

50A, 60V, N-Channel MOSFET

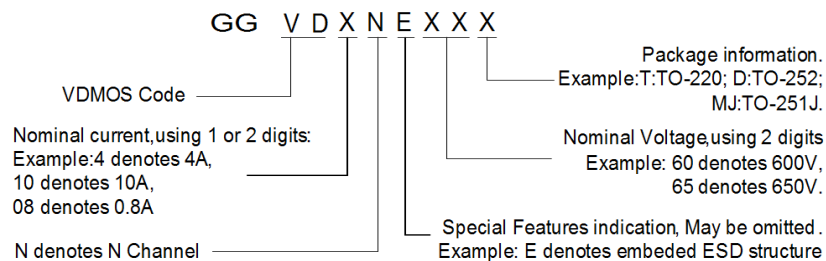
General Description

The GGVD50N06T is an N-channel enhancement mode high voltage MOS field effect transistor. An improved planar stripe cell and improved guard ring terminal have been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulses in the avalanche and commutation modes.

Features

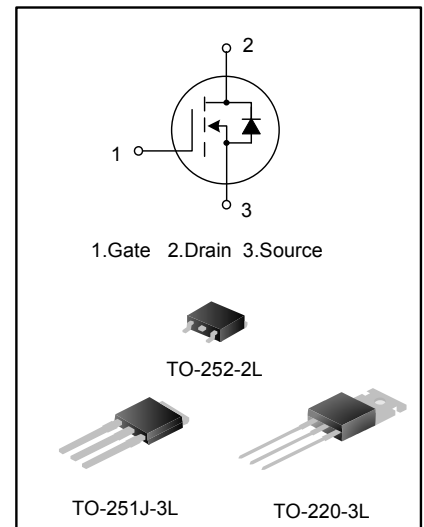
- 50A, 60V
- $R_{DS(on)} (typ) = 18m\Omega @ V_{GS}=10V$
- Low gate charge
- Low C_{rss}
- Fast switching
- Improved dv/dt capability

Nomenclature



Applications

- Electronic Ballasts
- Low Power SMPS

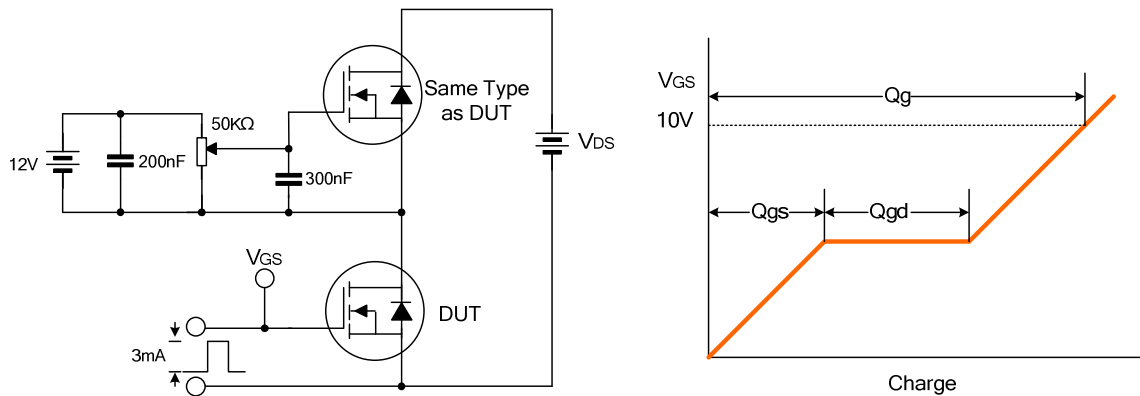


Ordering Information

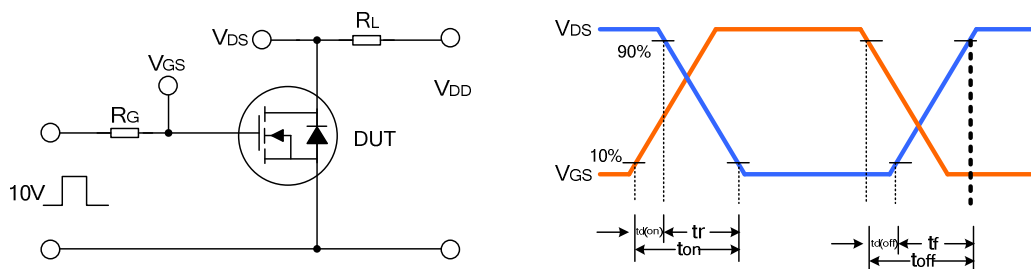
Part No.	Package	Marking	Material	Packing
GGVD50N06T	TO-220-3L	GGVD50N06T	Pb free	Tube
GGVD50N06D	TO-252-2L	GGVD50N06D	Pb free	Tube
GGVD50N06DTR	TO-252-2L	GGVD50N06D	Pb free	Tape & Reel
GGVD50N06MJ	TO-251J-3L	GGVD50N06MJ	Pb free	Tube

Typical Test Circuits

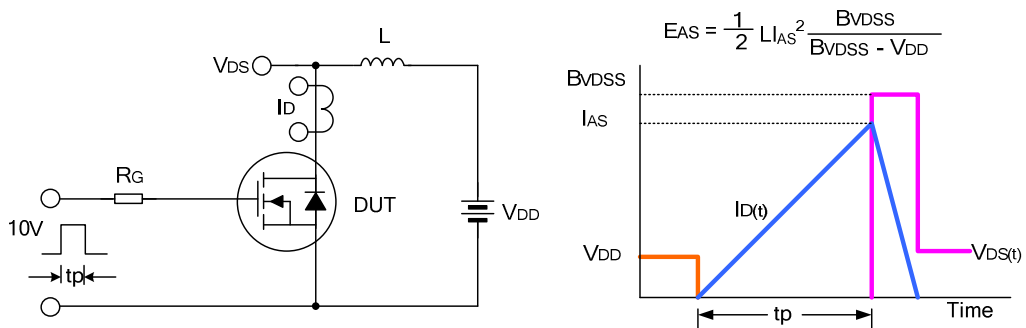
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



Typical Characteristics

Figure 1. On-Region Characteristics

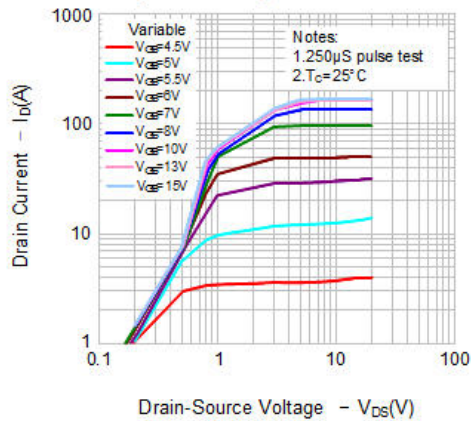


Figure 2. Transfer Characteristics

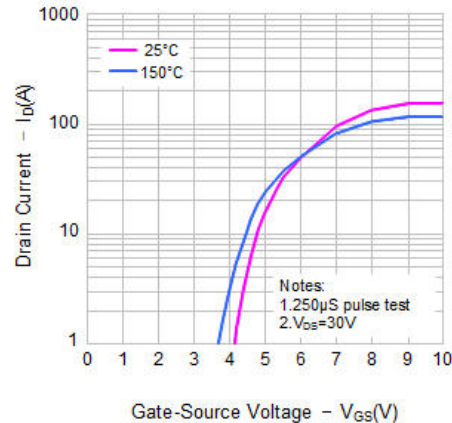


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

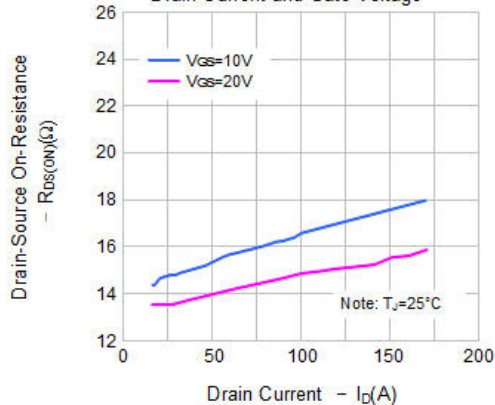


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

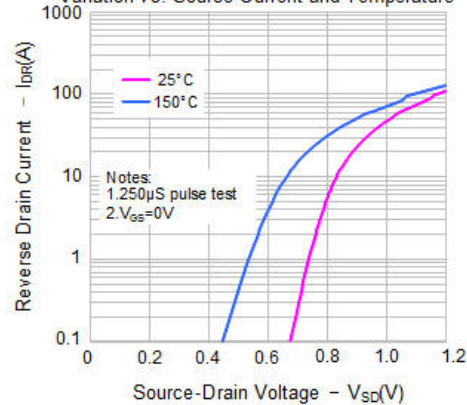


Figure 5. Capacitance Characteristics

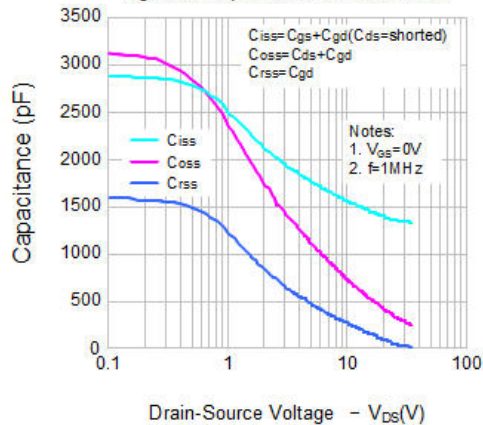
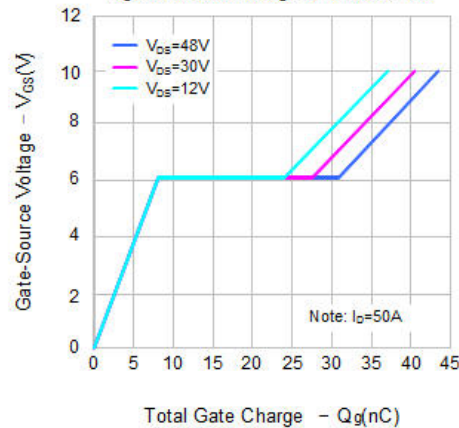
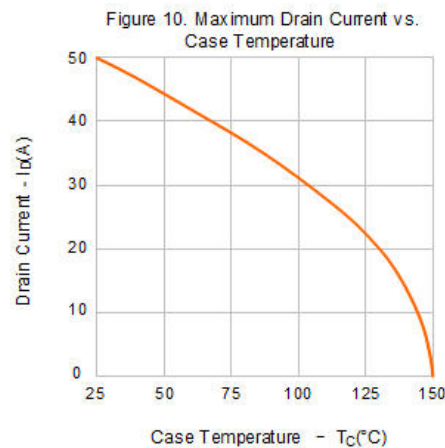
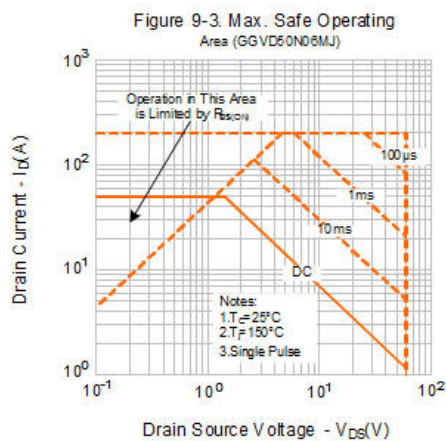
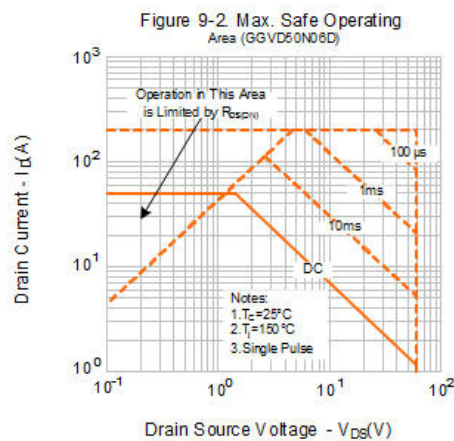
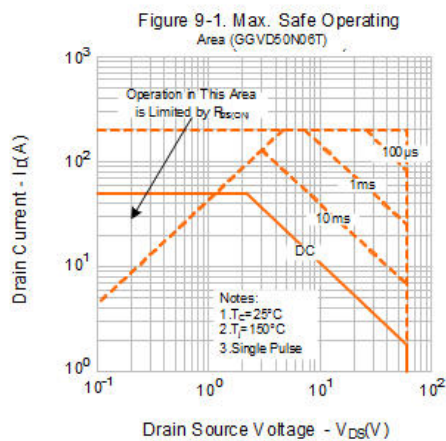
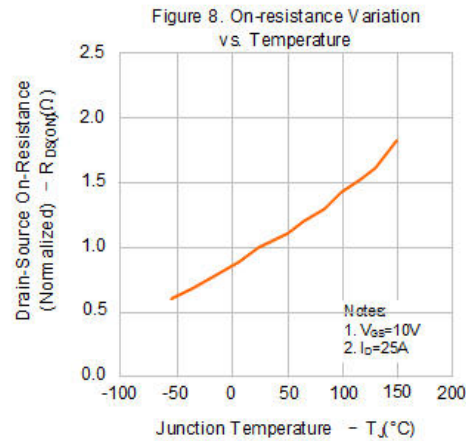
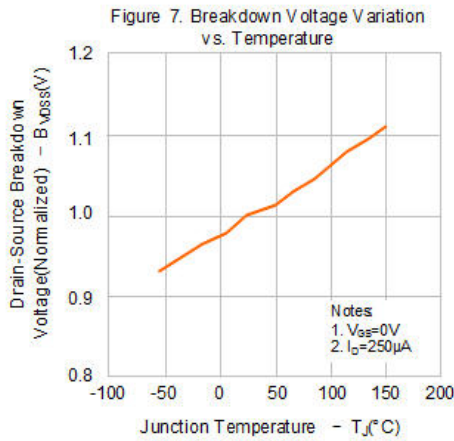


Figure 6. Gate Charge Characteristics



Typical Characteristics (continued)



Absolute Maximum Ratings ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Characteristics		Symbol	Rating			Unit
			GGVD50N06T	GGVD50N06D	GGVD50N06MJ	
Drain-Source Voltage		V _{DS}	60			V
Gate-Source Voltage		V _{GS}	±20			V
Drain Current	T _C =25°C	I _D	50			A
	T _C =100°C		31.62			
Drain Current Pulsed		I _{DM}	200			A
Power Dissipation(T _C =25°C) -Derate above 25°C		P _D	110	72	83	W
			0.88	0.58	0.66	W/°C
Single Pulsed Avalanche Energy(Note 1)		E _{AS}	272			mJ
Operation Junction Temperature Range		T _J	-55~+150			°C
Storage Temperature Range		T _{sta}	-55~+150			°C

Thermal Characteristics

Characteristics	Symbol	Rating			Unit
		GGVD50N06T	GGVD50N06D	GGVD50N06MJ	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.14	1.74	1.51	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.50	110	110	$^{\circ}\text{C/W}$

Electrical Characteristics ($T_C=25^{\circ}\text{C}$, Unless Otherwise Specified)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain -Source Breakdown Voltage	$B_{V_{DS}}$	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$	60	--	--	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60\text{V}$, $V_{GS}=0\text{V}$	--	--	1.0	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$	--	--	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}$, $I_D=250\mu\text{A}$	2.0	--	4.0	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}$, $I_D=25\text{A}$	--	18	23	m Ω
Input Capacitance	C_{iss}	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$	--	1375.8	--	pF
Output Capacitance	C_{oss}		--	393.2	--	
Reverse Transfer Capacitance	C_{rss}		--	102.6	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30\text{V}$, $R_G=25\Omega$ $I_D=50\text{A}$	--	21.67	--	ns
Turn-on Rise Time	t_r		--	86.67	--	
Turn-off Delay Time	$t_{d(off)}$		--	32.33	--	
Turn-off Fall Time	t_f		--	93	--	
Total Gate Charge	Q_g	$V_{DS}=48\text{V}$, $I_D=50\text{A}$, $V_{GS}=10\text{V}$	--	43.25	--	nC
Gate-Source Charge	Q_{gs}		--	8.11	--	
Gate-Drain Charge	Q_{gd}		--	23.76	--	
Gate resistance	R_G	$f=1\text{MHz}$, Drain Open, OSC Level: 20mv	--	2.2	--	Ω

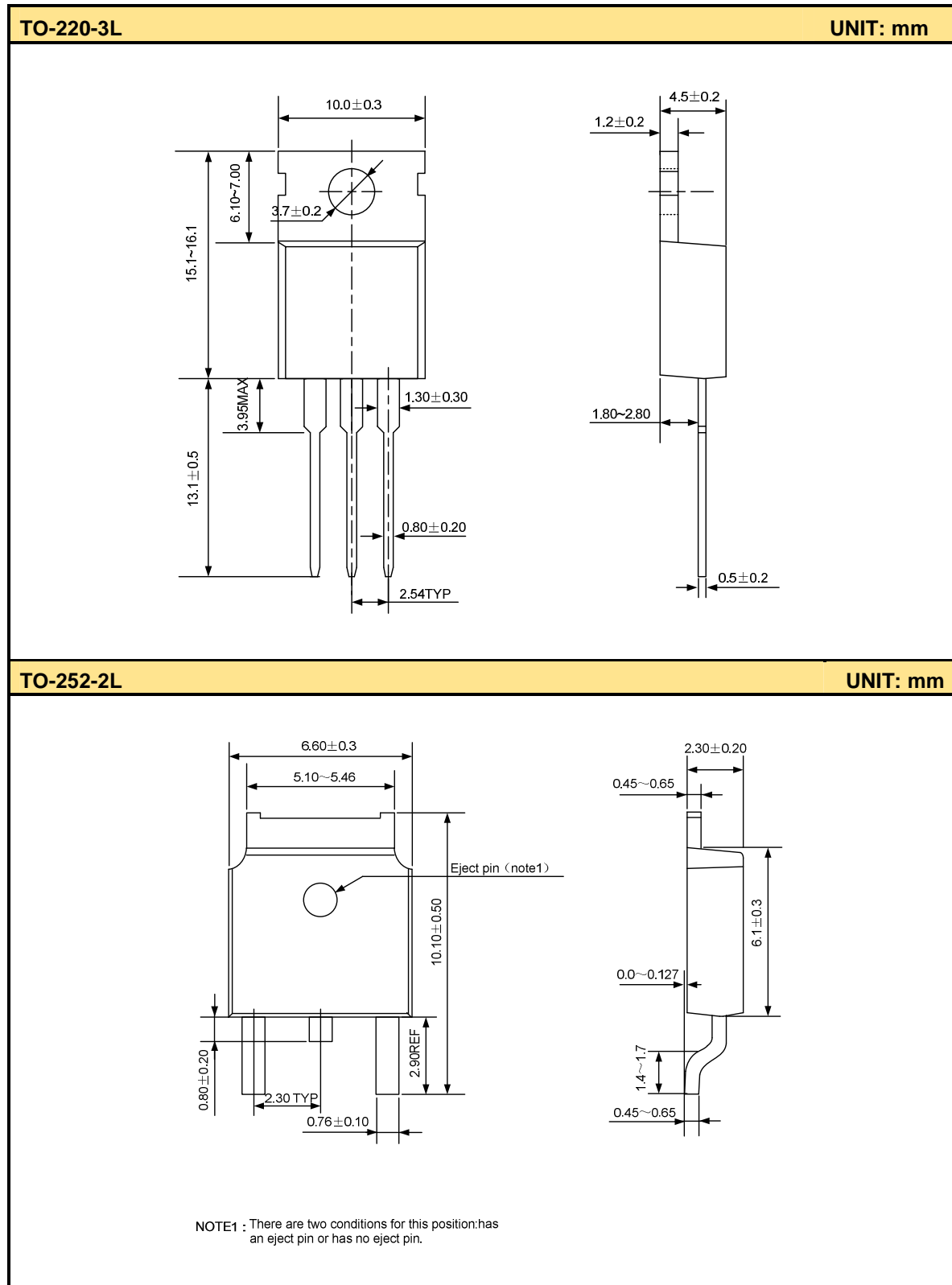
Source-Drain Diode Ratings and Characteristics

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	50	A
Pulsed Source Current	I_{SM}		--	--	200	
Diode Forward Voltage	V_{SD}	$I_S=50A, V_{GS}=0V$	--	--	1.2	V
Reverse Recovery Time	T_{rr}	$I_S=50A, V_{GS}=0V, dI_F/dt=100A/\mu s$	--	67.2	--	ns
Reverse Recovery Charge	Q_{rr}		--	0.2	--	μC

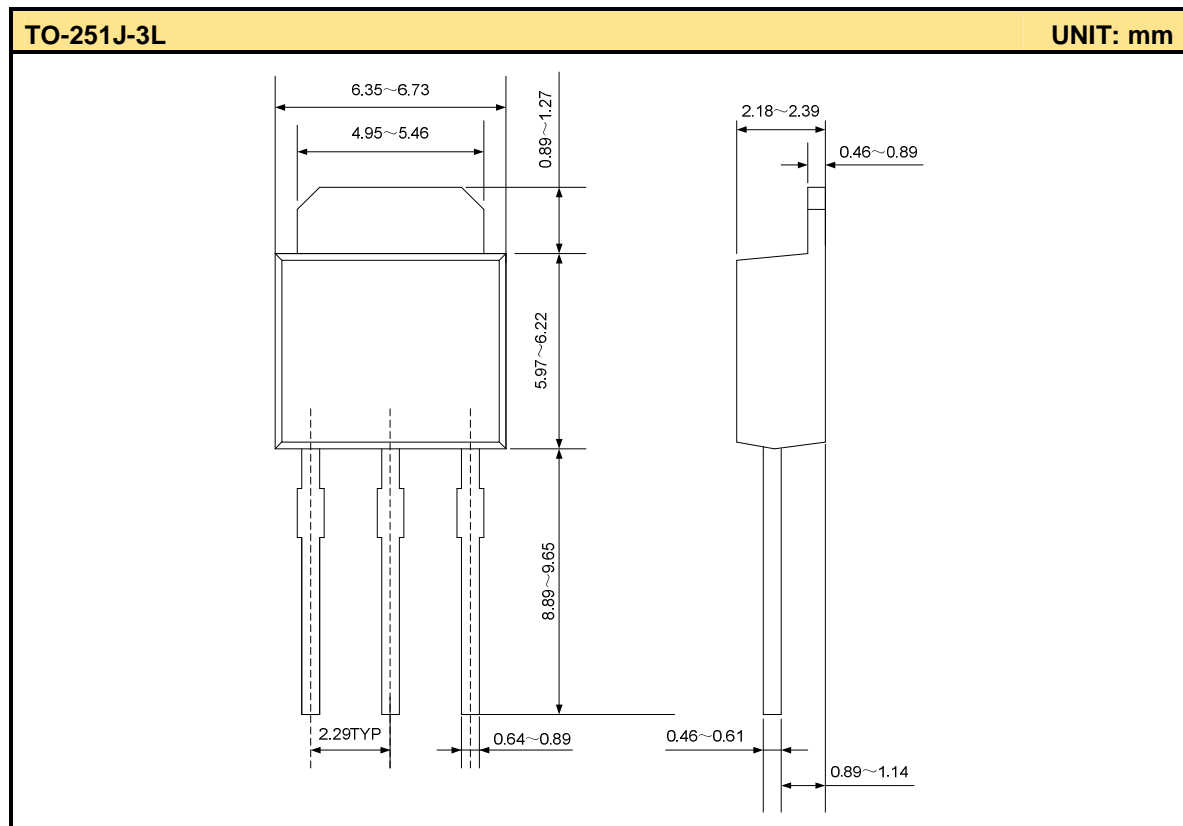
Notes:

1. $L=0.1mH, I_{AS}=53A, V_{DD}=35V, R_G=20\Omega$, starting $T_J=25^\circ C$;
2. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;
3. Essentially independent of operating temperature.

Package Outline



Package Outline (continued)



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