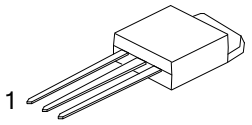
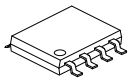
UT60N06

Power MOSFET

60A, 60V N-CHANNEL POWER MOSFET



TO-251



SOP-8

■ DESCRIPTION

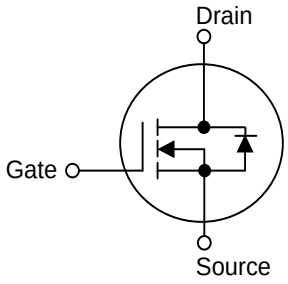
The UTC **UT60N06** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$ and high switching speed.

The UTC **UT60N06** is suitable for all commercial-industrial applications at power dissipation levels to approximately 50 watts, etc.

■ FEATURES

* $R_{DS(ON)} \leq 11\ m\Omega$ @ V_{GS}=10V, I_D=30A
  $R_{DS(ON)} \leq 14\ m\Omega$ @ V_{GS}=4.5V, I_D=30A
* High Switching Speed

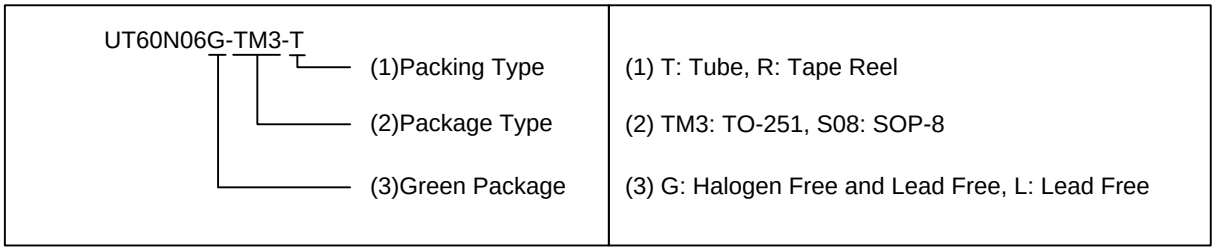
■ SYMBOL



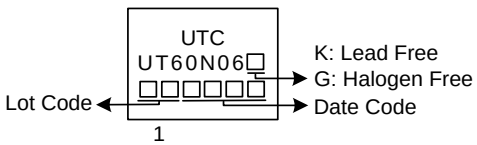
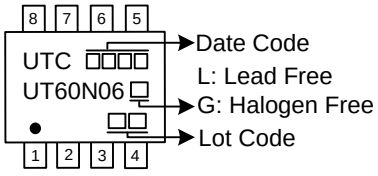
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT60N06L-TM3-T	UT60N06G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
UT60N06L-S08-R	UT60N06G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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



■ MARKING

TO-251	SOP-8
	

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous (V_{GS}=10V)	I_D	60	A
	Pulsed (Note 2)	I_{DM}	120	A
Power Dissipation	TO-251	P_D	48	W
	SOP-8		5.4	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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-251	θ_{JA}	110	°C/W
	SOP-8		62.5	°C/W
Junction to Case	TO-251	θ_{JC}	2.6 (Note)	°C/W
	SOP-8		23.1 (Note)	°C/W

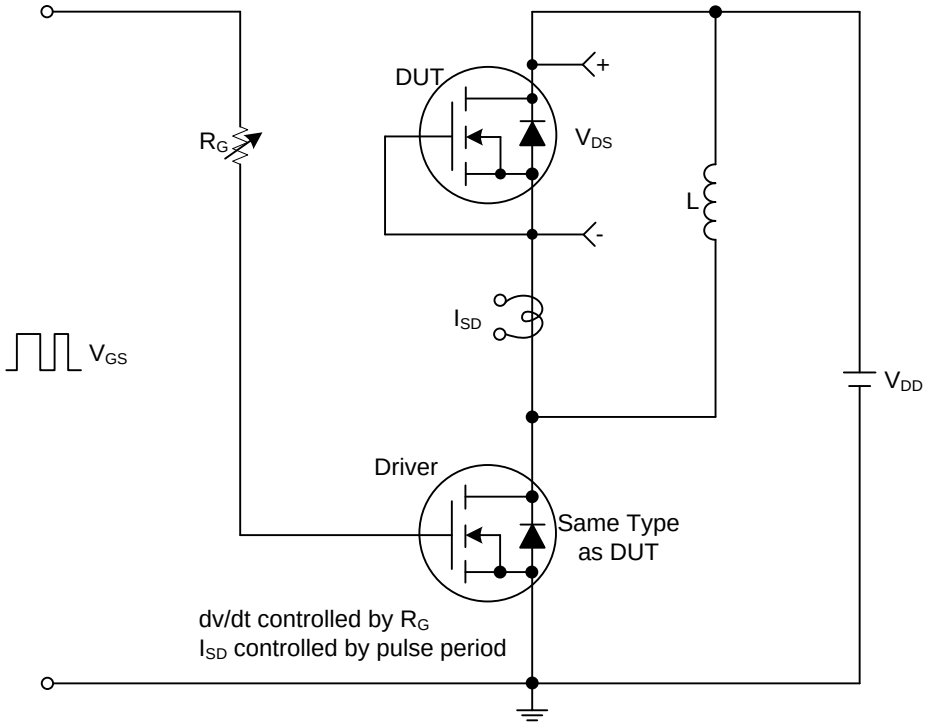
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

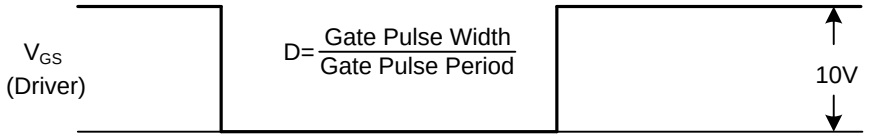
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

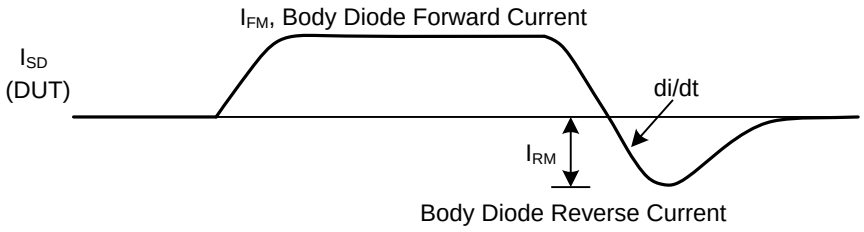
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=30A			11	mΩ
			V_{GS}=4.5V, I_D=30A			14	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1MHz		3500		pF
Output Capacitance		C_{OSS}			410		pF
Reverse Transfer Capacitance		C_{RSS}			340		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=48V, V_{GS}=10V, I_D=60A I_G=1mA (Note 1, 2)		98		nC
Gate-Source Charge		Q_{GS}			6		nC
Gate-Drain Charge		Q_{GD}			21		nC
Turn-On Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=30V, V_{GS}=10V, I_D=60A, R_G =3Ω (Note 1, 2)		10		ns
Turn-On Rise Time		t_R			17		ns
Turn-Off Delay Time		$t_{D(OFF)}$			86		ns
Turn-Off Fall Time		t_F			48		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I_S				60	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				120	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=60A,V_{GS}=0V			1.4	V

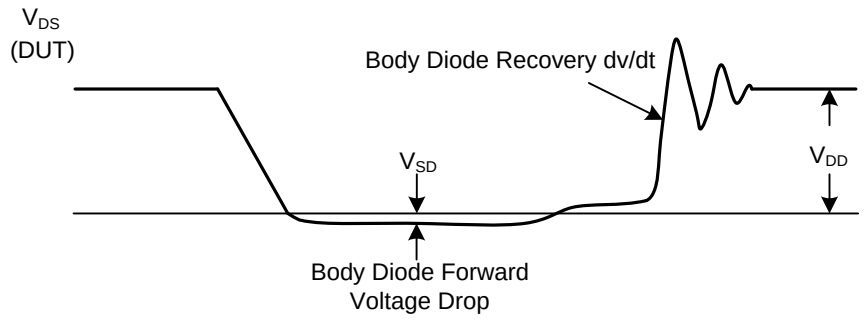
Notes: 1. Pulse Test : Pulse width ≤ 600μs, Duty cycle ≤ 2%.
2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



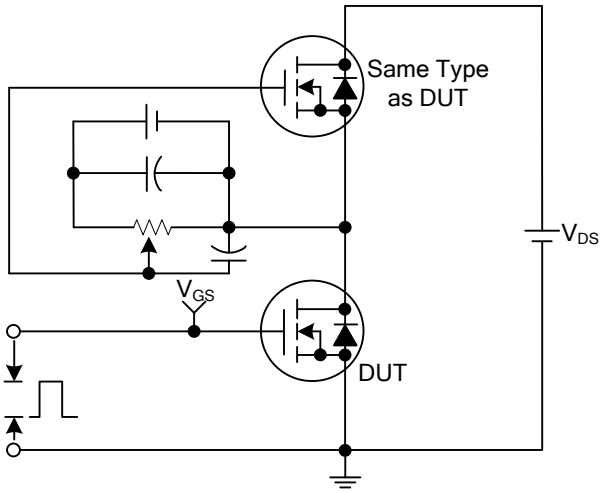




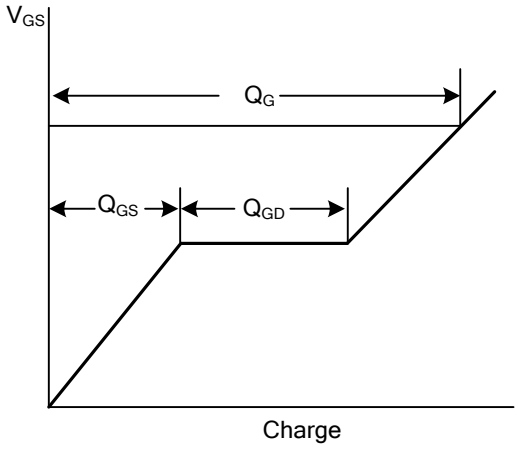


Peak Diode Recovery dv/dt Test Circuit and Waveforms

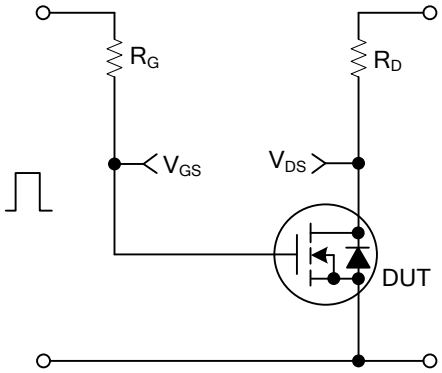
■ TEST CIRCUITS AND WAVEFORMS



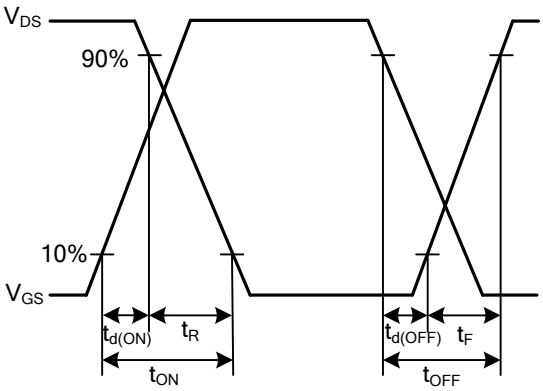
Gate Charge Test Circuit



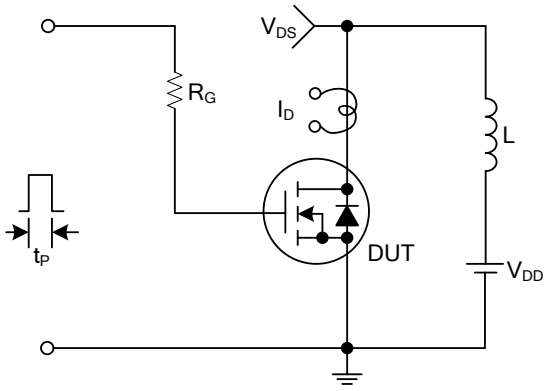
Gate Charge Waveforms



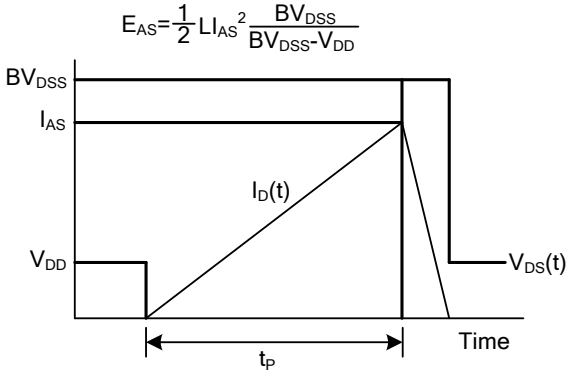
Resistive Switching Test Circuit



Resistive Switching Waveforms



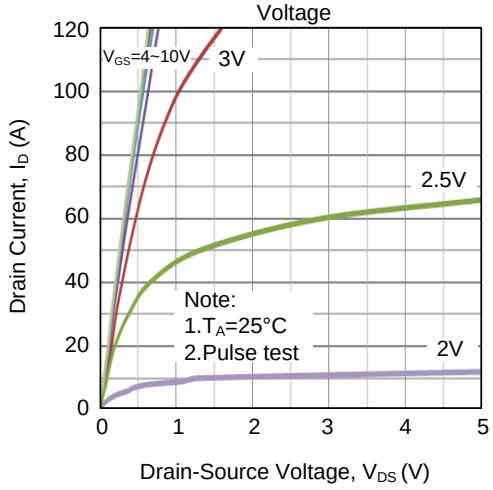
Unclamped Inductive Switching Test Circuit



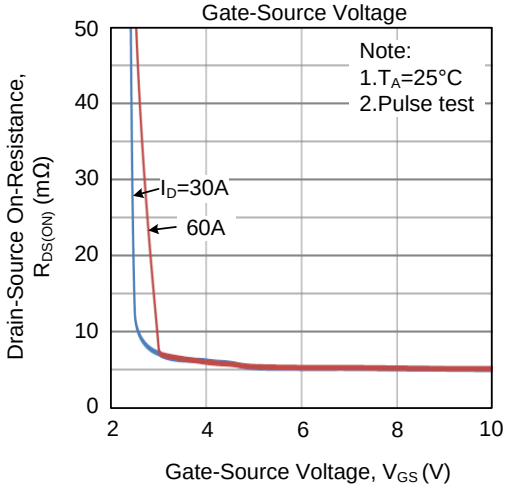
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

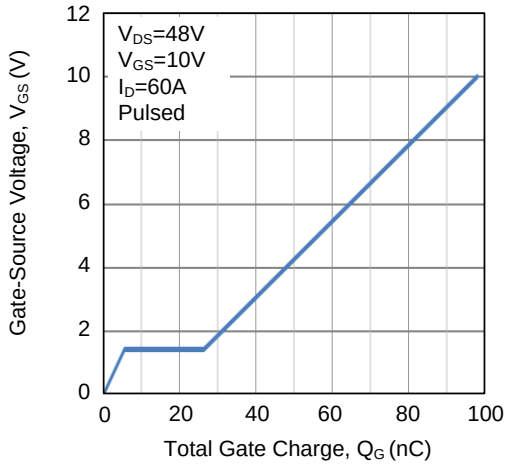
Drain Current vs. Drain-Source Voltage



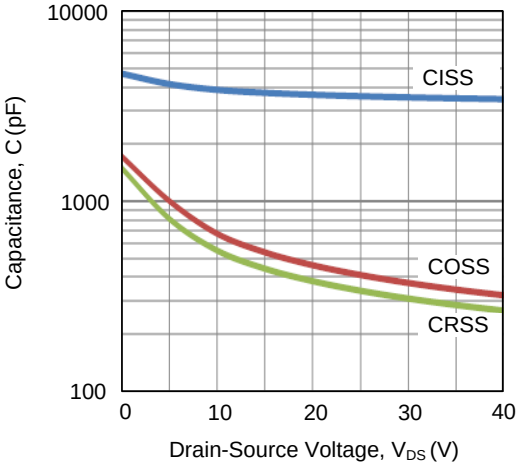
Drain-Source On-Resistance vs. Gate-Source Voltage



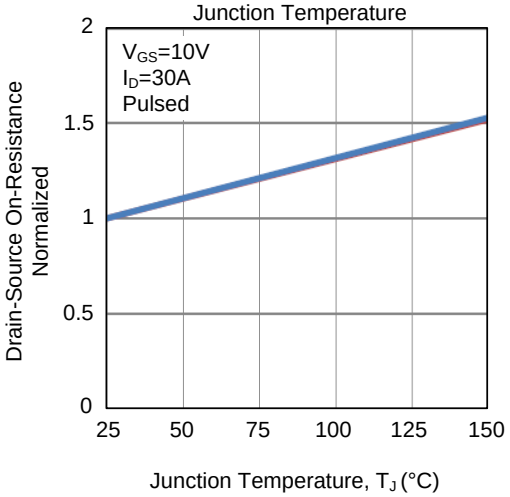
Gate Charge Characteristics



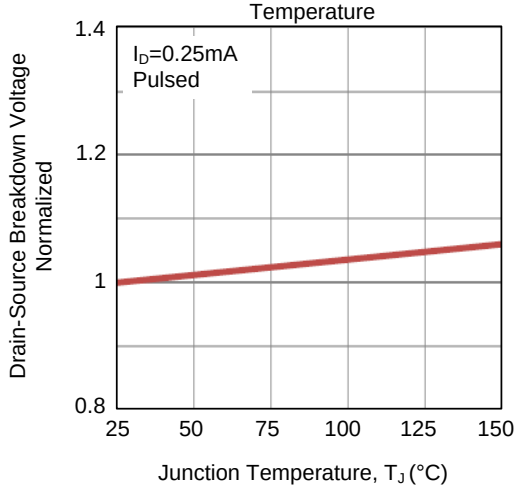
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

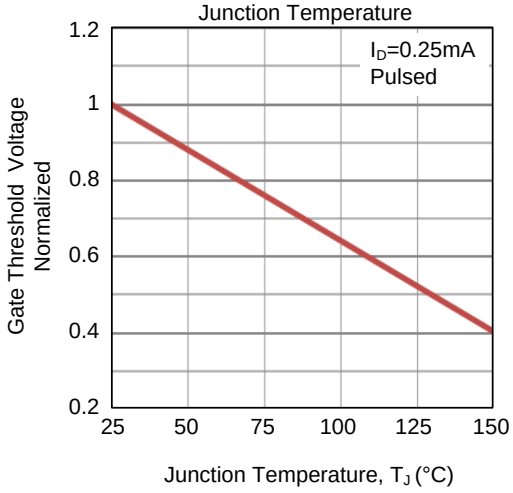


Breakdown Voltage vs. Junction Temperature

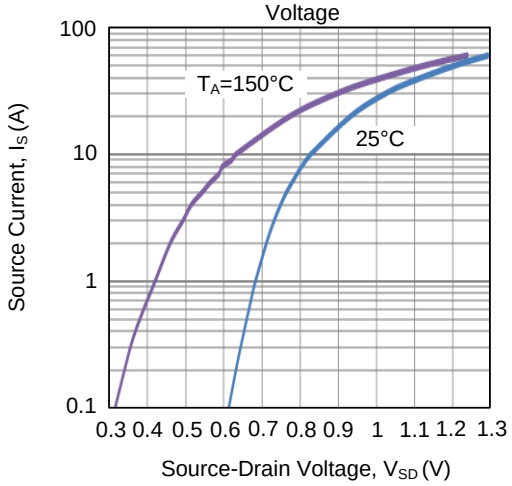


■ TYPICAL CHARACTERISTICS (Cont.)

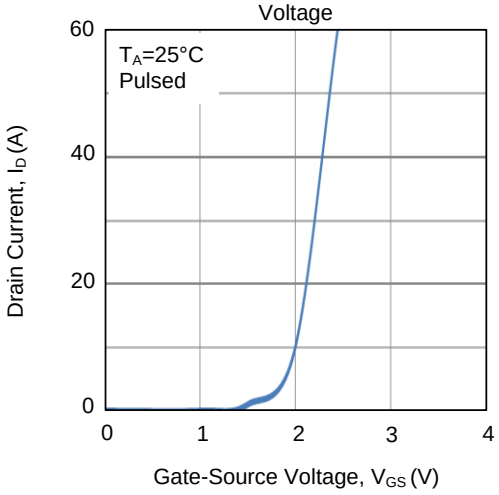
Gate Threshold Voltage vs. Junction Temperature



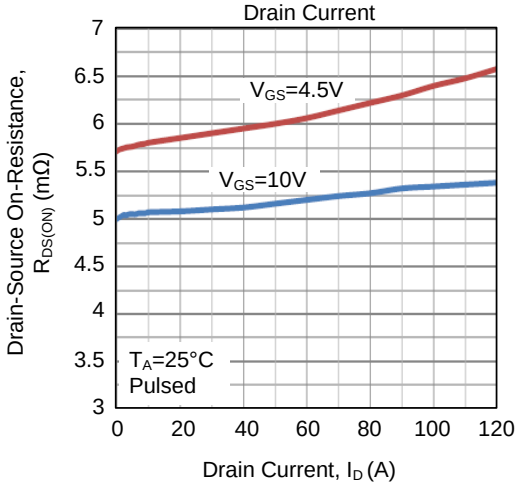
Source Current vs. Source-Drain Voltage



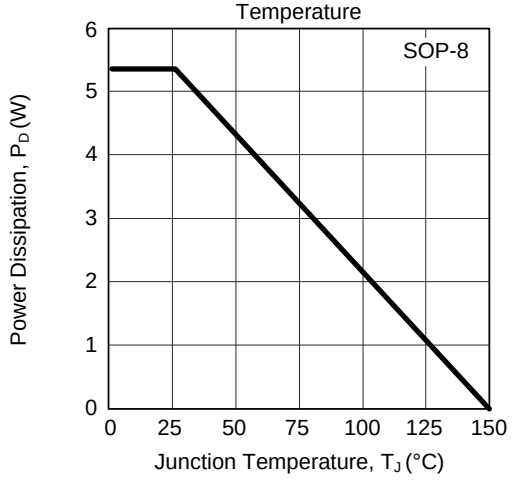
Drain Current vs. Gate-Source Voltage



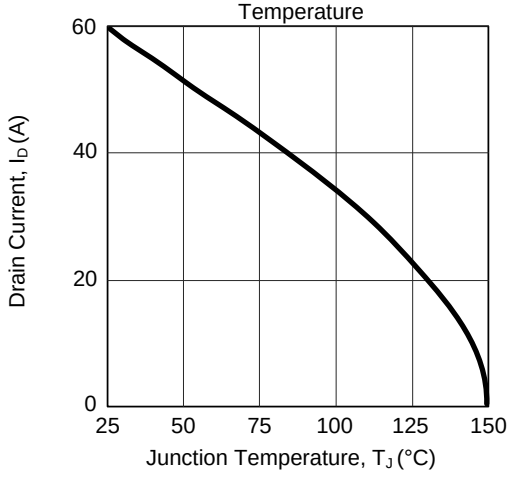
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)