

■ PRODUCT CHARACTERISTICS

VDSS	650V
$R_{DS(on)max}(@V_{GS}=10V)$	2.2Ω
Qg@type	24nC
ID	5A

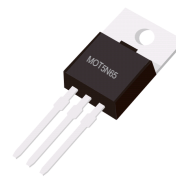
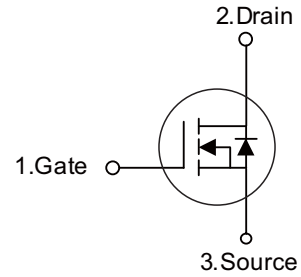
■ APPLICATIONS

- Electronic ballast
- High frequency switching
- LED power supply

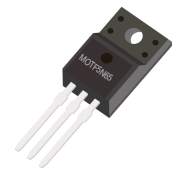
■ FEATURES

- * $R_{DS(ON)} \leq 2.2\Omega @ V_{GS}=10V$
- * High Switching Speed

Symbol



TO-220



TO-220F

■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT5N65F	TO-220F	50 pieces/Tube
N/A	MOT5N65A	TO-220	50 pieces/Tube

■ ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DSS}	650	V
Gate-Source Voltage	V_{GSS}	±30	V
Drain Current	Continuous	I_D	5
	Pulsed (Note 2)	I_{DM}	10
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	112
Peak Diode Recovery dv/dt (Note 4)	dv/dt	3.2	V/ns
Power Dissipation	TO-220	P_D	106
	TO-220F		36
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. $L = 10\text{mH}$, $I_{AS} = 4.73\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$ Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 7.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$



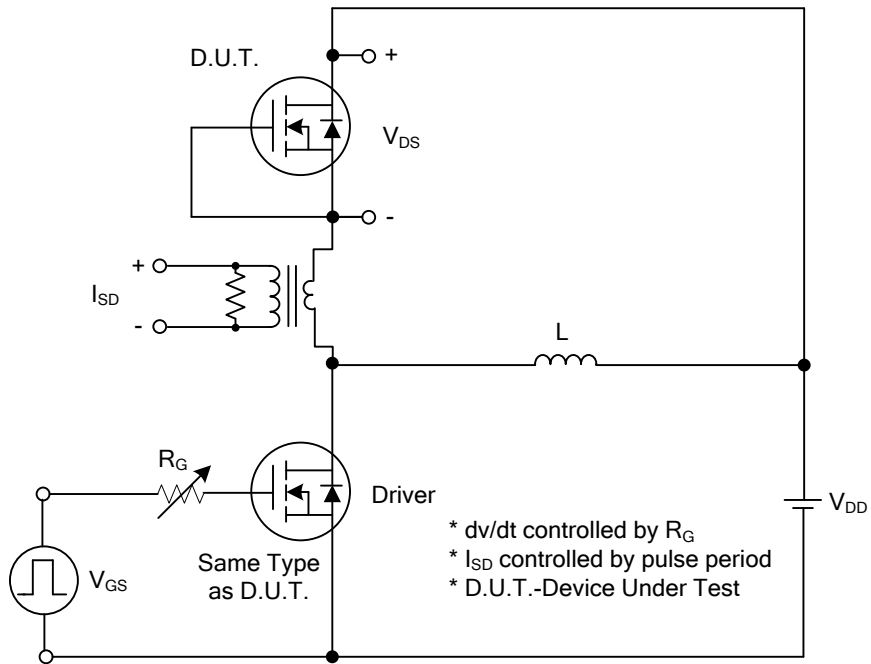
■ ELECTRICAL CHARACTERISTICS (T_c=25°C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D = 250μA	650			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS}			100	nA
	Reverse					
		V _{GS} =-30V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =2.5A		1.92	2.2	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0 MHz		623		pF
Output Capacitance	C _{OSS}			62		pF
Reverse Transfer Capacitance	C _{RSS}			2.9		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =100V, V _{GS} =10V, I _D =2.0A I _G =1mA (Note 1, 2)		15		nC
Gate-source Charge	Q _{GS}			5.6		nC
Gate-Drain Charge	Q _{GD}			2.5		nC
Turn-on Delay Time (Note 1)	t _{D(ON)}	V _{DS} =30V, V _{GS} =10V, I _D =0.5A, R _G =25Ω (Note 1, 2)		4.4		ns
Rise Time	t _R			24		ns
Turn-off Delay Time	t _{D(OFF)}			122		ns
Fall-Time	t _F			25		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				5	A
Maximum Body-Diode Pulsed Current	I _{SM}				10	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	V _{GS} =0V, I _S =5.0A			1.4	V
Reverse Recovery Time (Note 1)	t _{rr}	V _{GS} =0V, I _S =5.0A, di _F /dt=100A/μs (Note1)		328		ns
Reverse Recovery Charge	Q _{rr}				2.65	

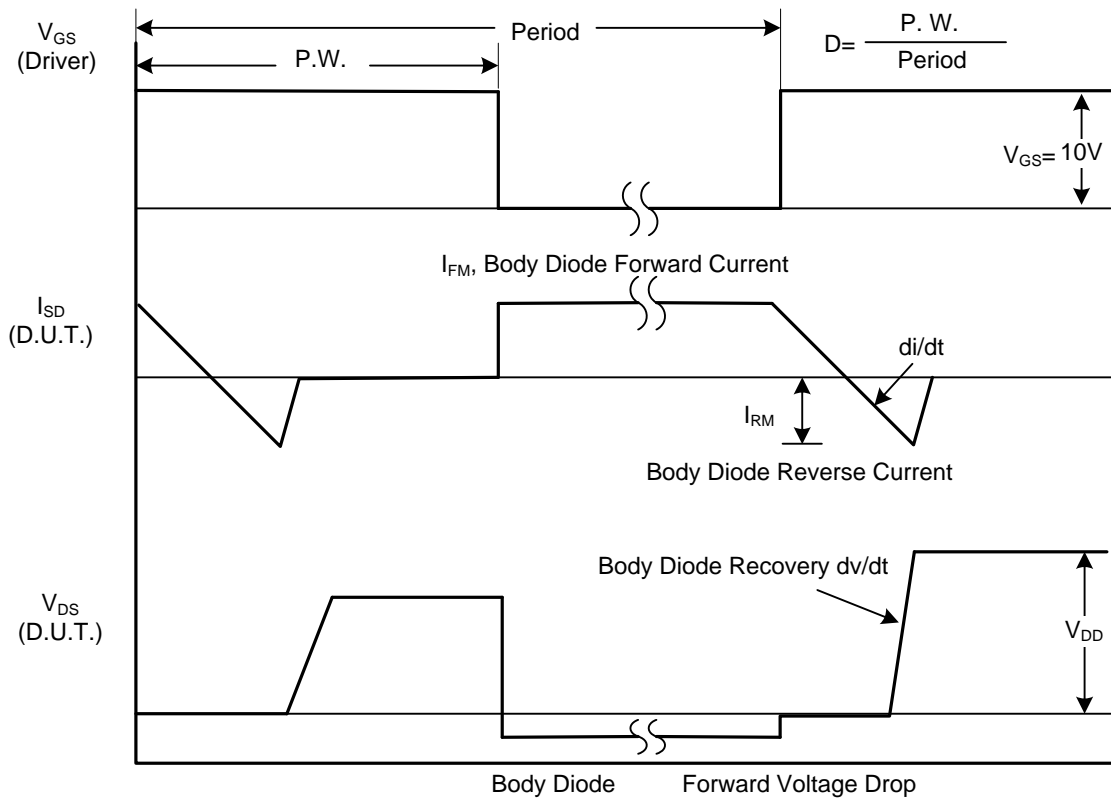
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

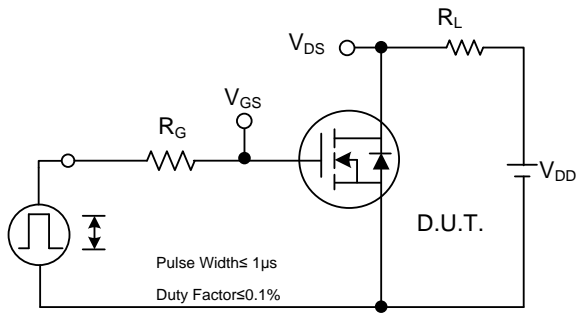


Peak Diode Recovery dv/dt Test Circuit

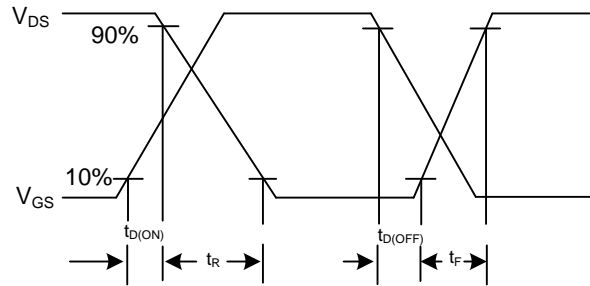


Peak Diode Recovery dv/dt Waveforms

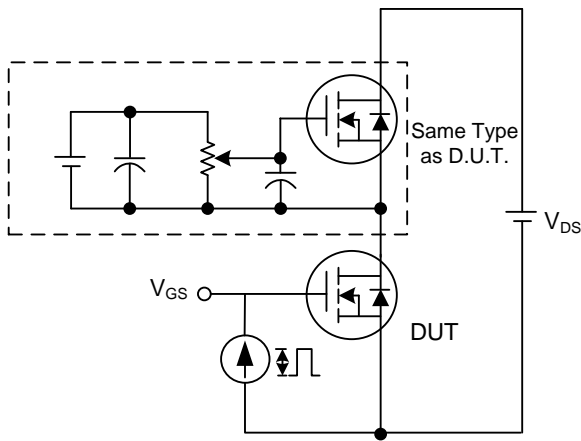
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



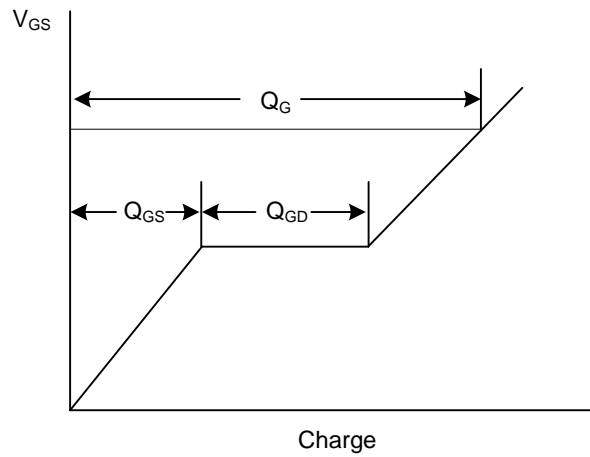
Switching Test Circuit



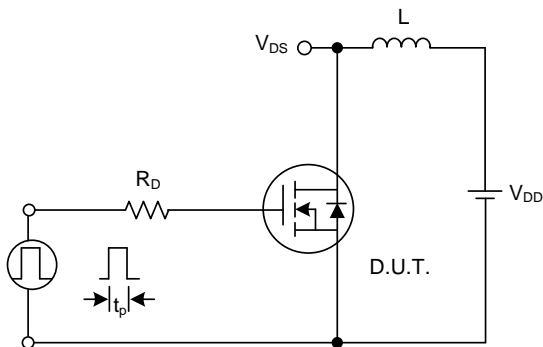
Switching Waveforms



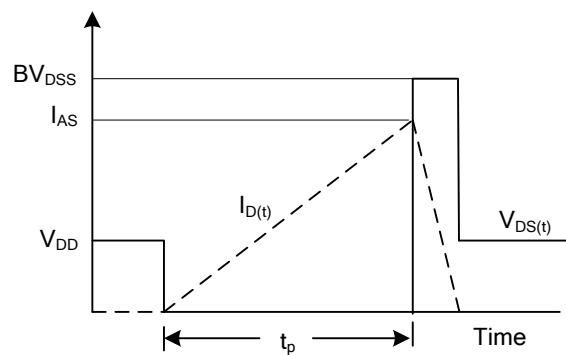
Gate Charge Test Circuit



Gate Charge Waveform

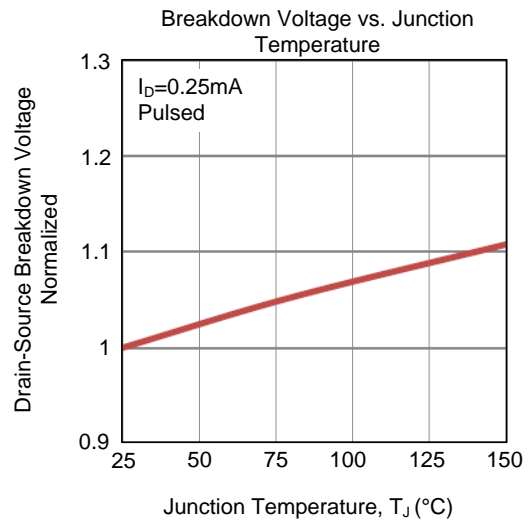
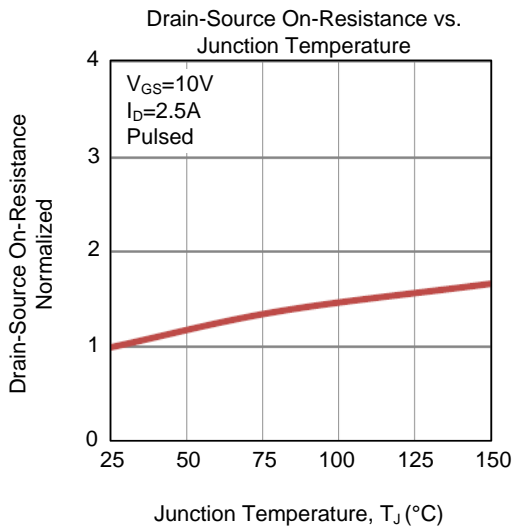
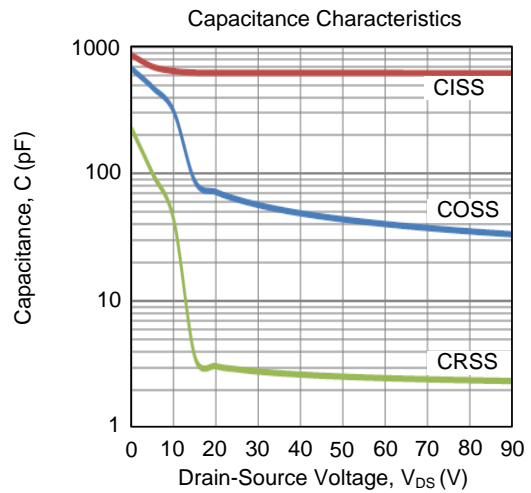
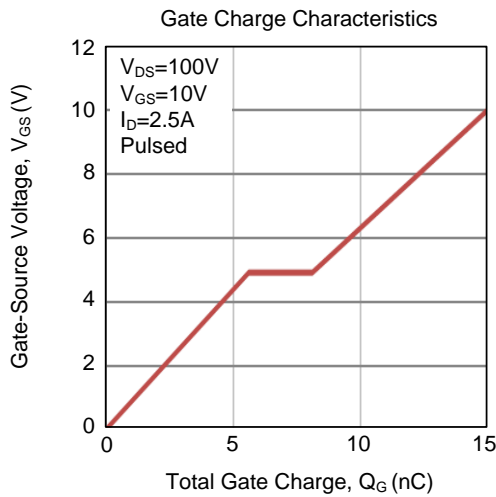
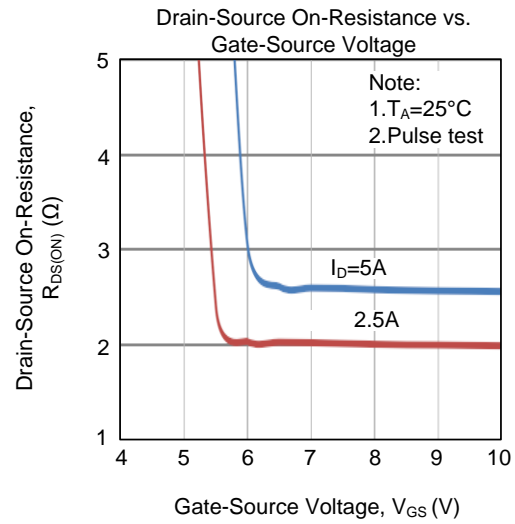
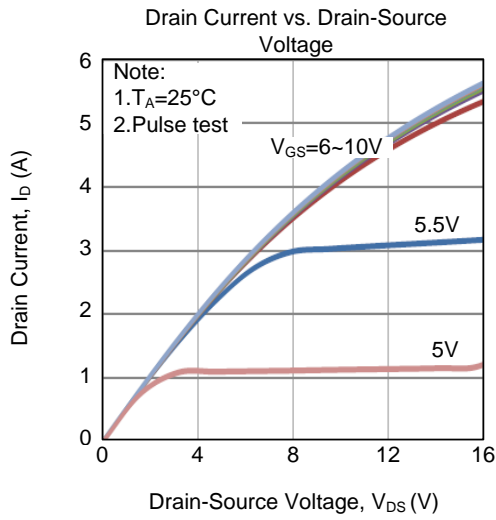


Unclamped Inductive Switching Test Circuit

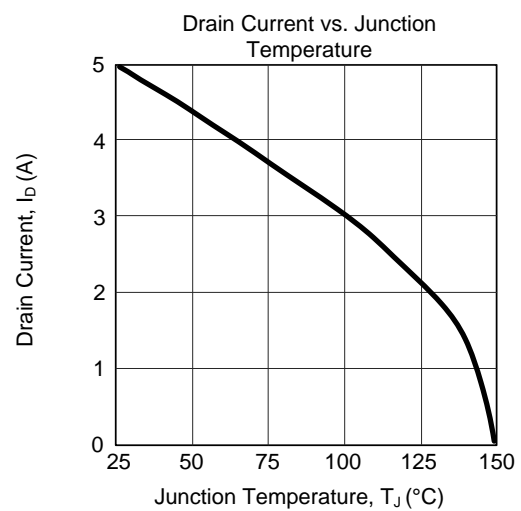
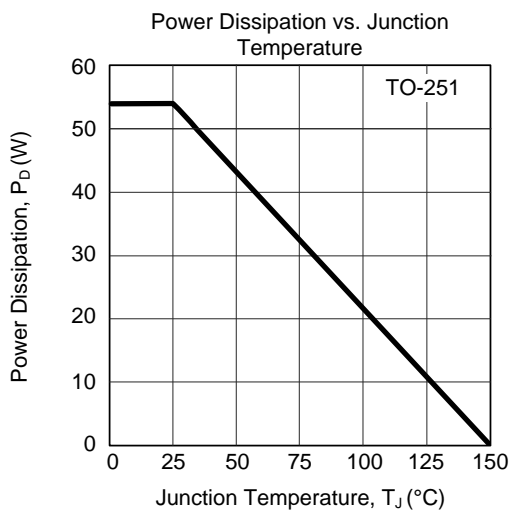
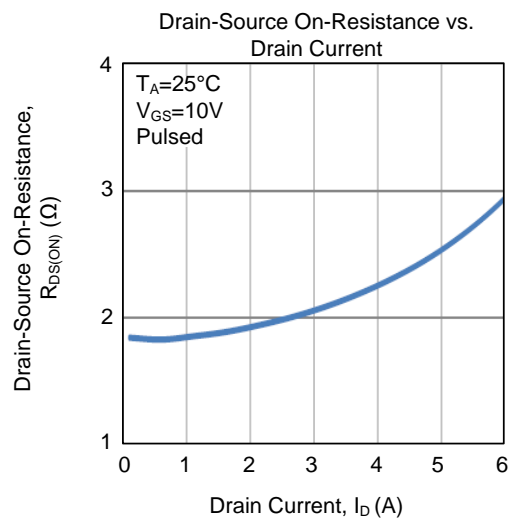
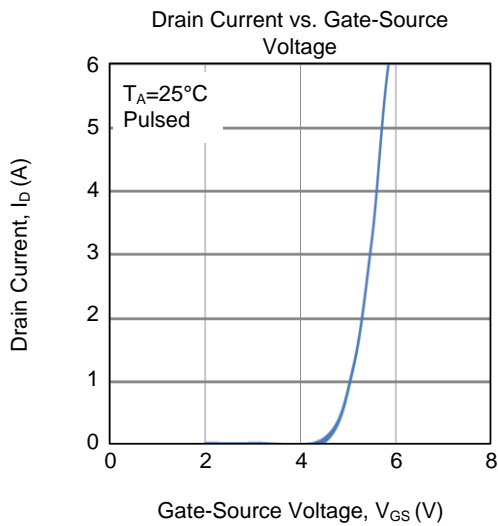
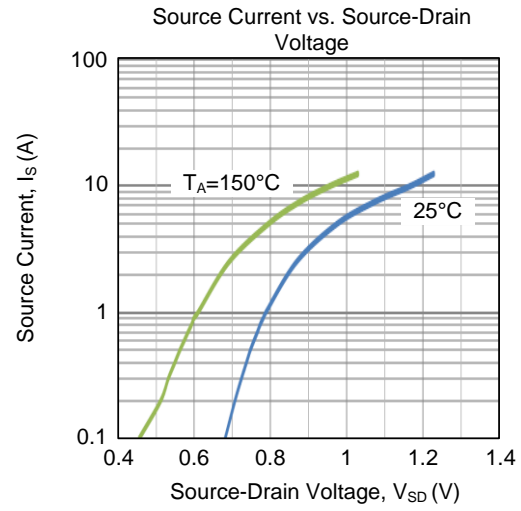
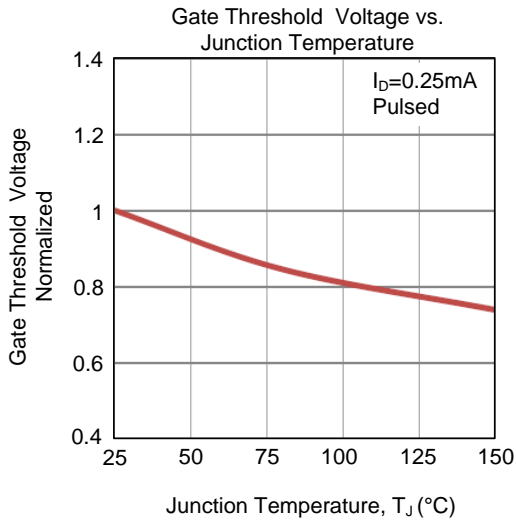


Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



■ TO-220-3L PACKAGE OUTLINE DIMENSIONS

