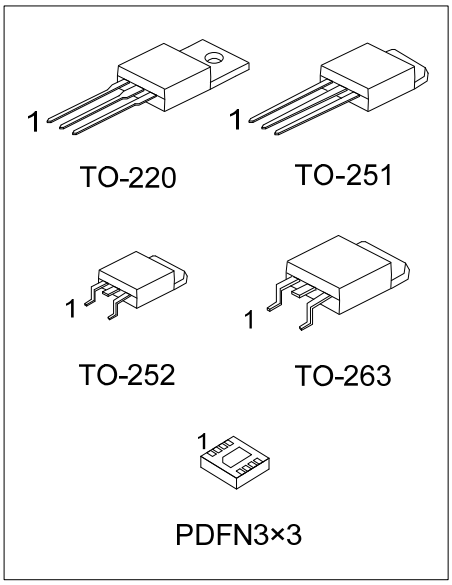
UT40N03T

Power MOSFET

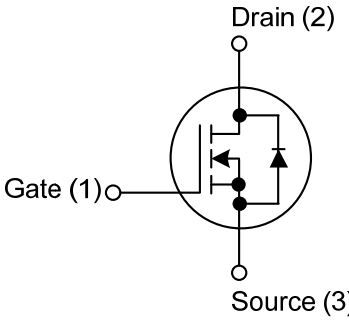
30V, 40A N-CHANNEL ENHANCEMENT MODE POWER MOSFET



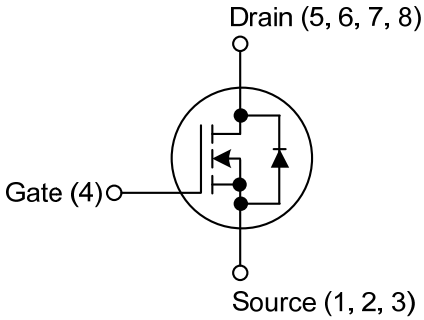
■ FEATURES

* $R_{DS(ON)}$ ≤ 25 mΩ @ V_{GS}=10V, I_D=18A
  $R_{DS(ON)}$ ≤ 45 mΩ @ V_{GS}=4.5V, I_D=14A
* Low capacitance
* Optimized gate charge
* Fast switching capability
* Avalanche energy specified

■ SYMBOL



TO-220/TO-251/TO-252/TO-263



PDFN3×3

■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT40N03TL-TA3-T	UT40N03TG-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UT40N03TL-TM3-T	UT40N03TG-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
UT40N03TL-TN3-R	UT40N03TG-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT40N03TL-TQ2-R	UT40N03TG-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
UT40N03TL-TQ2-T	UT40N03TG-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
UT40N03TL-P3030-R	UT40N03TG-P3030-R	PDFN3×3	S	S	S	G	D	D	D	D	Tape Reel

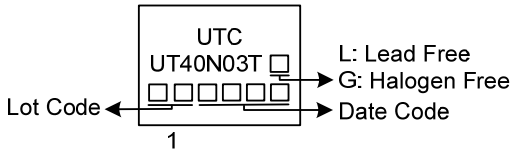
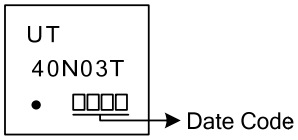
Note: Pin Assignment: G: Gate D: Drain S: Source

UT40N03TG-TA3-T

(1)Packing Type
(2)Package Type
(3)Green Package

(1) T: Tube, R: Tape Reel
(2) TA3: TO-220, TM3: TO-251, TN3:TO-252, TQ2: TO-263, P3030: PDFN3×3
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

TO-220 / TO-251 / TO-252 / TO-263	PDFN3×3
	

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±25	V
Continuous Drain Current		I_D	40	A
Pulsed Drain Current		I_{DM}	80	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	29	mJ
Total Power Dissipation	TO-220/TO-263	P_D	65	W
	TO-251/TO-252		54	W
	PDFN3×3		27	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. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L =0.1 mH, I_{AS} = 24A, V_{DD} = 20V, R_G = 25Ω, Starting T_J = 25°C

■ THERMAL DATA

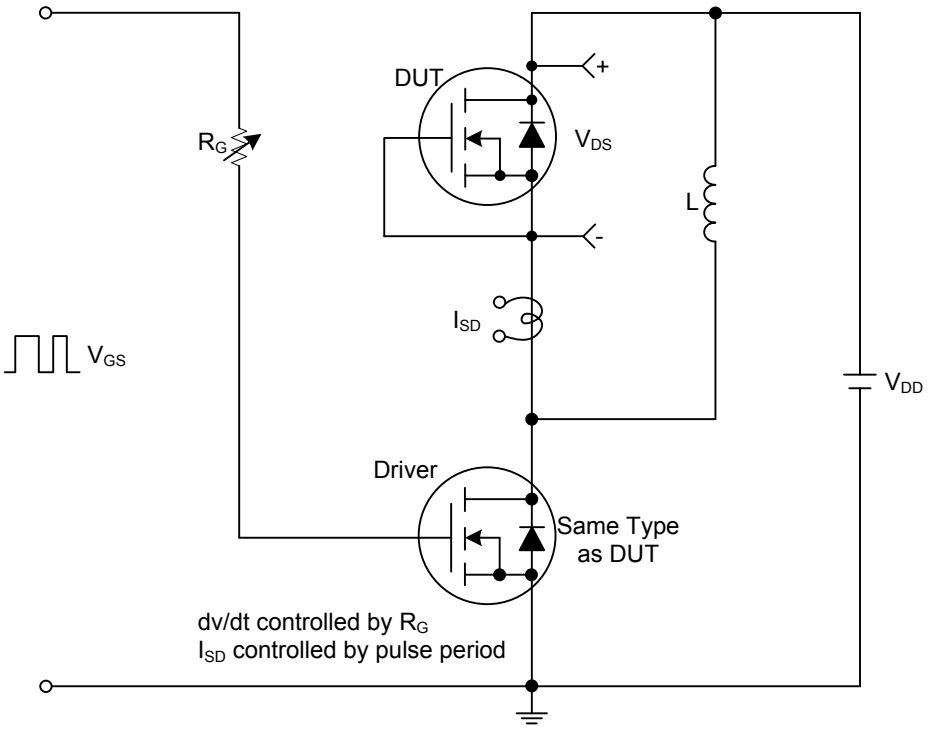
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-263	θ_{JA}	62.5	°C/W
	TO-251/TO-252		50	°C/W
	PDFN3×3		60	°C/W
Junction to Case	TO-220/TO-263	θ_{JC}	1.92	°C/W
	TO-251/TO-252		2.3	°C/W
	PDFN3×3		4.6	°C/W

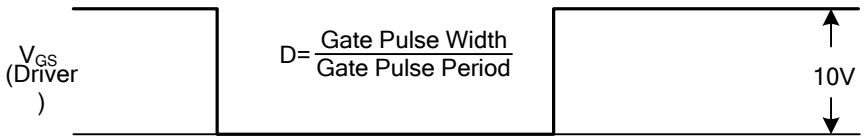
■ ELECTRICAL CHARACTERISTICS (T_J =25°C, unless otherwise specified)

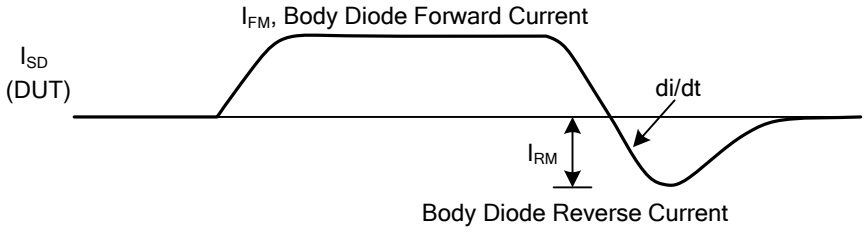
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V, T_J=25°C			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±25V			±100	nA
ON CHARACTERISTICS						
Gate-Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=18A			25	mΩ
		V_{GS}=4.5V, I_D=14A			45	
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz		680		pF
Output Capacitance	C_{OSS}			120		
Reverse Transfer Capacitance	C_{RSS}			100		
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS}=24V, V_{GS}=4.5V, I_D=40A		13		nC
Gate-Source Charge	Q_{GS}			3		
Gate-Drain Charge	Q_{GD}			6.2		
Turn-ON Delay Time	$t_{D(ON)}$	V_{GS}=10V, V_{DS}=15V, I_D=40A, R_G=3.3Ω		5		ns
Turn-ON Rise Time	t_R			18		
Turn-OFF Delay Time	$t_{D(OFF)}$			20		
Turn-OFF Fall-Time	t_F			25		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V_{SD}	I_S=28A, V_{GS}=0V			1.3	V

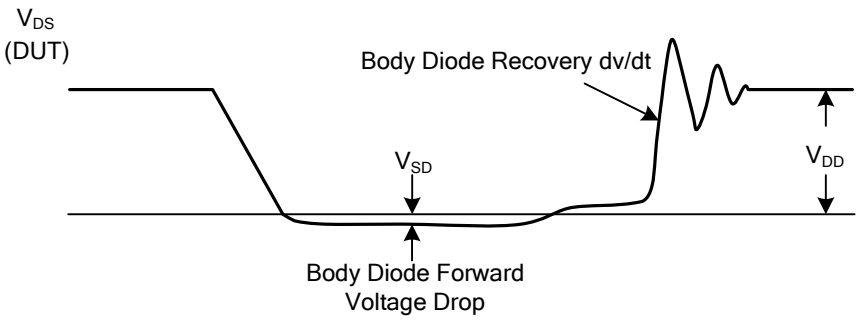
Notes: 1. Pulse width limited by $T_{J(MAX)}$.
2. Pulse width ≤ 300us, duty cycle ≤ 2%.

■ TEST CIRCUITS AND WAVEFORMS



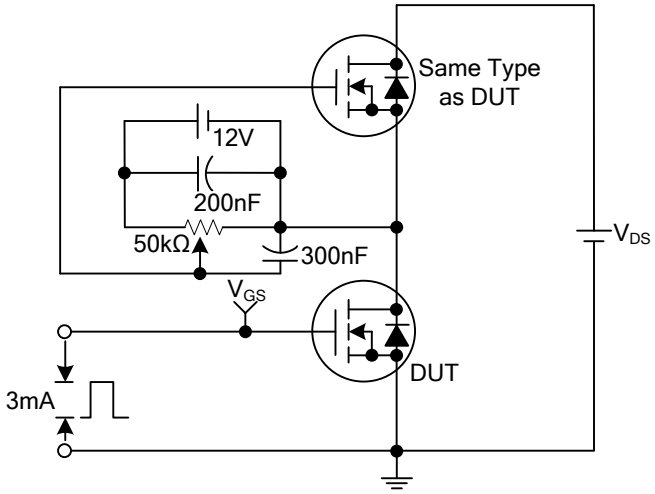




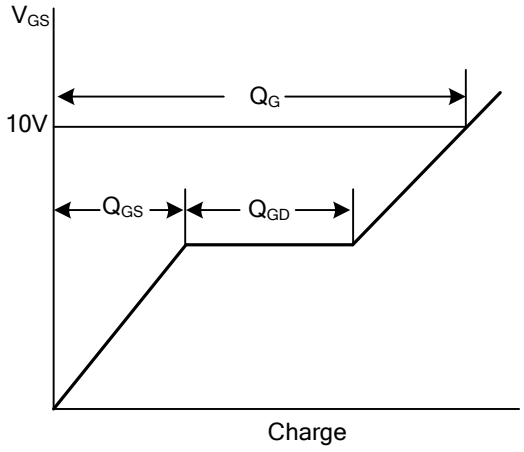


Peak Diode Recovery dv/dt Test Circuit and Waveforms

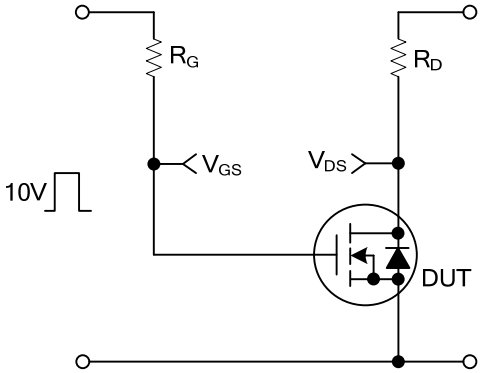
■ TEST CIRCUITS AND WAVEFORMS



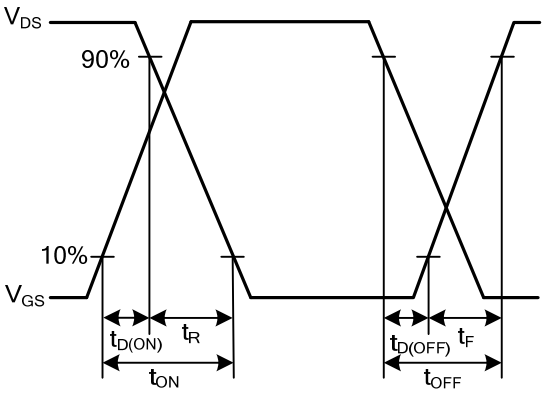
Gate Charge Test Circuit



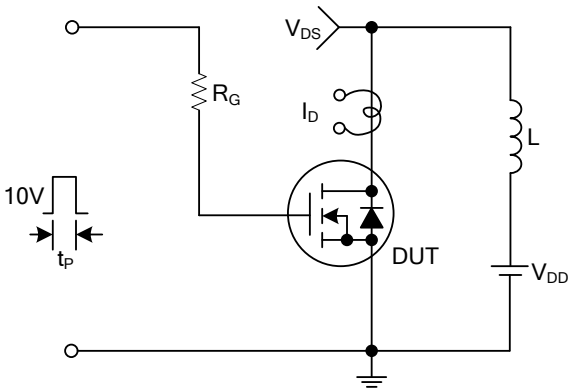
Gate Charge Waveforms



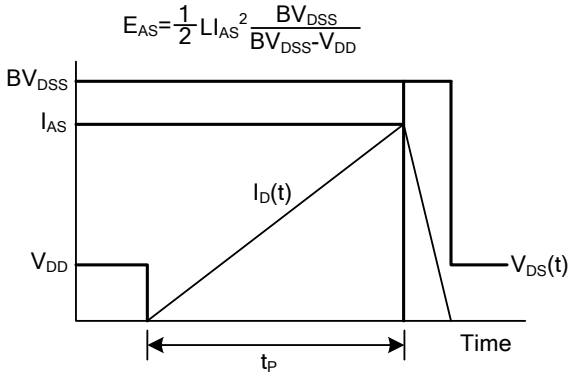
Resistive Switching Test Circuit



Resistive Switching Waveforms



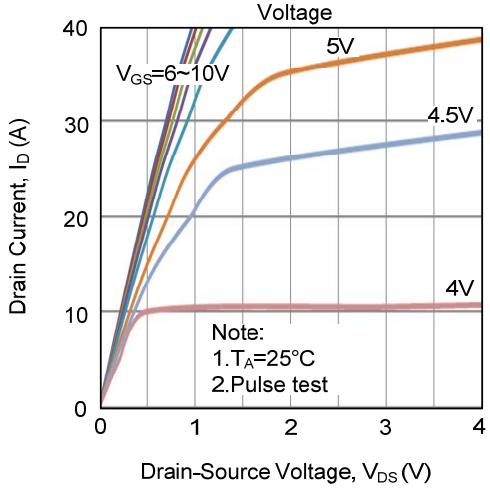
Unclamped Inductive Switching Test Circuit



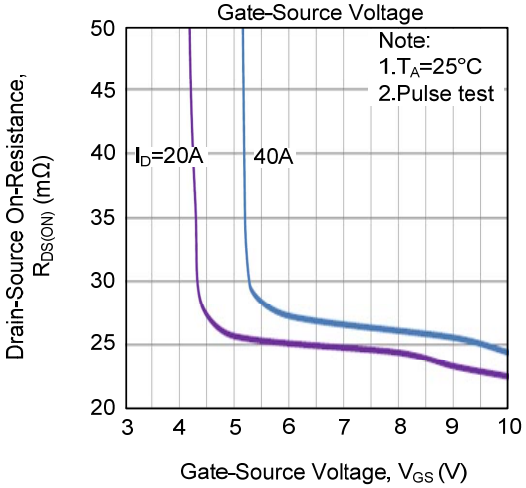
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

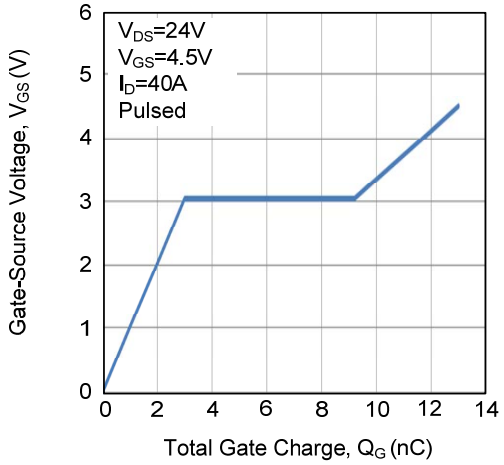
Drain Current vs. Drain-Source Voltage



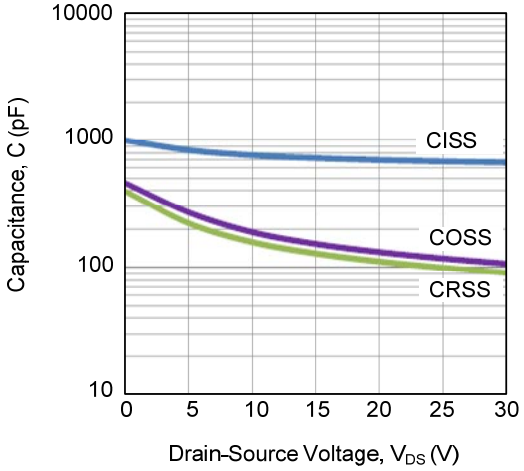
Drain-Source On-Resistance vs. Gate-Source Voltage



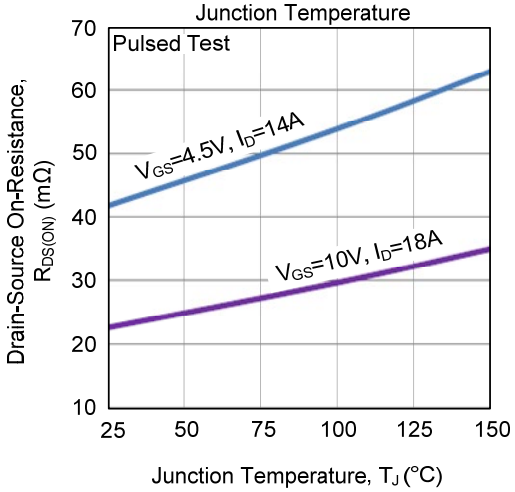
Gate Charge Characteristics



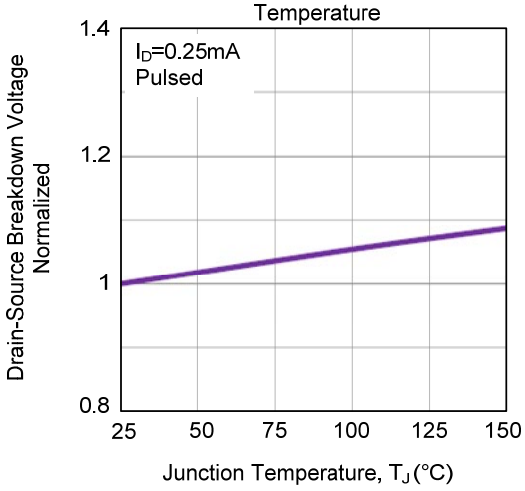
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

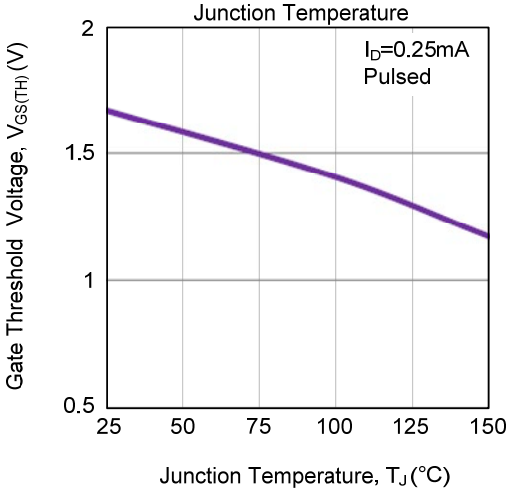


Breakdown Voltage vs. Junction Temperature

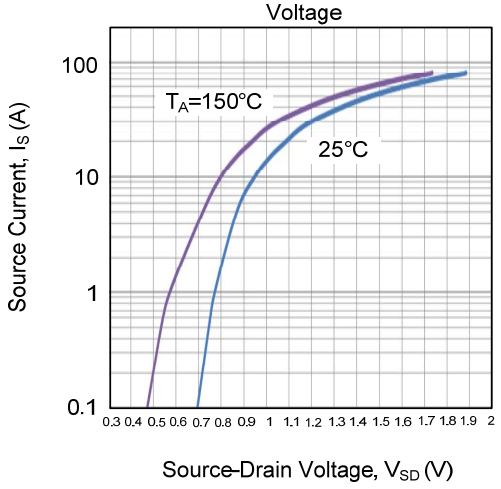


■ TYPICAL CHARACTERISTICS (Cont.)

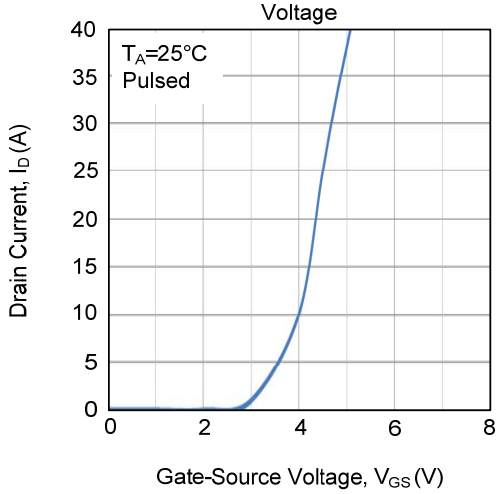
Gate Threshold Voltage vs. Junction Temperature



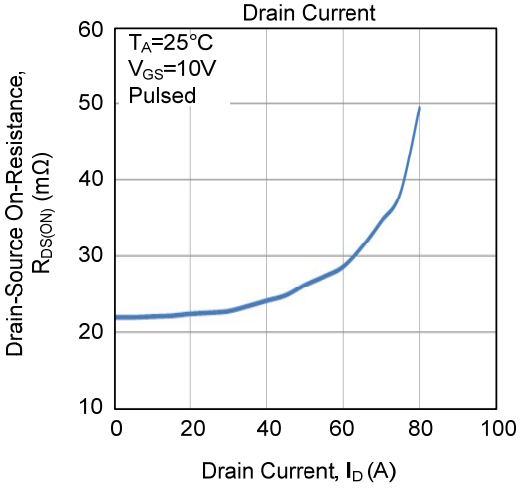
Source Current vs. Source-Drain Voltage



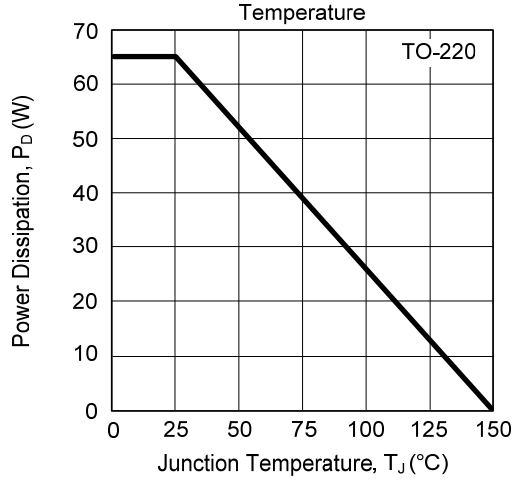
Drain Current vs. Gate-Source Voltage



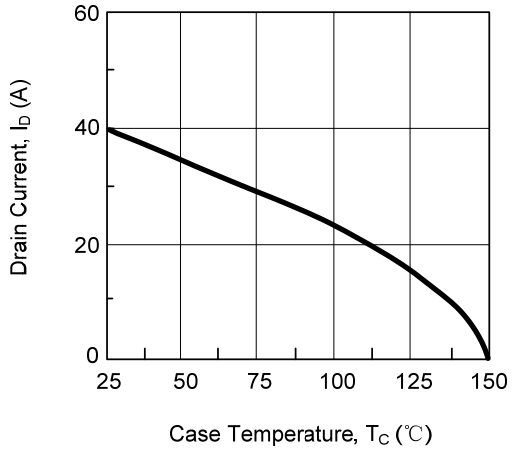
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Max. Drain Current vs. Case Temperature



■ TYPICAL CHARACTERISTICS (Cont.)