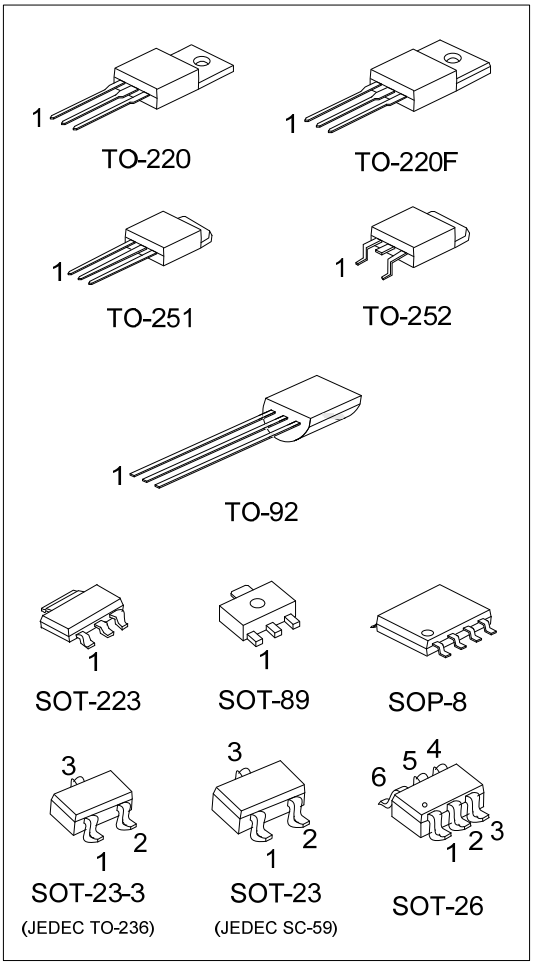
UT3N06

Power MOSFET

N-CHANNEL ENHANCEMENT MODE POWER MOSFET



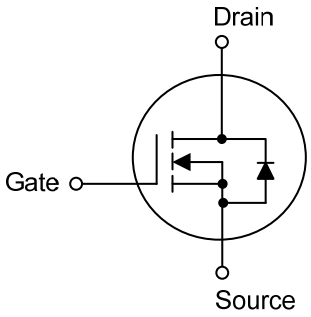
■ DESCRIPTION

The UTC **UT3N06** is an N-channel power MOSFET providing very low on-resistance. It has high efficiency and perfect cost-effectiveness. It can be generally applied in the commercial and industrial fields.

■ FEATURES

* $R_{DS(ON)} \leq 90\ m\Omega$ @ V_{GS}=10V, I_D=3.0A
  $R_{DS(ON)} \leq 120\ m\Omega$ @ V_{GS}=4.5V, I_D=2.0A
* Simple drive requirement

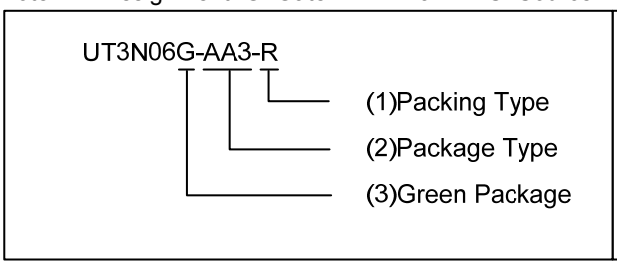
■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT3N06L-AA3-R	UT3N06G-AA3-R	SOT-223	G	D	S	-	-	-	-	-	Tape Reel
UT3N06L-AB3-R	UT3N06G-AB3-R	SOT-89	G	D	S	-	-	-	-	-	Tape Reel
UT3N06L-AE2-R	UT3N06G-AE2-R	SOT-23-3	G	S	D	-	-	-	-	-	Tape Reel
UT3N06L-AE3-R	UT3N06G-AE3-R	SOT-23	G	S	D	-	-	-	-	-	Tape Reel
UT3N06L-AG6-R	UT3N06G-AG6-R	SOT-26	D	D	G	S	D	D	-	-	Tape Reel
UT3N06L-S08-R	UT3N06G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UT3N06L-T92-B	UT3N06G-T92-B	TO-92	G	D	S	-	-	-	-	-	Tape Box
UT3N06L-T92-K	UT3N06G-T92-K	TO-92	G	D	S	-	-	-	-	-	Bulk
UT3N06L-TA3-T	UT3N06G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UT3N06L-TF3-T	UT3N06G-TF3-T	TO-220F	G	D	S	-	-	-	-	-	Tube
UT3N06L-TM3-T	UT3N06G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
UT3N06L-TN3-R	UT3N06G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel

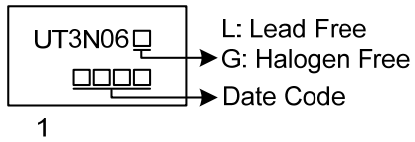
Note: Pin Assignment: G: Gate D: Drain S: Source



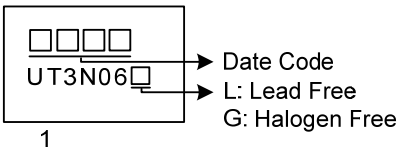
(1) T: Tube, R: Tape Reel, B: Tape Box, K: Bulk
(2) AA3: SOT-223, AB3: SOT-89, AE2: SOT-23-3
AE3: SOT-23, AG6:SOT-26, S08: SOP-8
T92: TO-92, TA3: TO-220, TF3: TO-220F
TM3: TO-251, TN3: TO-252
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

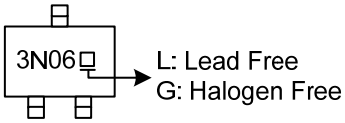
SOT-223



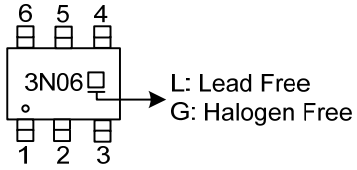
SOT-89



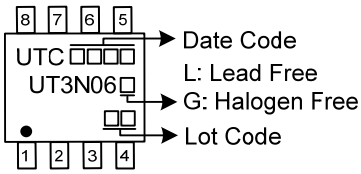
SOT-23-3 / SOT-23



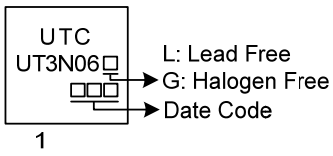
SOT-26



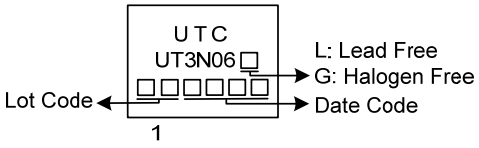
SOP-8



TO-92



TO-220 / TO-220F / TO-251 / TO-252



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (V_{GS}=4.5V, T_A= 25°C) (Note 2)		I_D	3	A
Pulsed Drain Current (Note 3, 4)		I_{DM}	12	A
Power Dissipation	SOT-223	P_D	2	W
	SOT-89		1.4	W
	SOT-23-3/SOT-23		1.25	W
	SOT-26		1.2	W
	SOP-8		1.5	W
	TO-92		1.3	W
	TO-220		2	W
	TO-220F		2.5	W
	TO-251/TO-252		3.13	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. Surface mounted on 1 in^2 copper pad of FR4 board; 270°C/W when mounted on min. copper pad.
3. Repetitive Rating: Pulse width limited by maximum junction temperature.
4. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	SOT-223	θ_{JA}	62.5 (Note)	°C/W
	SOT-89		89.3 (Note)	°C/W
	SOT-23-3/SOT-23		100 (Note)	°C/W
	SOT-26		104 (Note)	°C/W
	SOP-8		83.3 (Note)	°C/W
	TO-92		96 (Note)	°C/W
	TO-220F		50 (Note)	°C/W
	TO-220		62	°C/W
	TO-251/TO-252		40 (Note)	°C/W

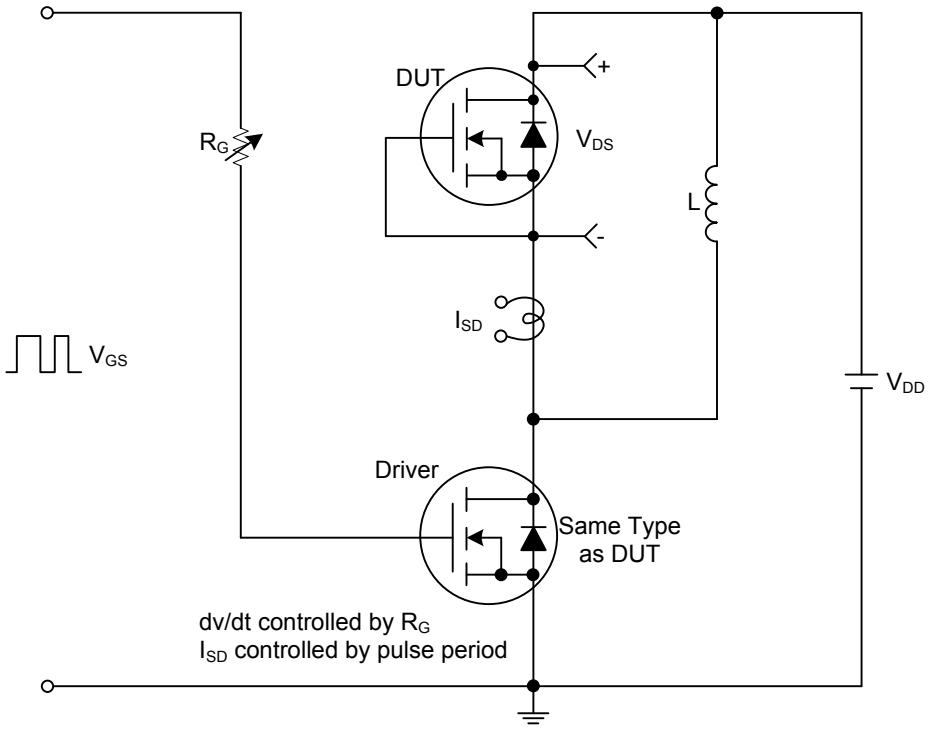
Note: Surface mounted on 1 in^2 copper pad of FR4 board; 270°C/W when mounted on min. copper pad.

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

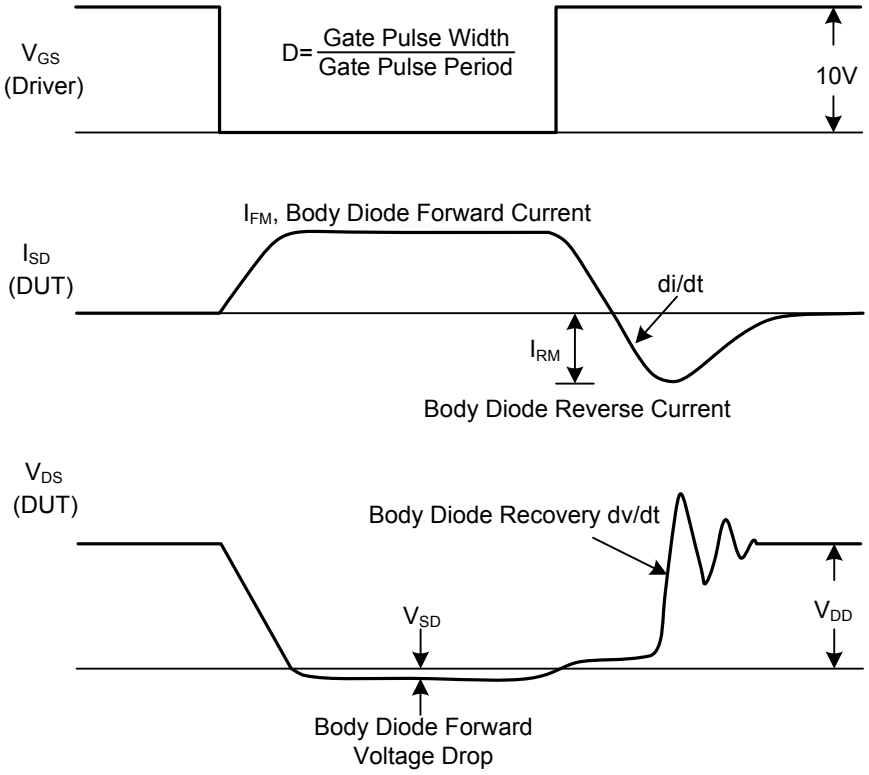
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D =250μA	60			V
Drain-Source Leakage Current	I_{DSS}	V_{DS} =60V, V_{GS} =0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate 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=3.0A		62	90	mΩ
		V_{GS}=4.5V, I_D=2.0A		82	120	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=25V, V_{GS}=0V, f =1.0MHz		380		pF
Output Capacitance	C_{OSS}			42		pF
Reverse Transfer Capacitance	C_{RSS}			30		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note)	Q_G	V_{GS}=10V, V_{DS}=48V, I_D=3.0A, I_G=1mA		17		nC
Gate Source Charge	Q_{GS}			2.8		nC
Gate Drain Charge	Q_{GD}			3		nC
Turn-ON Delay Time (Note)	$t_{D(ON)}$	V_{DD}=30V, V_{GS}=10V, I_D=3A, R_{GEN}=3.3Ω		5		ns
Turn-ON Rise Time	t_R			16		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			17		ns
Turn-OFF Fall-Time	t_F			18		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				3	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				12	A
Drain-Source Diode Forward Voltage (Note)	V_{SD}	I_S =1.2A, V_{GS} =0V			1.2	V
Reverse Recovery Time	t_{rr}	I_S=3.0A,V_{GS}=0V, dI/dt=100A/μs		60		ns
Reverse Recovery Charge	Q_{rr}			40		nC

Note: Pulse width ≤ 300μs, duty cycle ≤ 2%.

■ TEST CIRCUITS AND WAVEFORMS



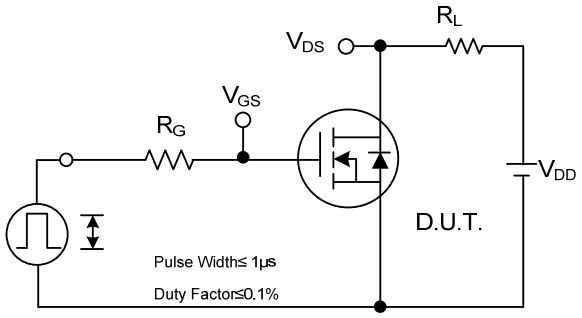
Peak Diode Recovery dv/dt Test Circuit



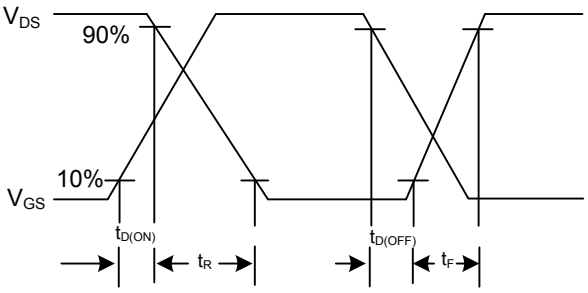
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

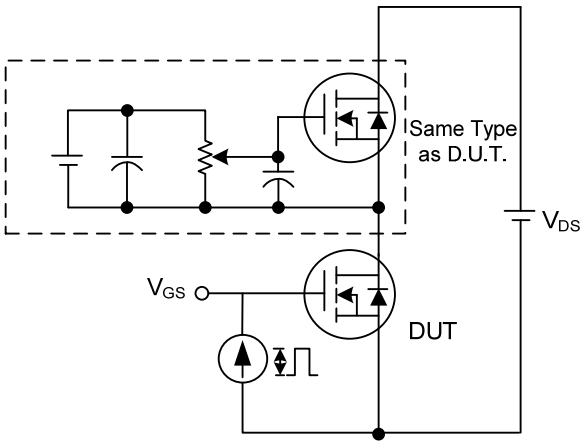
■ TEST CIRCUITS AND WAVEFORMS



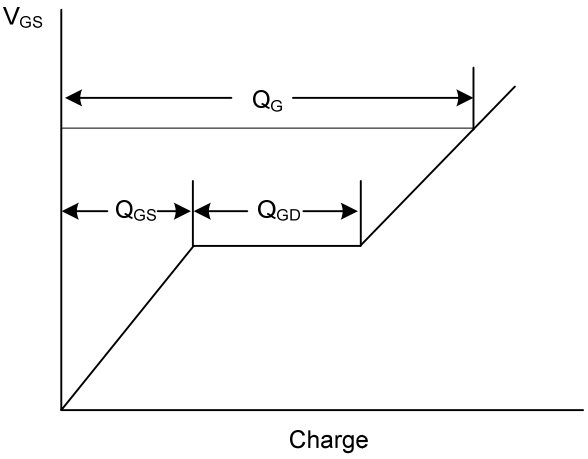
Switching Test Circuit



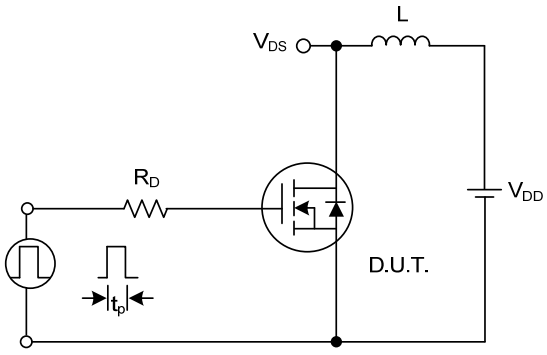
Switching Waveforms



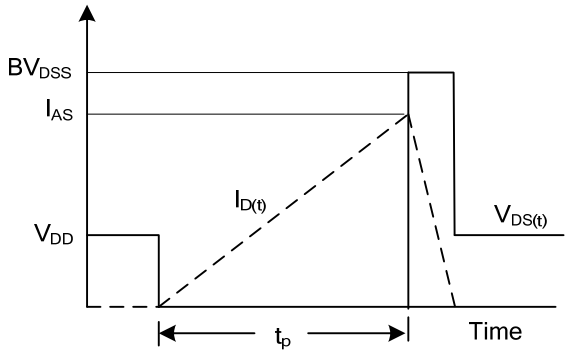
Gate Charge Test Circuit



Gate Charge Waveform



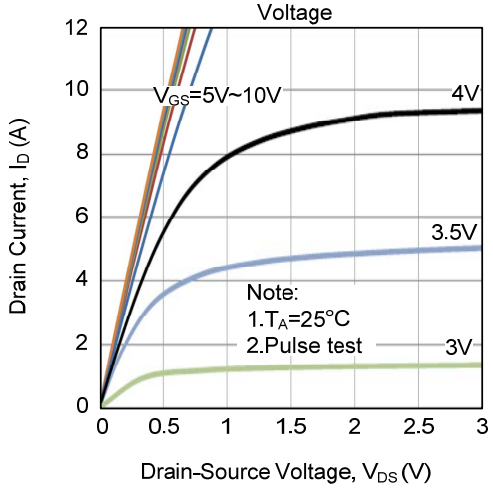
Unclamped Inductive Switching Test Circuit



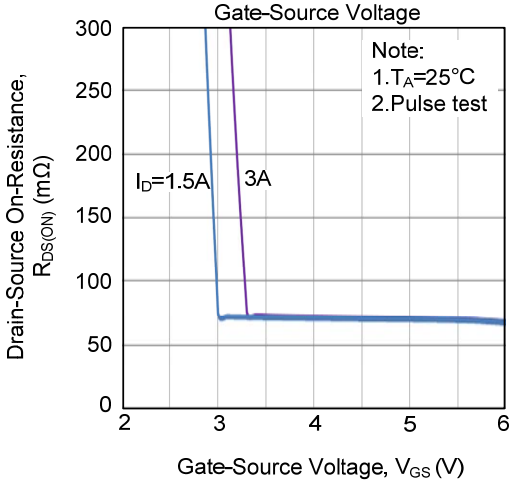
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

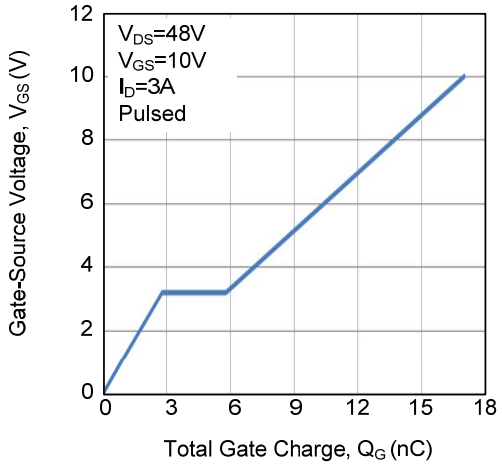
Drain Current vs. Drain-Source Voltage



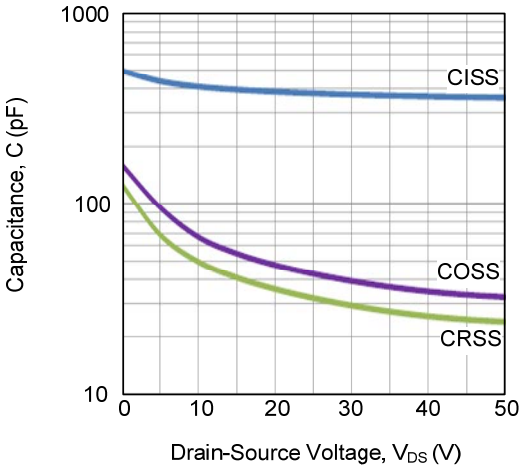
Drain-Source On-Resistance vs. Gate-Source Voltage



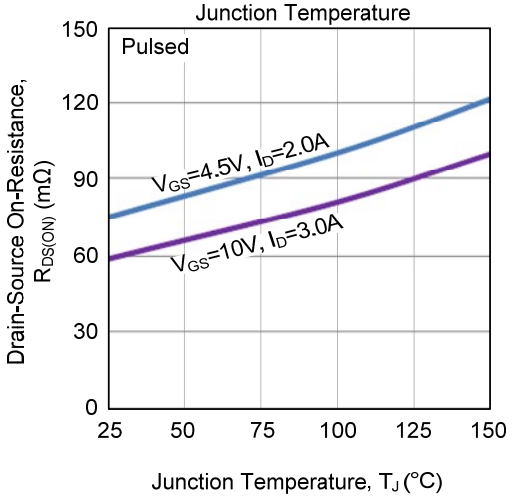
Gate Charge Characteristics



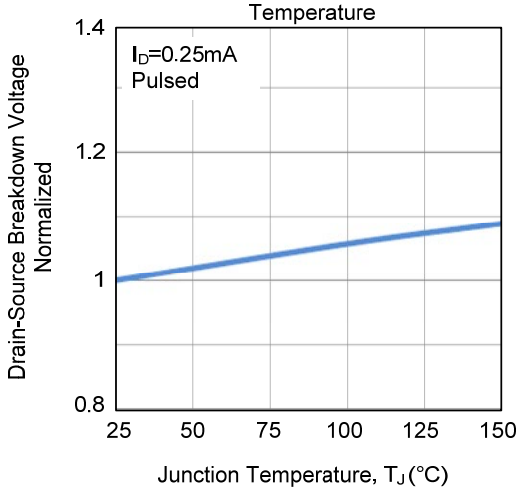
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

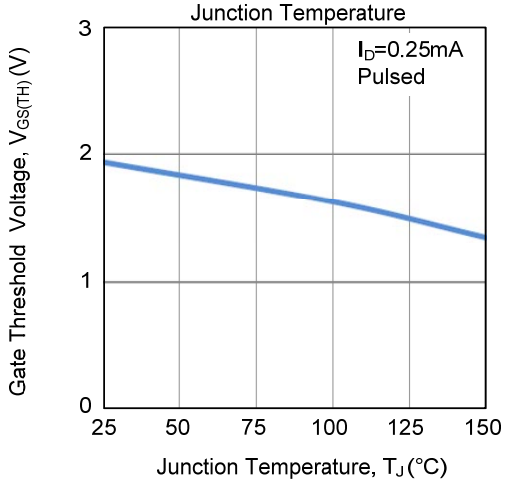


Breakdown Voltage vs. Junction Temperature

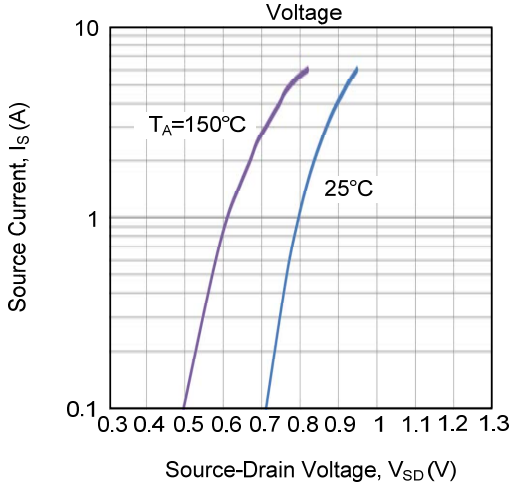


■ TYPICAL CHARACTERISTICS (Cont.)

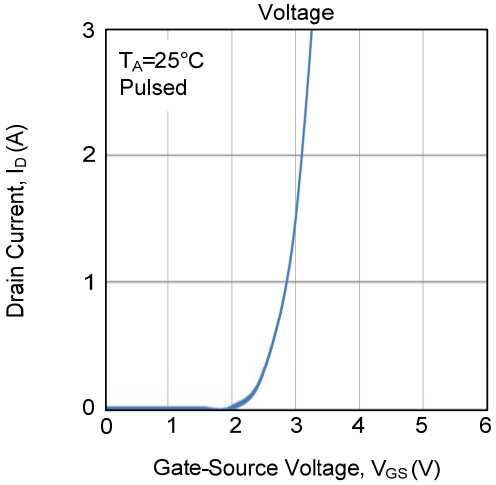
Gate Threshold Voltage vs. Junction Temperature



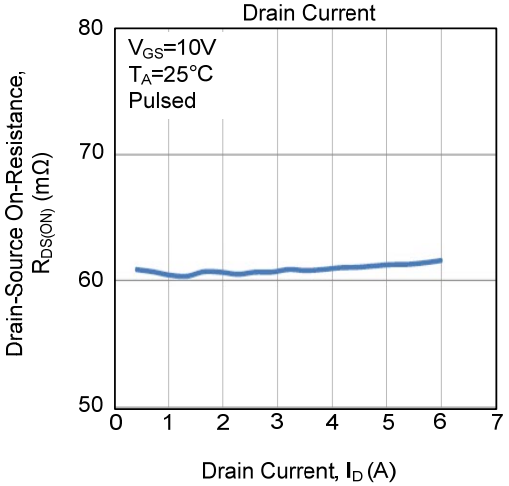
Source Current vs. Source-Drain Voltage



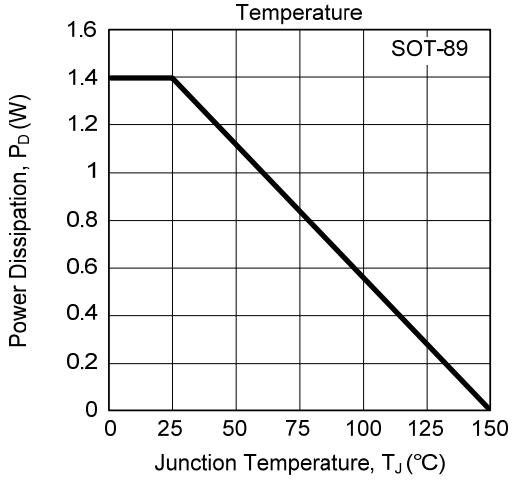
Drain Current vs. Gate-Source Voltage



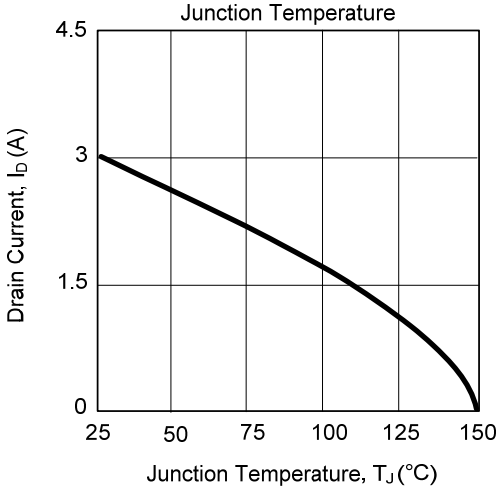
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)