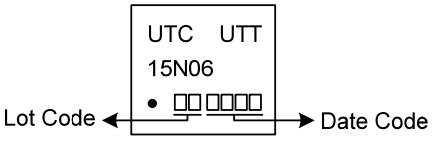
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT15N06L-TN3-R	UTT15N06G-TN3-R	TO-252	G	D	S						Tape Reel
UTT15N06L-TQ2-T	UTT15N06G-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
UTT15N06L-TQ2-R	UTT15N06G-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
UTT15N06L-S08-R	UTT15N06G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UTT15N06L-P5060-R	UTT15N06G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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



■ MARKING

Package	Marking
TO-252 TO-263	
SOP-8	
PDFN5×6	

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	15	A
	Pulsed	I_{DM}	60	A
Avalanche Energy	Single Pulsed	E_{AS}	23.8	mJ
Power Dissipation	TO-252	P_D	42	W
	TO-263		80	W
	SOP-8		2	W
	PDFN5×6		15	W
Operating Temperature		T_{OPR}	-55 ~ +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} = 21.8A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient (Note)	TO-252	θ_{JA}	75	°C/W
	TO-263		35	°C/W
	SOP-8		125	°C/W
	PDFN5×6		60	°C/W
Junction to Case	TO-252	θ_{JC}	3	°C/W
	TO-263		1.6	°C/W
	SOP-8		62.5	°C/W
	PDFN5×6		8	°C/W

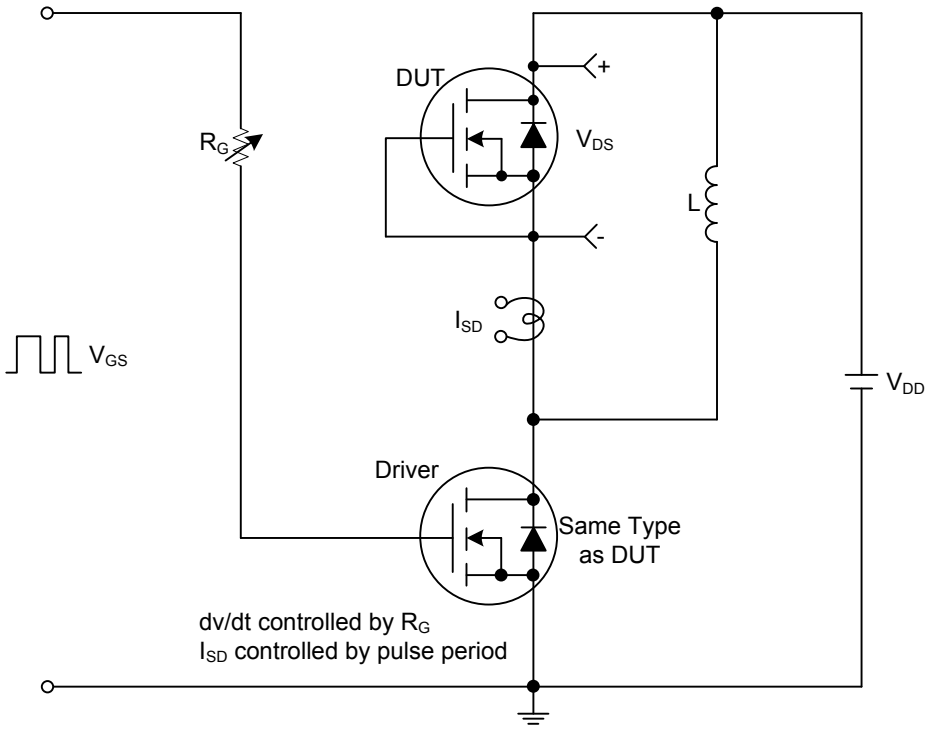
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square pad.

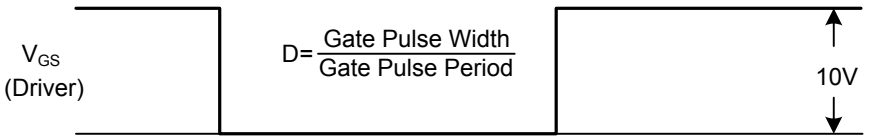
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

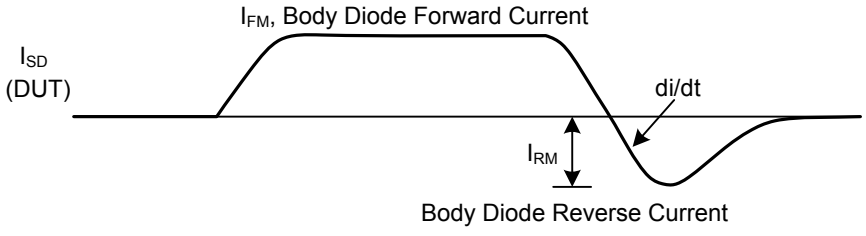
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=20V, V_{DS}=0V			100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	0.8		2.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=15A		23.9	28	mΩ
			V_{GS}=4.5V, I_D=15A		32	40	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		770		pF
Output Capacitance		C_{OSS}			84		pF
Reverse Transfer Capacitance		C_{RSS}			70		pF
Gate Resistance		R_G			1		Ω
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DD}=48V, I_D=15A, V_{GS}=10V		21.6		nC
Gate to Source Charge		Q_{GS}			3.4		nC
Gate to Drain Charge		Q_{GD}			5.4		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=30V, I_D=15A, R_G=3.3Ω V_{DS}=10V		5.9		ns
Rise Time		t_R			16.4		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			18.2		ns
Fall-Time		t_F			18		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I_S				15	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				60	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=15A, V_{GS}=0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)		t_{rr}	I_S=15A, V_{GS}=0V, dI_F/dt=100A/μs		2.92		nS
Body Diode Reverse Recovery Charge		Q_{rr}			46		μC

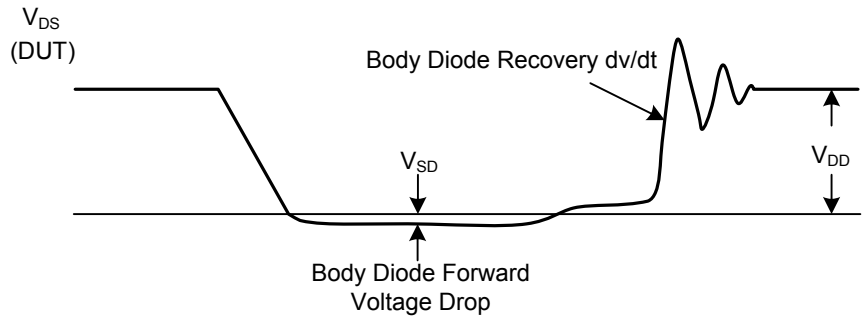
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



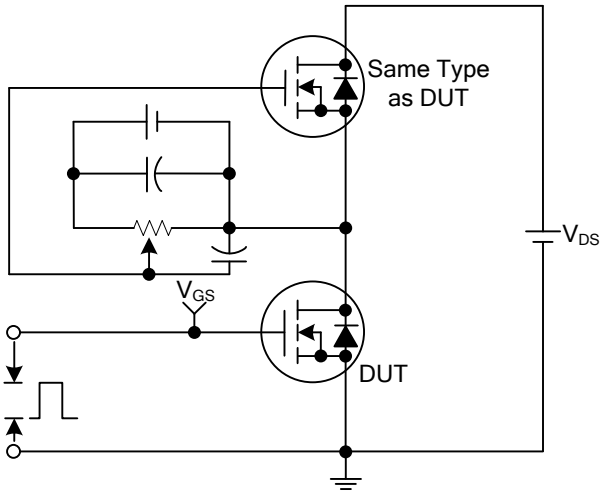




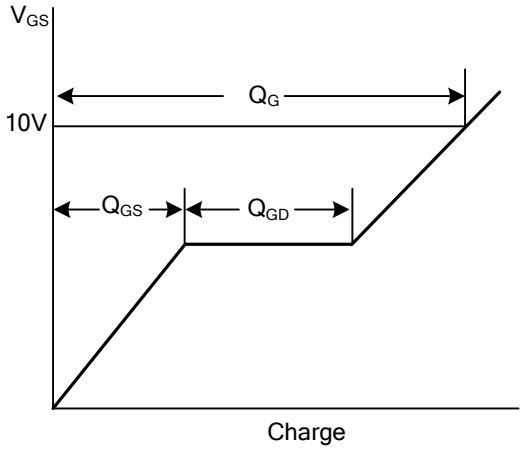


Peak Diode Recovery dv/dt Test Circuit and Waveforms

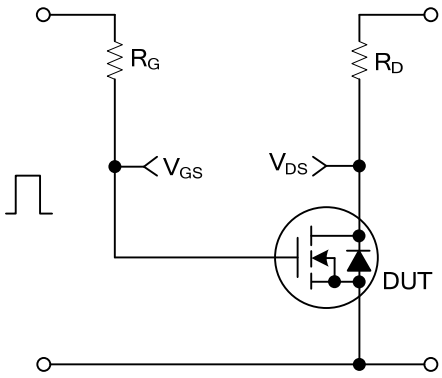
■ TEST CIRCUITS AND WAVEFORMS



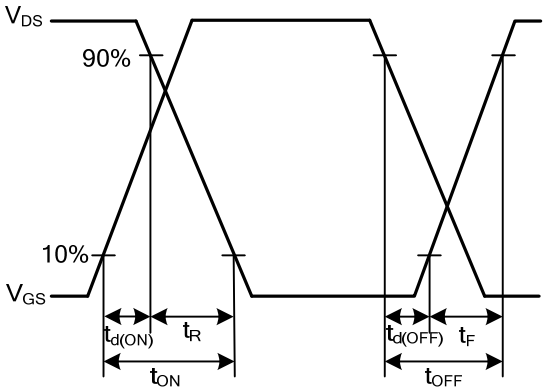
Gate Charge Test Circuit



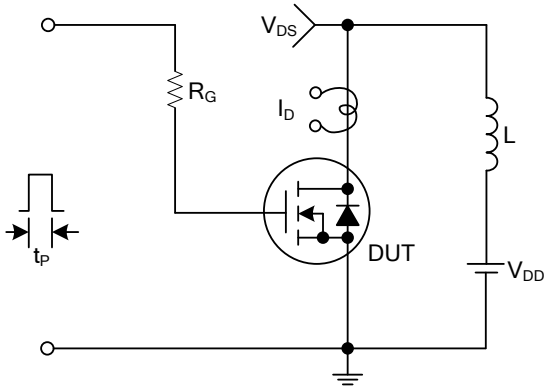
Gate Charge Waveforms



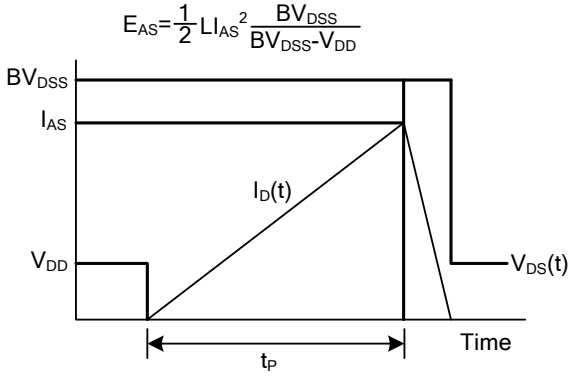
Resistive Switching Test Circuit



Resistive Switching Waveforms



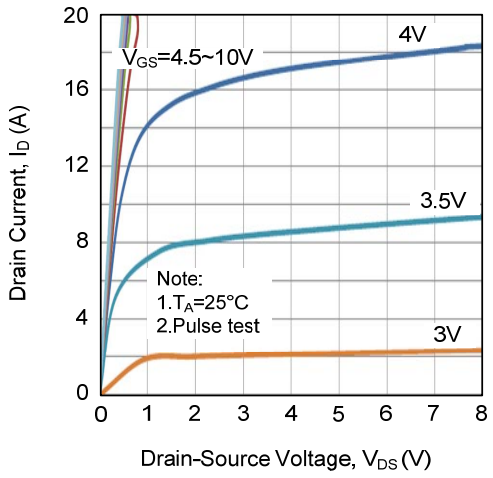
Unclamped Inductive Switching Test Circuit



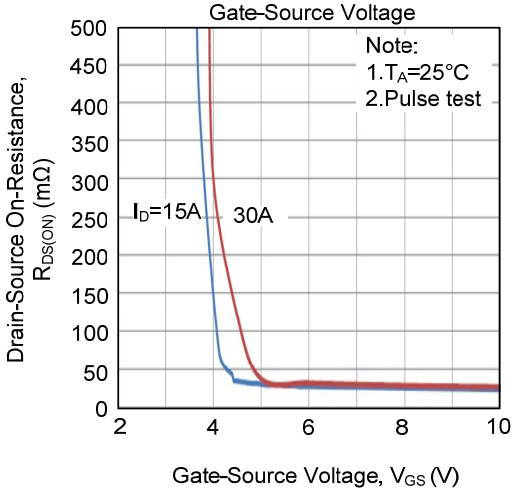
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

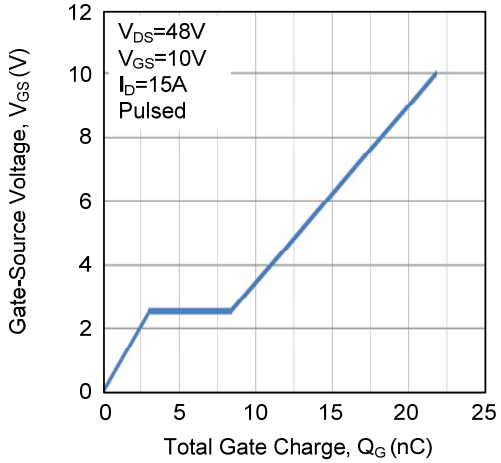
Drain Current vs. Drain-Source Voltage



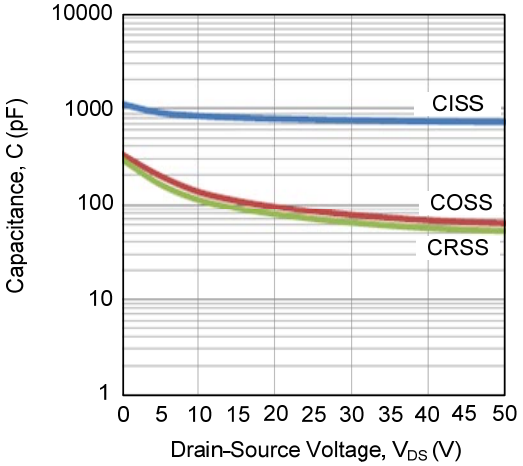
Drain-Source On-Resistance vs. Gate-Source Voltage



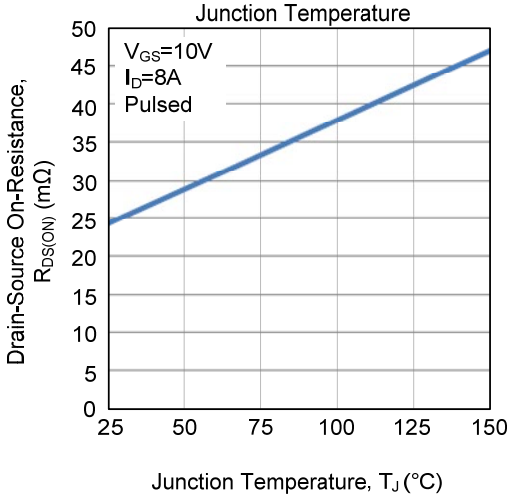
Gate Charge Characteristics



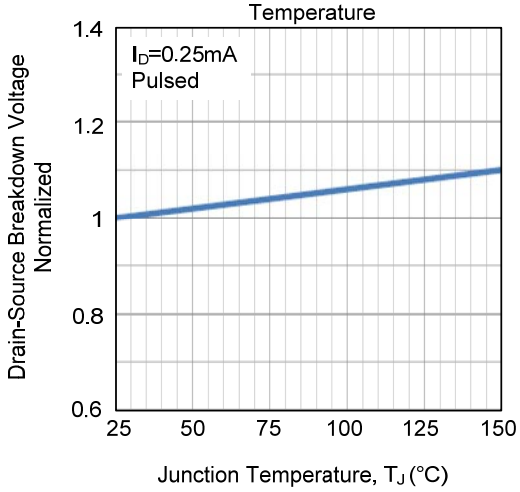
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

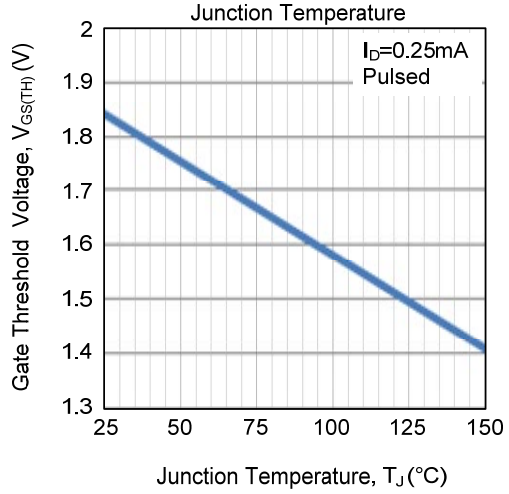


Breakdown Voltage vs. Junction Temperature

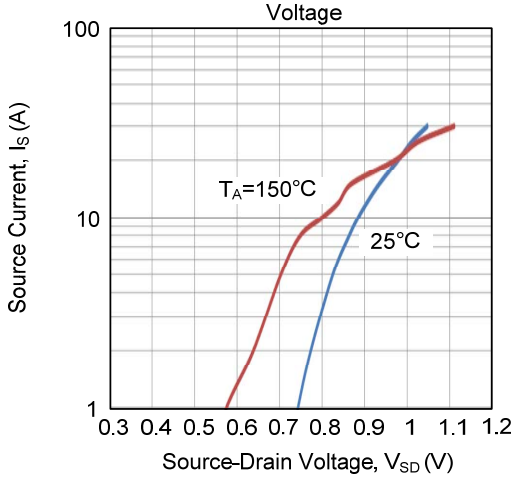


■ TYPICAL CHARACTERISTICS (Cont.)

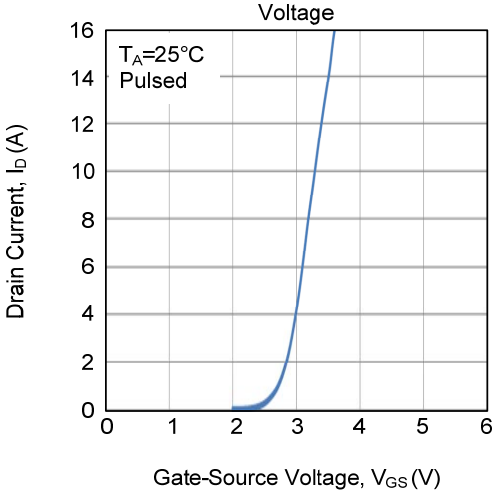
Gate Threshold Voltage vs. Junction Temperature



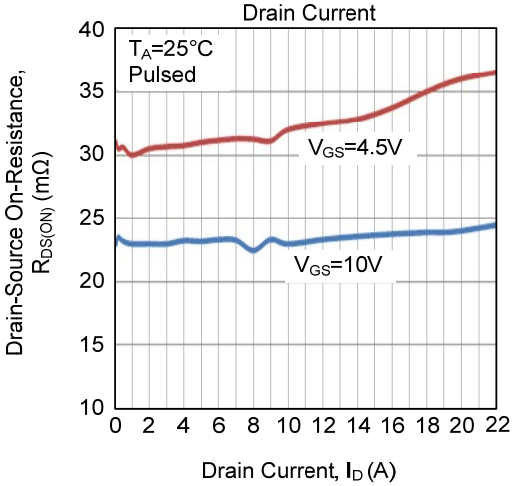
Source Current vs. Source-Drain Voltage



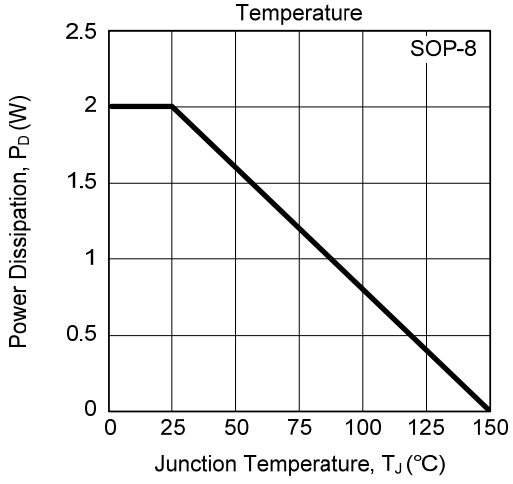
Drain Current vs. Gate-Source Voltage



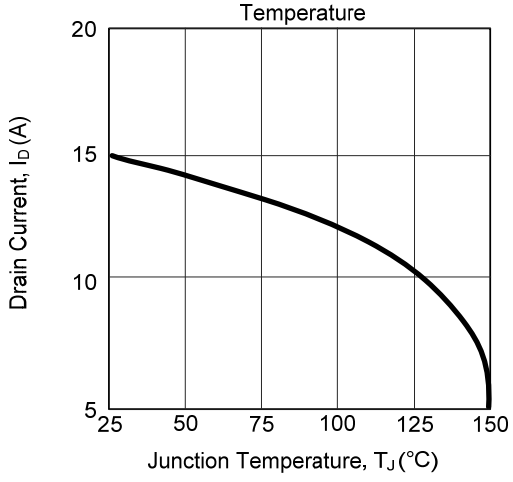
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)