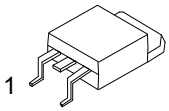
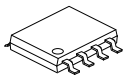
UT4435

Power MOSFET

-8.8A, -30V P-CHANNEL POWER MOSFET

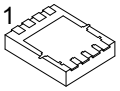


TO-252



SOP-8

PDFN3×3



PDFN5×6

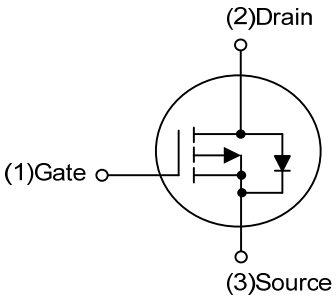
■ DESCRIPTION

The **UT4435** uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

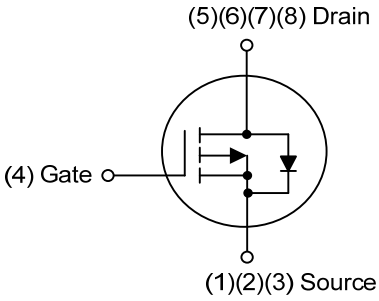
■ FEATURES

* $R_{DS(ON)}$ ≤ 20 mΩ @ V_{GS}=-10V, I_D=-8.8A
* $R_{DS(ON)}$ ≤ 35 mΩ @ V_{GS} =-4.5V, I_D=-6.7A
* Low capacitance
* Low gate charge
* Fast switching capability
* Avalanche energy specified

■ SYMBOL



TO-252

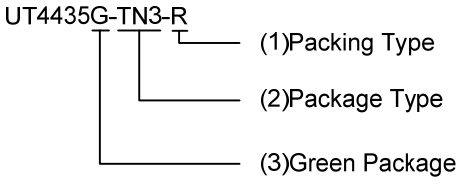


SOP-8/PDFN3×3/PDFN5×6

■ ORDERING INFORMATION

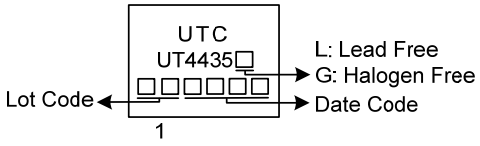
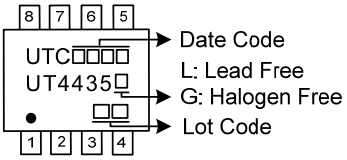
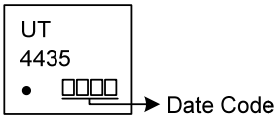
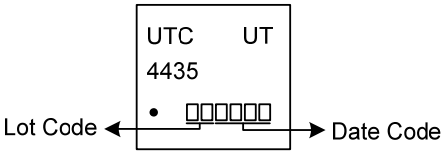
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT4435L-TN3-R	UT4435G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT4435L-S08-R	UT4435G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UT4435L-P3030-R	UT4435G-P3030-R	PDFN3×3	S	S	S	G	D	D	D	D	Tape Reel
UT4435L-P5060-R	UT4435G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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



(1) R: Tape Reel
(2) TN3: TO-252, S08: SOP-8, P3030: PDFN3×3
P5060: PDFN5×6
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

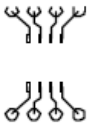
TO-252	SOP-8
	
PDFN3×3	**PDFN5×6**
	

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-30	V
Gate-Source Voltage		V_{GSS}	±25	V
Continuous Drain Current (Note 3a)		I_D	-8.8	A
Pulsed Drain Current		I_{DM}	-50	A
Power Dissipation (Note 3b)	TO-252	P_D	1.25	W
	SOP-8		1	W
	PDFN3×3		1.13	W
	PDFN5×6		1.56	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. Pulse Test: Pulse Width < 300μs, Duty Cycle < 2.0%.
3. θ_{JA} is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. θ_{JC} is guaranteed by design while θ_{JA} is determined by the user's board design.

a) 50°C/W when mounted on a 1 in^2 pad of 2 oz copper



b) 125°C/W when mounted on a minimum pad.

■ THERMAL CHARACTERISTICS

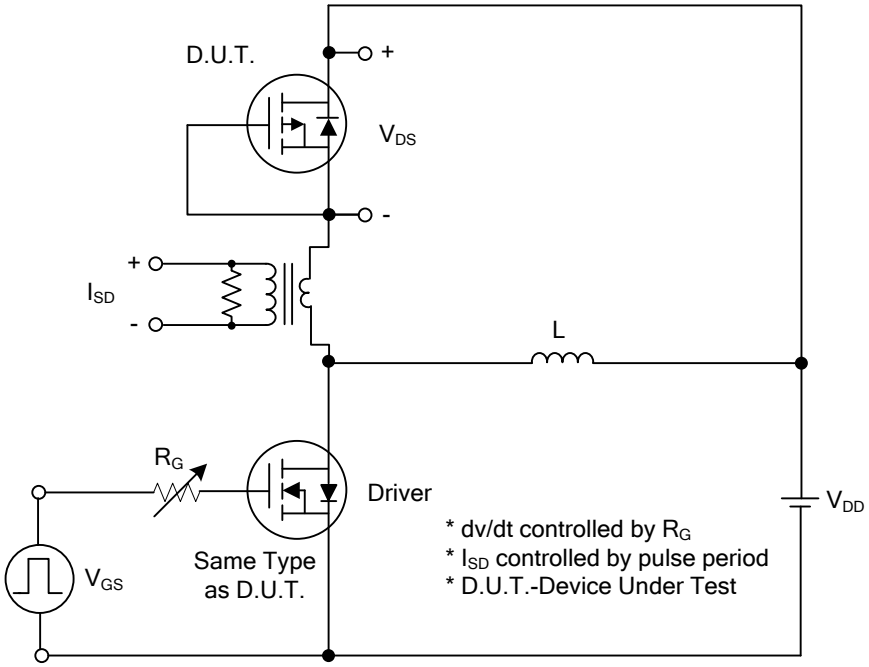
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient (Note 3a)	TO-252	θ_{JA}	40	°C/W
	SOP-8		50	°C/W
	PDFN3×3		45	°C/W
	PDFN5×6		42.5	°C/W
Junction to Ambient(Note 3b)	TO-252		100	°C/W
	SOP-8		125	°C/W
	PDFN3×3		110	°C/W
	PDFN5×6		80	°C/W
Junction to Case	TO-252	θ_{JC}	2.78	°C/W
	SOP-8		25	°C/W
	PDFN3×3		13	°C/W
	PDFN5×6		3.5	°C/W

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

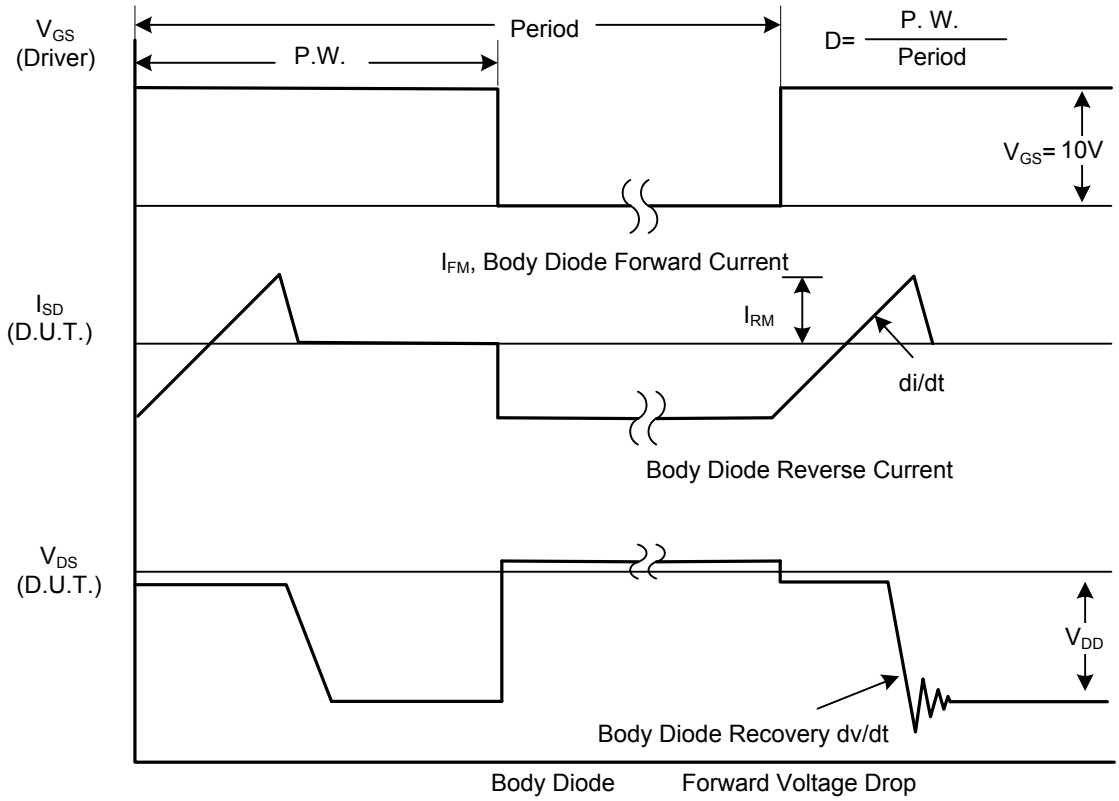
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250μA	-30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-24 V, V_{GS}=0V			-1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±25 V, V_{DS}=0V			±100	nA
ON CHARACTERISTICS(Note)						
Gate-Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_{DS}=-250μA	-1.0	-1.7	-3.0	V
On State Drain Current	$I_{D(ON)}$	V_{GS}=-10V, V_{DS}=-5V	-50			A
Static Drain–Source On–Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-8.8A		16.5	20	mΩ
		V_{GS}=-4.5V, I_D=-6.7A		26	35	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-8.8A		24		S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=-15V, V_{GS}=0V, f=1.0MHz		1750		pF
Output Capacitance	C_{OSS}			305		pF
Reverse Transfer Capacitance	C_{RSS}			250		pF
SWITCHING PARAMETERS(Note)						
Total Gate Charge	Q_G	V_{DS} =-15V, V_{GS}=-10V, I_D=-8.8A		38		nC
Gate-Source Charge	Q_{GS}			5		nC
Gate-Drain Charge	Q_{GD}			9		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=-15V,V_{GS}=-10V, I_D=-8.8A R_G=6Ω		11		ns
Turn-ON Rise Time	t_R			23		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			47		ns
Turn-OFF Fall-Time	t_F			38		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Body-Diode Continuous Current	I_S				-2.1	A
Diode Forward Voltage(Note)	V_{SD}	I_S=-2.1A, V_{GS}=0V			1.4	V

Note: Pulse Test: Pulse Width < 300μs, Duty Cycle < 2.0%.

■ TEST CIRCUITS AND WAVEFORMS

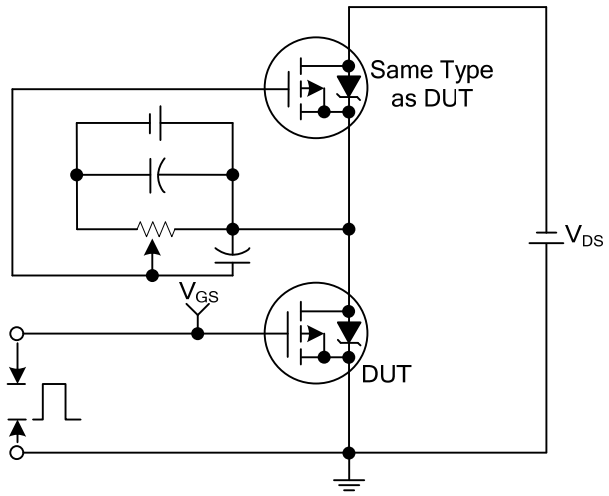


Peak Diode Recovery dv/dt Test Circuit

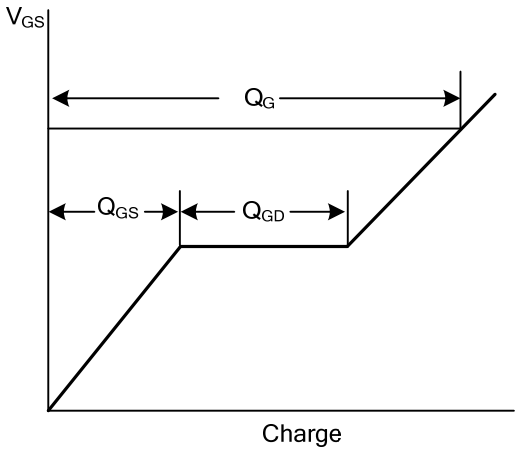


Peak Diode Recovery dv/dt Waveforms

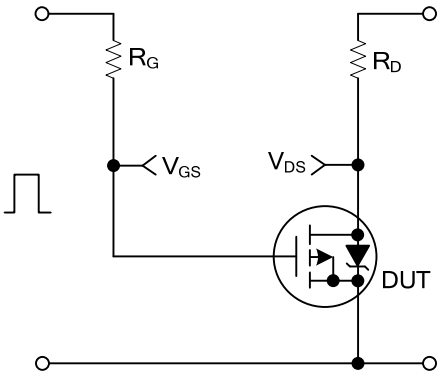
■ TEST CIRCUITS AND WAVEFORMS



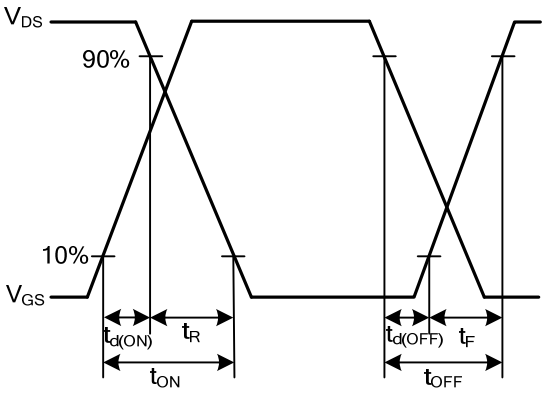
Gate Charge Test Circuit



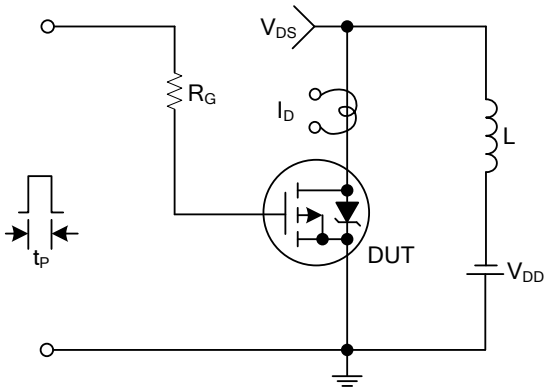
Gate Charge Waveforms



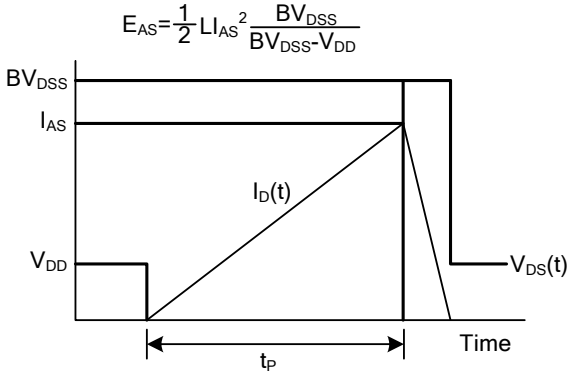
Resistive Switching Test Circuit



Resistive Switching Waveforms



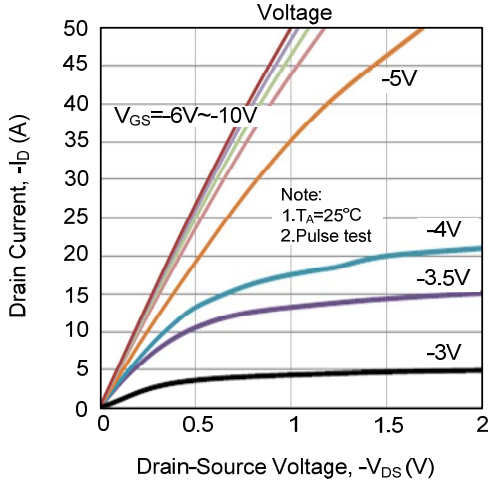
Unclamped Inductive Switching Test Circuit



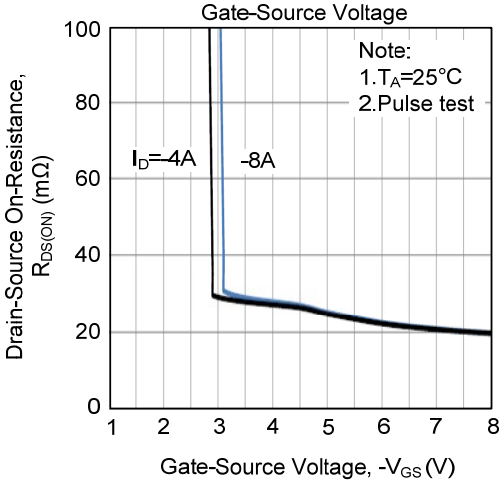
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

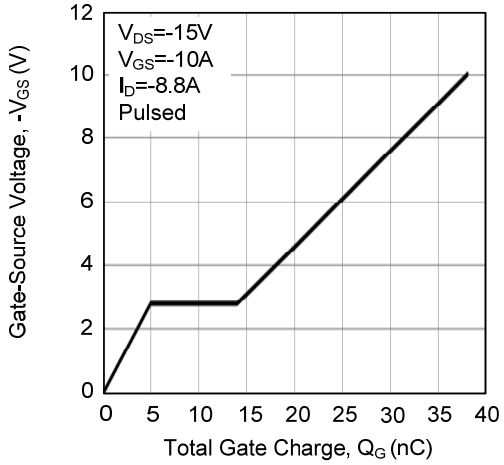
Drain Current vs. Drain-Source Voltage



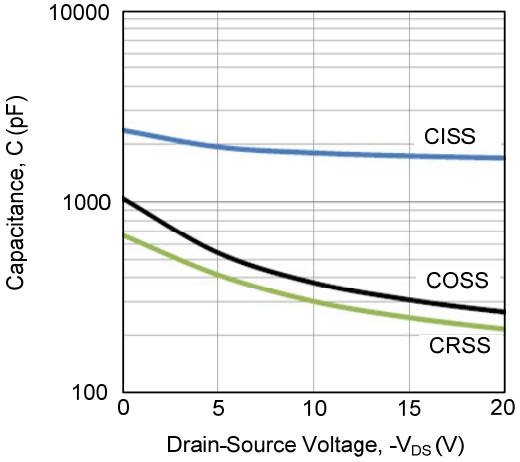
Drain-Source On-Resistance vs. Gate-Source Voltage



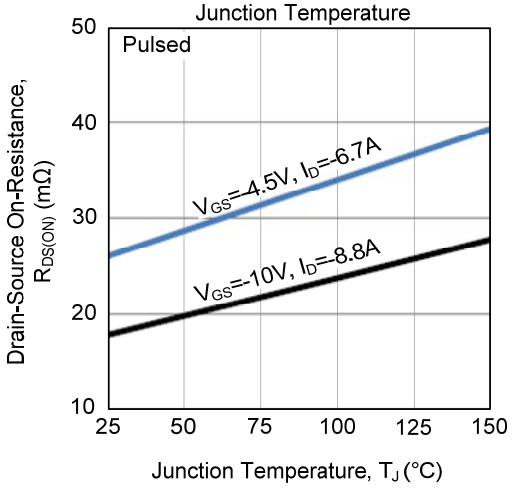
Gate Charge Characteristics



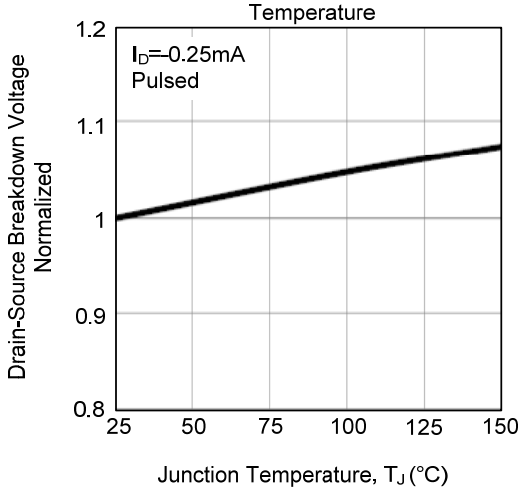
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

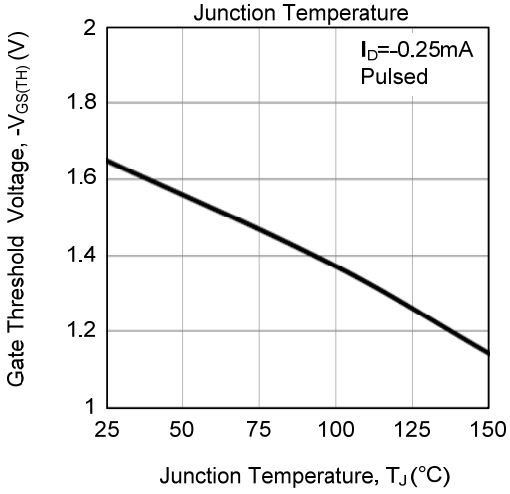


Breakdown Voltage vs. Junction Temperature

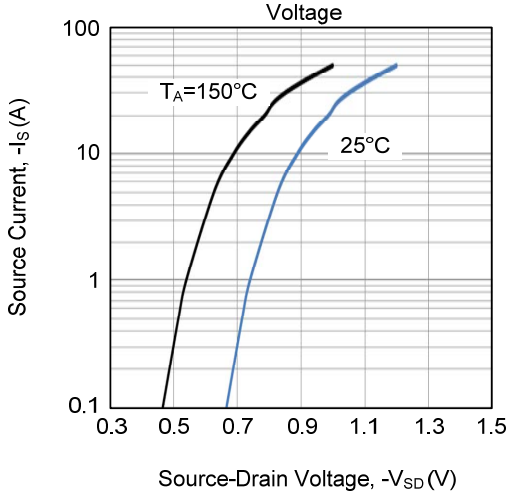


■ TYPICAL CHARACTERISTICS (Cont.)

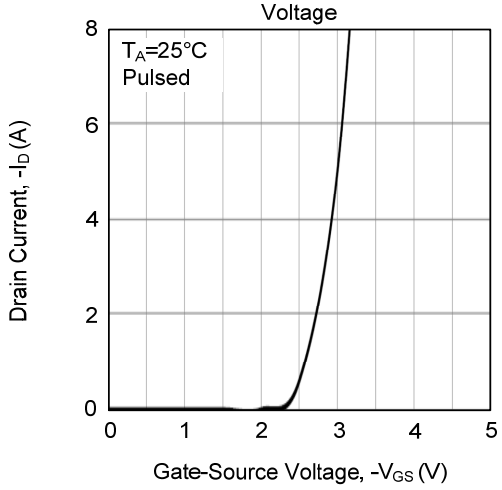
Gate Threshold Voltage vs. Junction Temperature



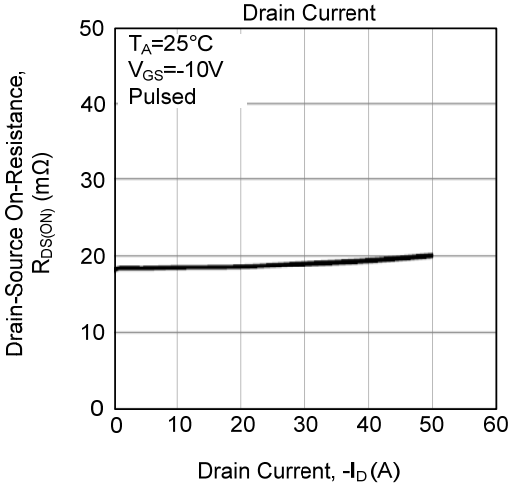
Source Current vs. Source-Drain Voltage



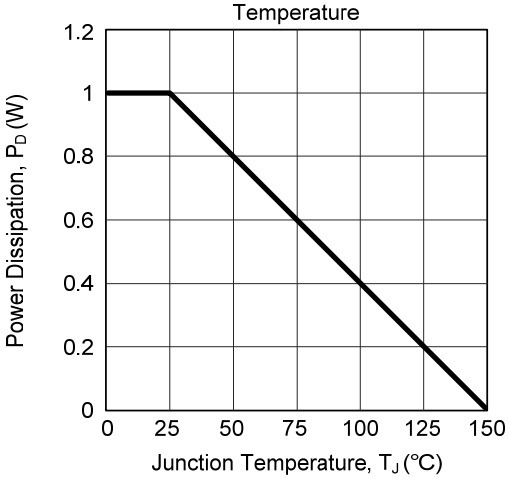
Drain Current vs. Gate-Source Voltage



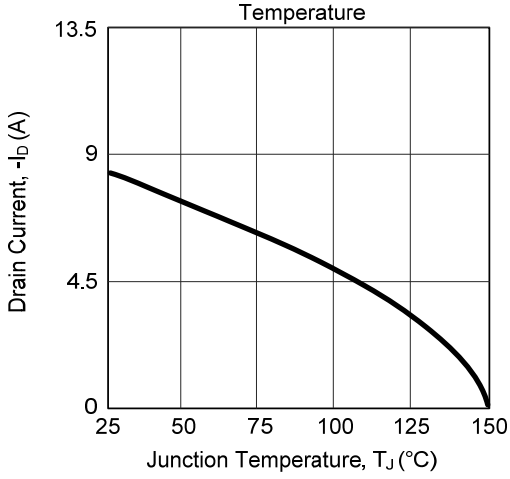
Drain-Source On-Resistance vs. Drain Current



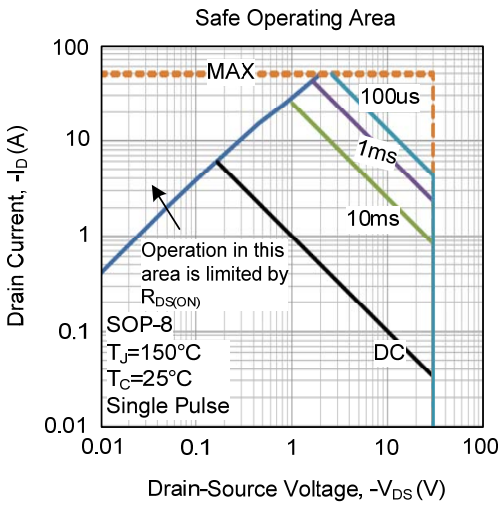
Power Dissipation vs. Junction Temperature

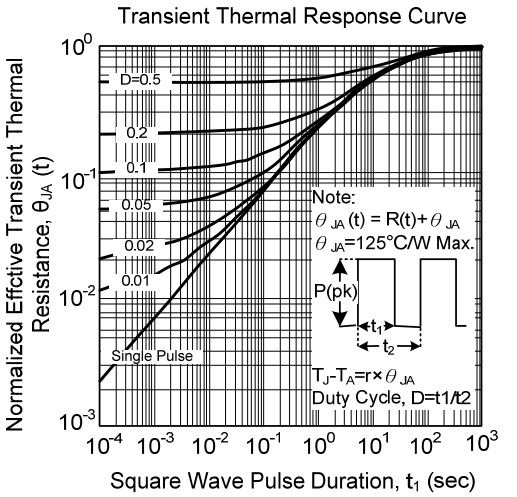


Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)





Thermal characterization performed using the conditions described in Note 3b.
Transient thermal response will change depending on the circuit board design.