## General Description

The 26N65F is a high voltage power MOSFET d5esigned to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristic. This power MOSFET is usually used in high speed switching applications including power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits

Features

- V_{DS} 650V
- I_D 20A
- $R_{DS(ON)}$ (V_{GS} = 10V)   <0.19Ω
- Fast Switching Capability
- Avalanche Energy Specified
- Improved dv/dt Capability, High Ruggedness

TO-220F

1. Gate
2. Drain
3. Source
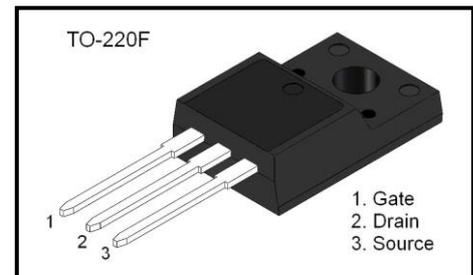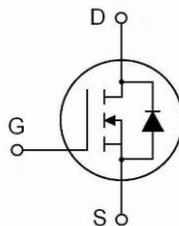
Absolute Maximum Ratings   (T_A = 25 ℃)

Parameter		Symbol	Ratings	Units
Gate-drain voltage		V_{DSS}	650	V
Gate-source voltage		V_{GSS}	±30	V
Continuous drain current (Note 2)	T_C=25 ^{o}C	I_D	20	A
	Pulsed	I_{DM}	50	
Power dissipation		P_D	34	W
Avalanche tnergy	Single pulsed (Note 4)	E_{AS}	418	mJ
	Repetitive (Note 5)	E_{AR}	0.63	mJ
Junction temperature		T_j	150	^{o}C
Storage temperature		T_{stg}	-55～150	^{o}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. Drain current limited by maximum junction temperature
3. Repetitive Rating: Pulse width limited by maximum junction temperature
4. L = 5.2mH, I_{AS} = 3.4A, V_{DD} = 50V, R_G= 25Ω Starting T_j = 25°C
5. I_{SD} ≤15A, di/dt≤200A/μs, V_{DD}≤BV_{DSS}, Starting T_j = 25°C

Thermal Characteristic

Parameter	Symbol	Value	Units
Maximum thermal resistance, junction-case	$R_{\theta JC}$	3.7	^{o}C/W
Maximum thermal resistance, junction-Ambient	$R_{\theta JA}$	80	^{o}C/W

Electrical Characteristics (T_j = 25°C unless otherwise specified)

Parameter		Symbol	Test Conditions		Min.	Typ	Max.	Units
Off Characteristics								
Drain-source breakdown voltage		BV_{DSS}	V_{GS}=0V,I_D=-250µA		650			V
Breakdown voltage temperature coefficient		$\Delta BV_{DSS}/\Delta T_J$	I_D = 250µA, Referenced to 25 ^{o}C			0.7		V/^{o}C
Zero gate voltage drain current		I_{DSS}	V_{DS}= 650V V_{GS}= 0V	T_j = 25°C			1	µA
				T_j = 125°C		10		
Gate leakage current	Forward	I_{GSS}	V_{DS}=0V,V_{GS}=30V				100	nA
	Reverse		V_{DS}=0V,V_{GS}=-30V				-100	nA
On Characteristics								
Gate threshold voltage		$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250µA		2.5		4.5	V
Drain-source on-resistance		$R_{DS(ON)}$	V_{GS} = 10V,I_D = 7.5A			0.16	0.19	Ω
Dynamic Characteristics								
Input capacitance		Ciss	V_{DS} = 25V,V_{GS} = 0V, f = 1.0MHz			1570		pF
Output capacitance		Coss				1330		
Reverse transfer capacitance		Crss				10		
Switching Characteristics)								
Turn-on delay time		$t_{d(on)}$	V_{DS} = 300V, I_D = 10A R_G = 25Ω , V_{GS} = 10V (Note1, 2)			36		ns
Turn-on Rise time		t_r				38		
Turn-off elay time		$t_{d(off)}$				120		
Turn-off Fall		t_f				30		
Total gate charge		Q_g	V_{DS} = 480V, I_D = 10A V_{GS} = 0V to 10V (Note1, 2)			34.5		nC
Gate-source charge		Q_{gs}				7.7		
Gate-drain charge		Q_{gd}				15.7		
Drain-Source Diode Characteristics								
Diode forward voltage		V_{SD}	V_{GS}=0V, I_S =8A				1.2	V
Diode forward current		I_S	-				20	A
Pulsed diode forward current		I_{SM}					50	A
Reverse recovery time		t_{rr}	V_R=10V, I_F = 10A, dI_F/dt =100A/µs (Note 1)			262		ns
Reverse recovery charge		Q_{rr}				31.7		nC

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

      2. Essentially independent of operating temperature
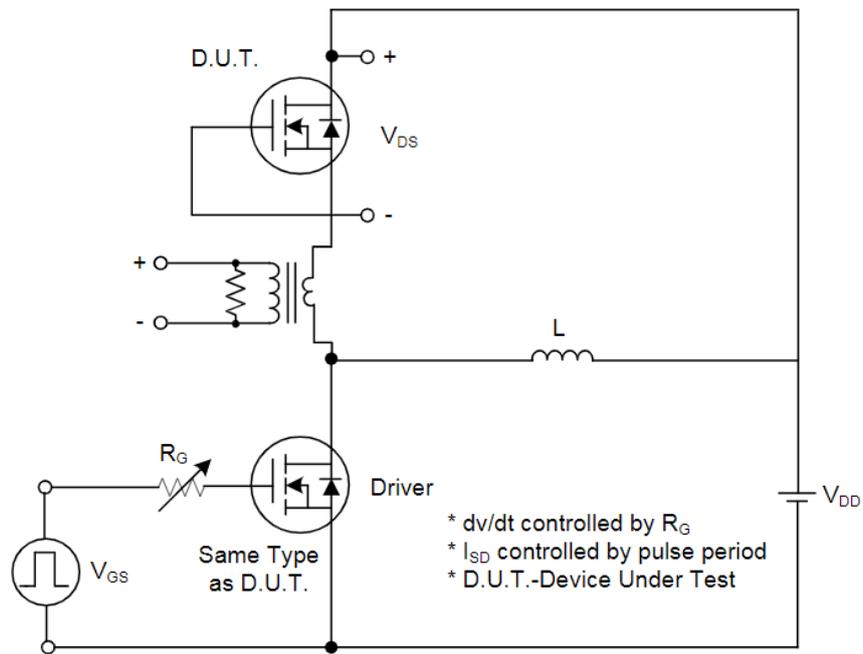
Test Circuits and Waveforms

Figure 1. Peak Diode Recovery dv/dt Test Circuit
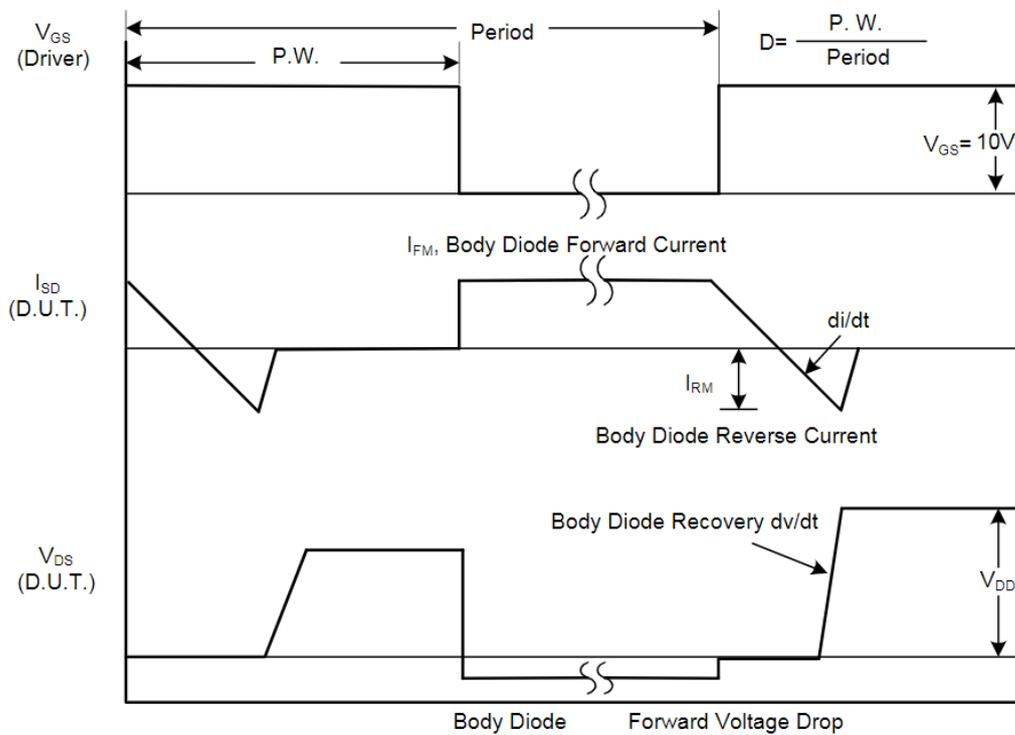

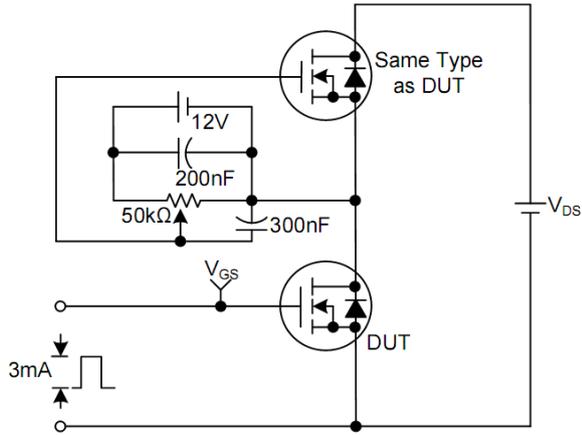**Figure 2. Peak Diode Recovery dv/dt Waveforms**

Test Circuits and Waveforms
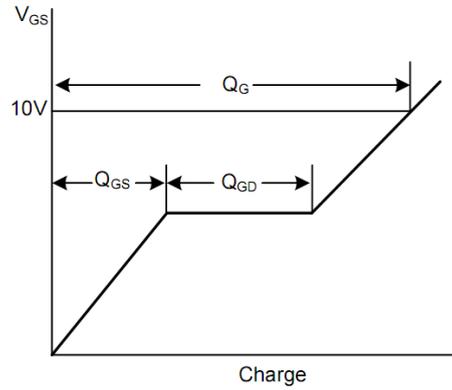
Figure 3. Gate Charge Test Circuit
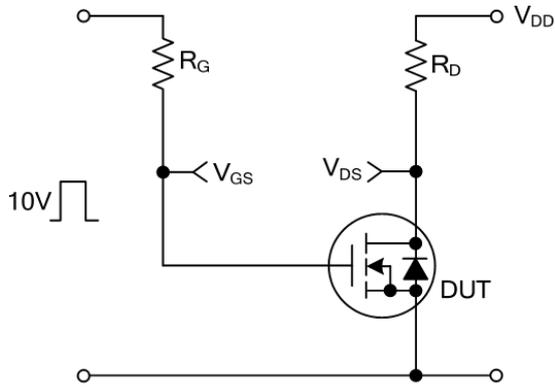
Figure 4. Gate Charge Waveforms

Figure 5. Resistive Switching Circuit
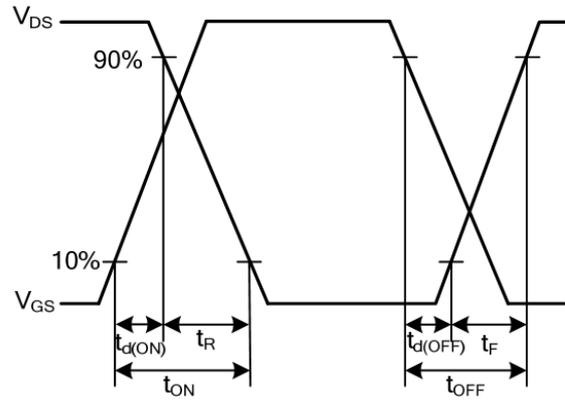
Figure 7. Resistive Switching Waveforms

$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$
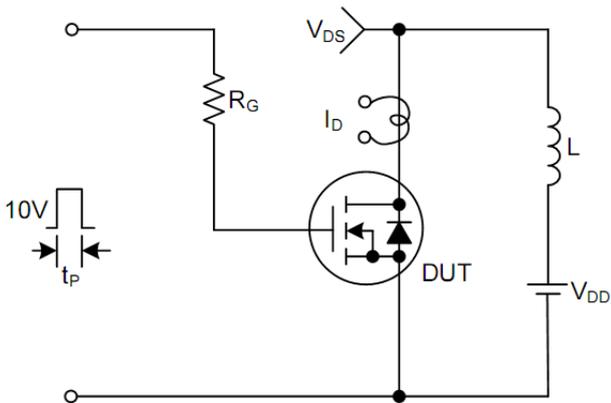
Figure 7. Unclamped Inductive Switching Test Circuit
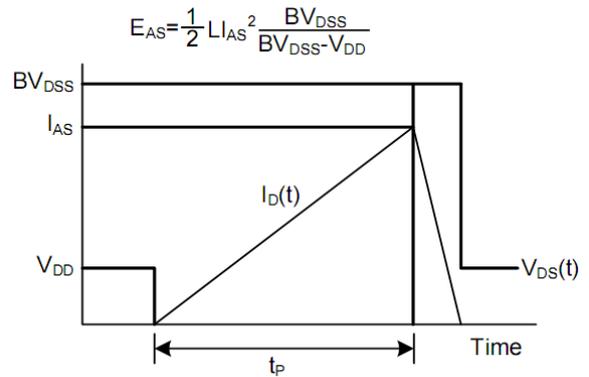
Figure 8. Unclamped Inductive Switching Waveforms

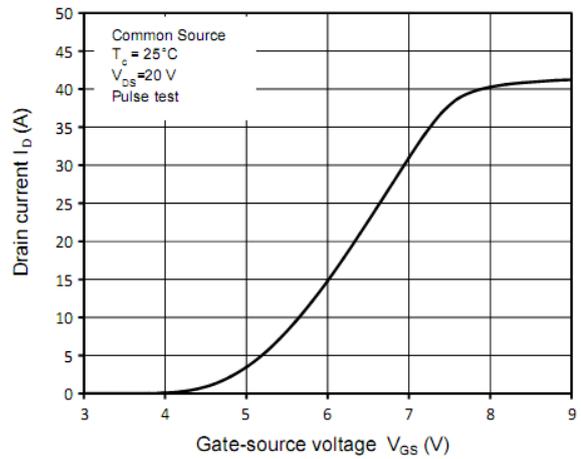## Typical Characteristics
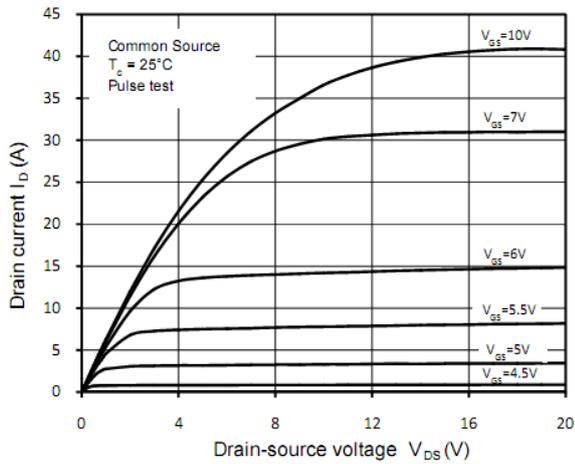
Figure 9 Output Characteristics

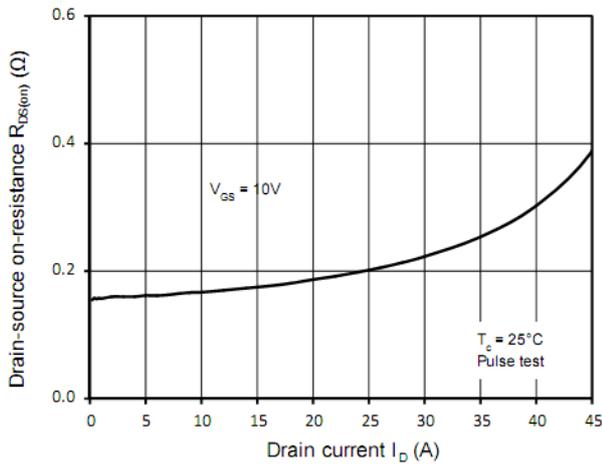**Figure 10. Transfer Characteristics**

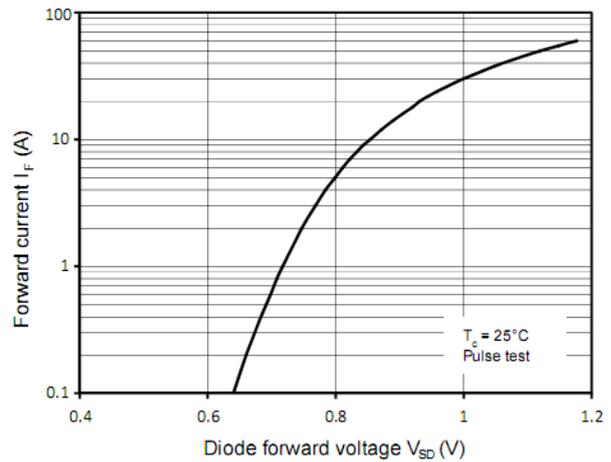**Figure 11. Static Drain-Source On Resistance**

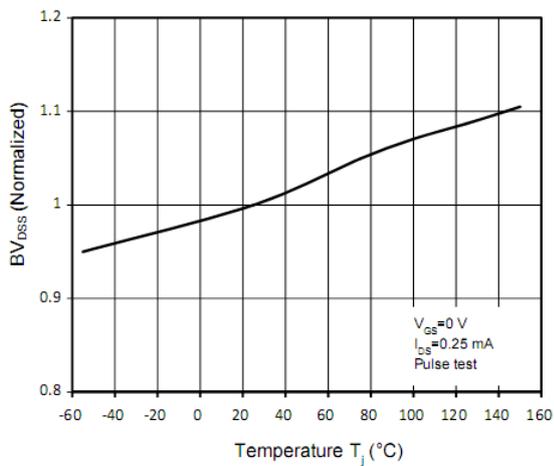**Figure 12. Body- Diode Forward Characteristics**

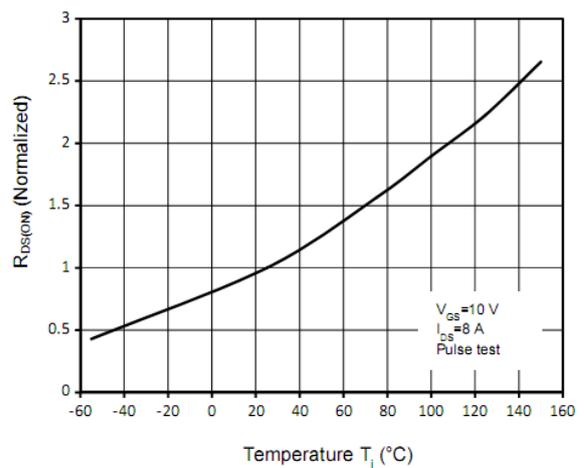**Figure 13. Breakdown Voltage Variation vs. temperature**

Figure 14. Normalized $R_{DS(on)}$ vs. Temperature
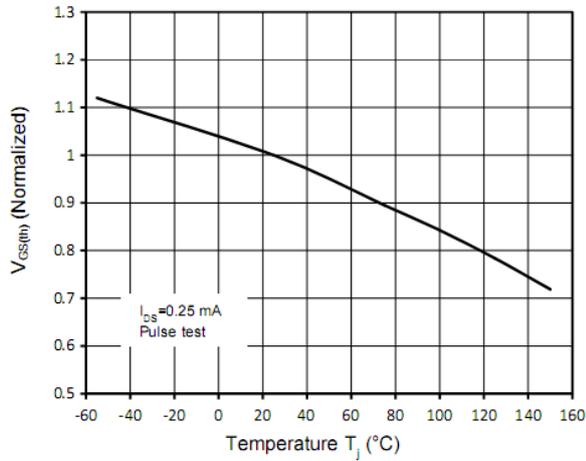
Typical Characteristics
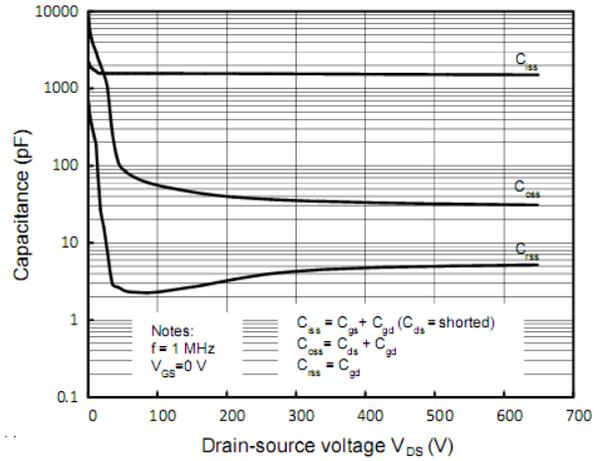

Figure 15. Threshold Voltage vs. Temperature

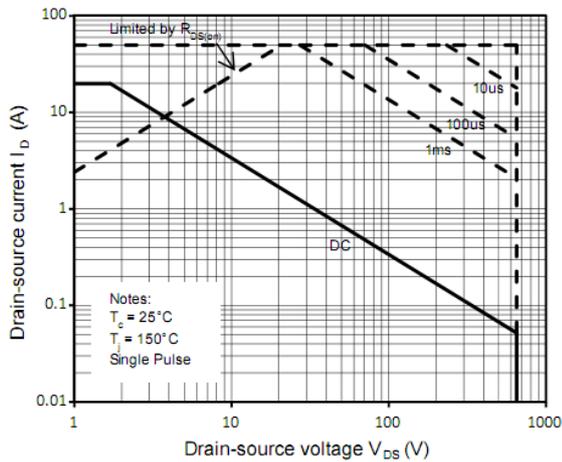
Figure 16. Capacitance Characteristics

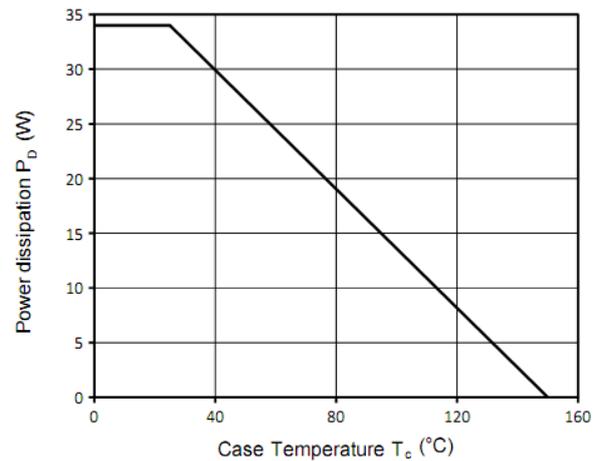**Figure 17. Safe Operating Area**

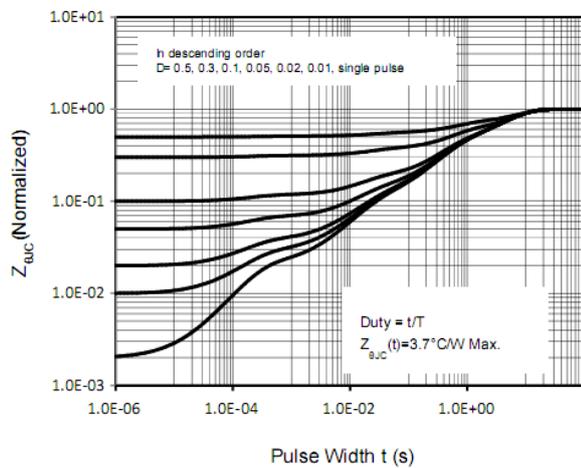
Figure 18. Power Derating
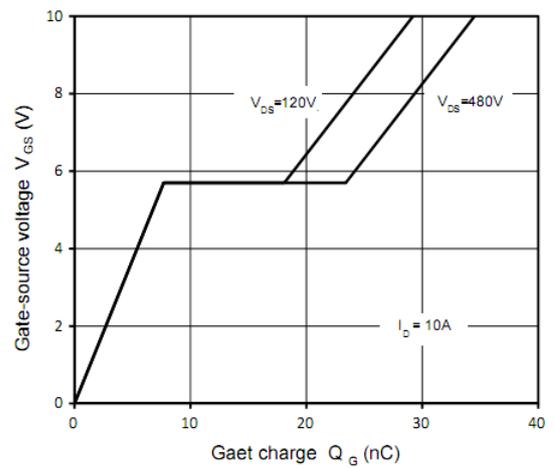

Figure 19. Transient Thermal Response Curve

Figure 20. Gate Charge Characteristics

Package Dimensions

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.50	4.90	0.177	0.193
A1	2.34	2.74	0.092	0.108
A2	2.66	2.86	0.105	0.113
b	0.75	0.85	0.030	0.033
b1	1.24	1.44	0.049	0.057
c	0.40	0.60	0.016	0.024
D	10.00	10.32	0.394	0.406
E	15.75	16.05	0.620	0.632
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
F	3.10	3.5	0.122	0.138
L	12.90	13.50	0.508	0.531
L1	2.90	3.30	0.114	0.130
Φ	3.10	3.30	0.122	0.130