

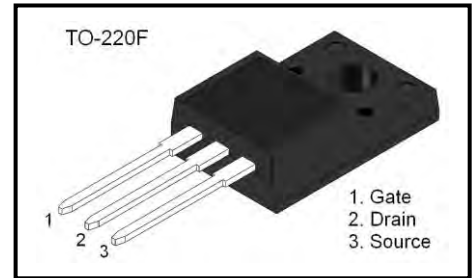
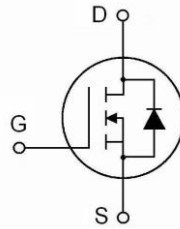
N-Channel Mode Power MOSFET

General Description

The RM26N65F is a high voltage power MOSFET designed 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
- $R_{DS(ON)}$ ($V_{GS} = 10V$) $<0.19\Omega$
- Fast Switching Capability
- Avalanche Energy Specified
- Improved dv/dt Capability, High Ruggedness



Absolute Maximum Ratings ($T_A = 25^\circ C$)

Parameter		Symbol	Ratings	Units
Gate-drain voltage		V_{DSS}	650	V
Gate-source voltage		V_{GSS}	± 30	V
Continuous drain current (Note 2)	$T_C = 25^\circ C$	I_D	20	A
	Pulsed	I_{DM}	50	
Power dissipation		P_D	34	W
Avalanche energy	Single pulsed (Note 4)	E_{AS}	418	mJ
	Repetitive (Note 5)	E_{AR}	0.63	mJ
Junction temperature		T_j	150	$^\circ C$
Storage temperature		T_{stg}	-55 ~ 150	$^\circ C$

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. $L = 5.2mH$, $I_{AS} = 3.4A$, $V_{DD} = 50V$, $R_G = 25\Omega$ Starting $T_j = 25^\circ C$
5. $I_{SD} \leq 15A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_j = 25^\circ C$

Thermal Characteristic

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



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Electrical Characteristics ($T_j = 25^\circ\text{C}$ unless otherwise specified)

Parameter		Symbol	Test Conditions	Min.	Typ	Max.	Units
Off Characteristics							
Drain-source breakdown voltage		BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	650			V
Breakdown voltage temperature coefficient		$\Delta BV_{DSS}/\Delta T_j$	$I_D = 250\mu A$, Referenced to 25°C		0.7		$V/^\circ\text{C}$
Zero gate voltage drain current		I_{DSS}	$V_{DS}= 650V$ $V_{GS}= 0V$	$T_j = 25^\circ\text{C}$		1	μA
				$T_j = 125^\circ\text{C}$		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		$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	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		C_{iss}	$V_{DS} = 25V, V_{GS} = 0V$, $f = 1.0\text{MHz}$		1570		pF
Output capacitance		C_{oss}			1330		
Reverse transfer capacitance		C_{rss}			10		
Switching Characteristics)							
Turn-on delay time		$t_{d(on)}$	$V_{DS} = 300V, I_D = 10A$ $R_G = 25\Omega, V_{GS} = 10V$ (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	$V_{DS} = 480V, I_D = 10A$ $V_{GS} = 0V \text{ to } 10V$ (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}	$V_R=10V, I_F = 10A$, $di_F/dt =100A/\mu s$ (Note 1)		262		ns
Reverse recovery charge		Q_{rr}			31.7		nC

Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

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Test Circuits and Waveforms

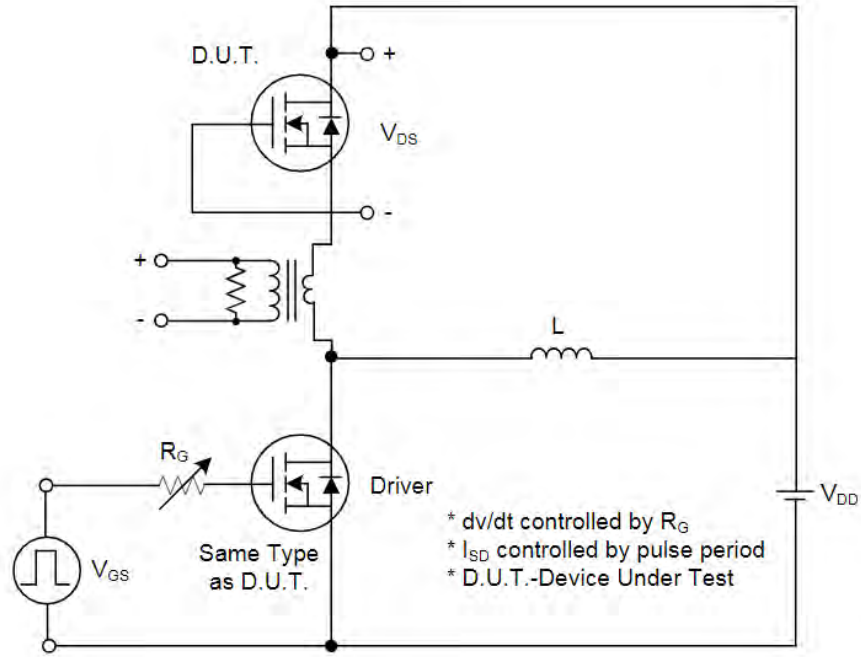


Figure 1. Peak Diode Recovery dv/dt Test Circuit

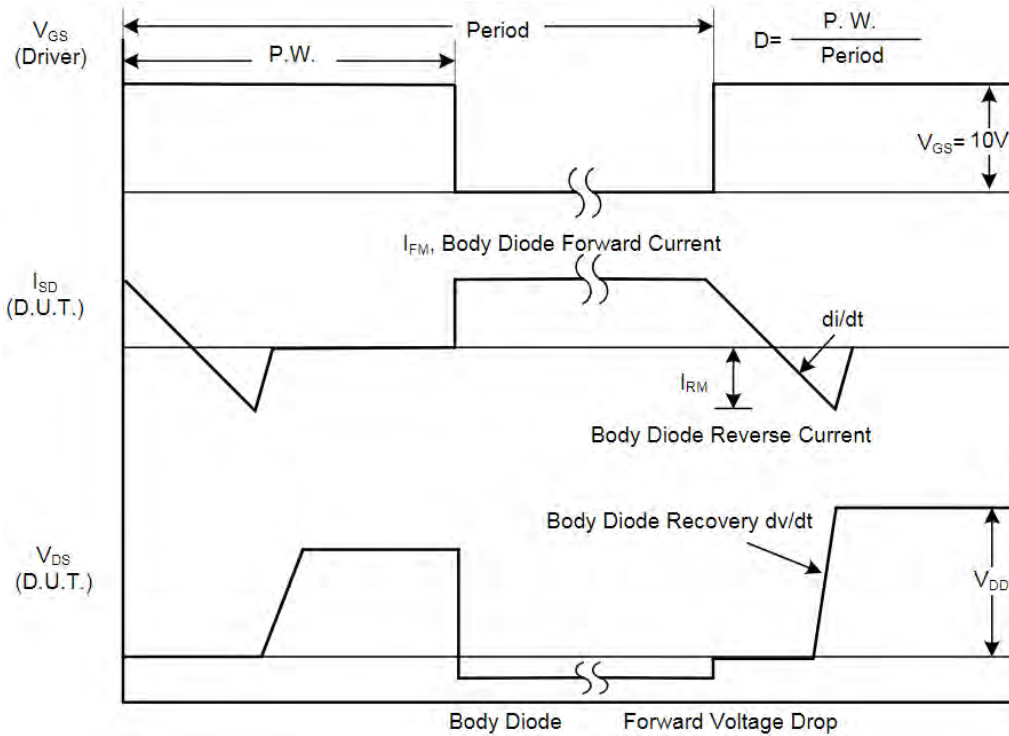


Figure 2. Peak Diode Recovery dv/dt Waveforms

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Test Circuits and Waveforms

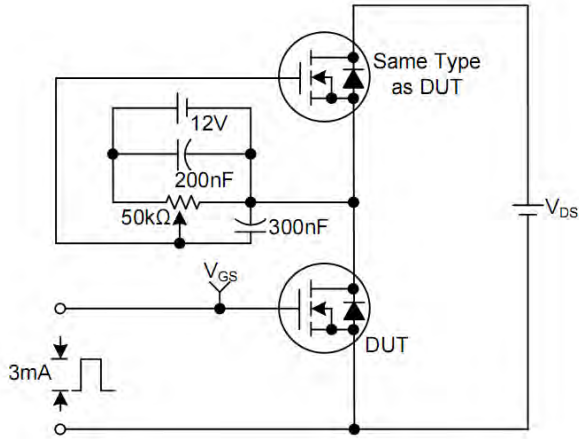


Figure 3. Gate Charge Test Circuit

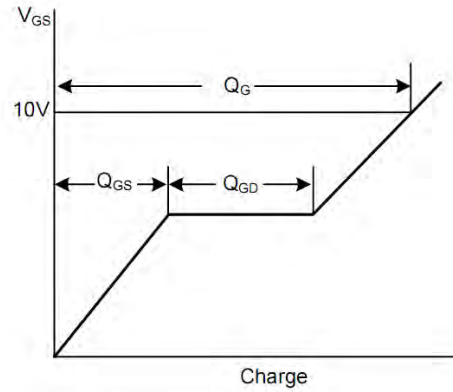


Figure 4. Gate Charge Waveforms

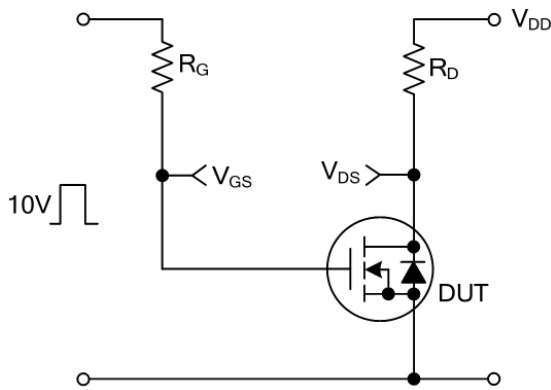


Figure 5. Resistive Switching Circuit

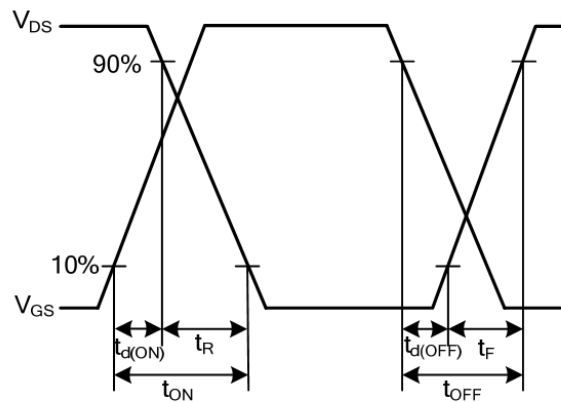


Figure 7. Resistive Switching Waveforms

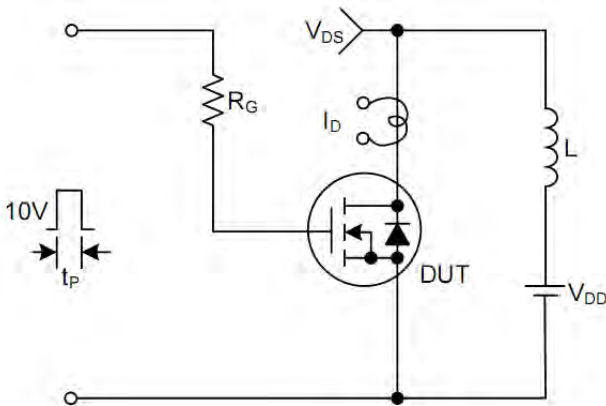


Figure 7. Unclamped Inductive Switching Test Circuit

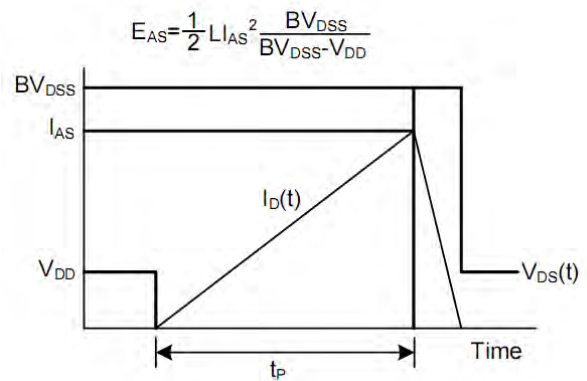


Figure 8. Unclamped Inductive Switching Waveforms

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Typical Characteristics

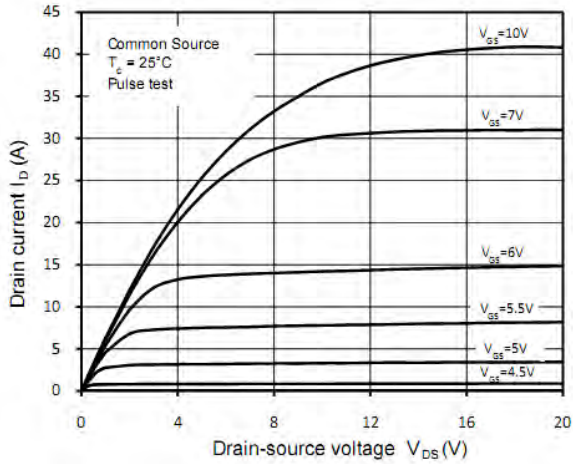


Figure 9 Output Characteristics

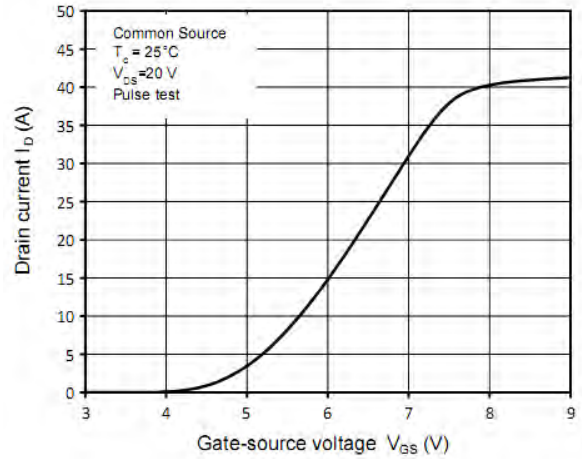


Figure 10. Transfer Characteristics

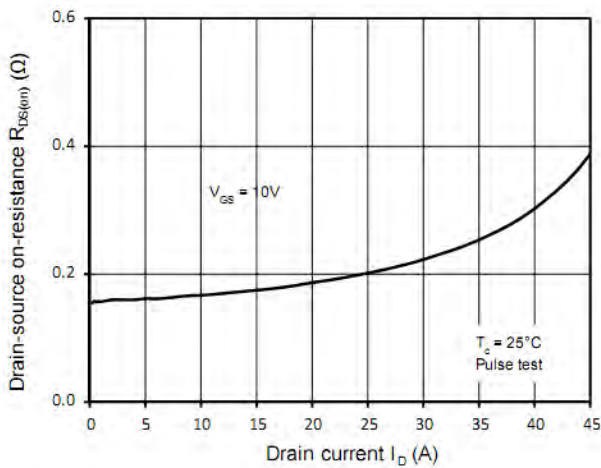


Figure 11. Static Drain-Source On Resistance

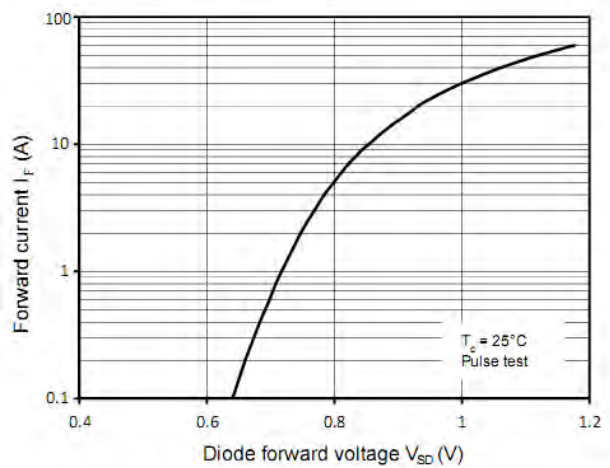


Figure 12. Body-Diode Forward Characteristics

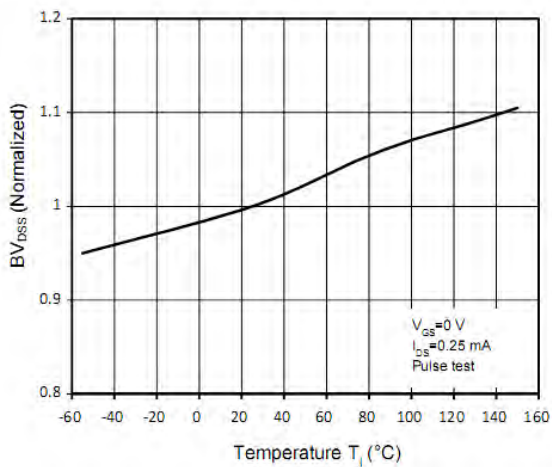


Figure 13. Breakdown Voltage Variation vs. temperature

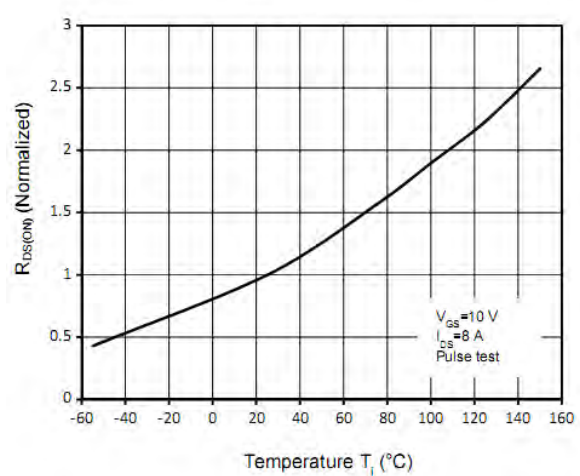


Figure 14. Normalized $R_{DS(on)}$ vs. Temperature

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Typical Characteristics

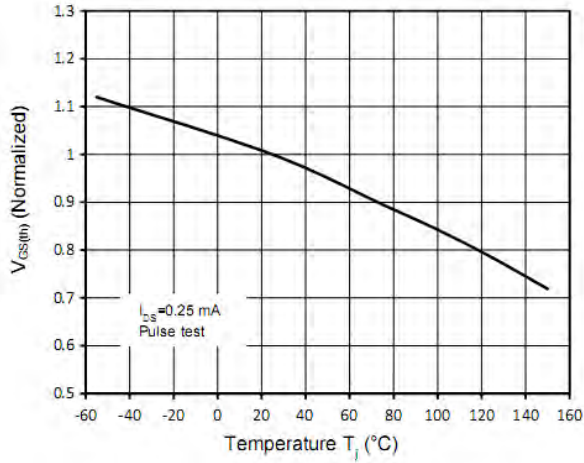


Figure 15. Threshold Voltage vs. Temperature

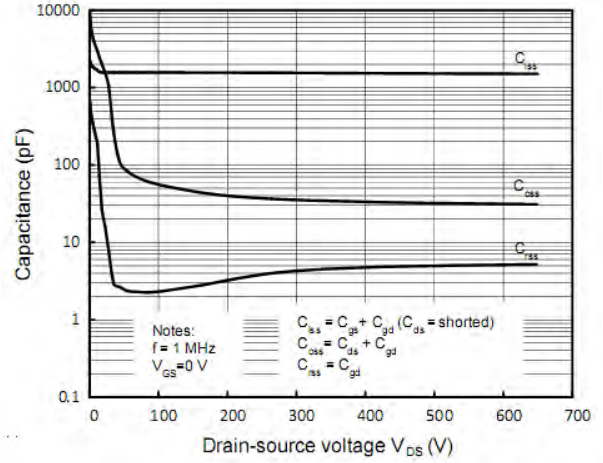


Figure 16. Capacitance Characteristics

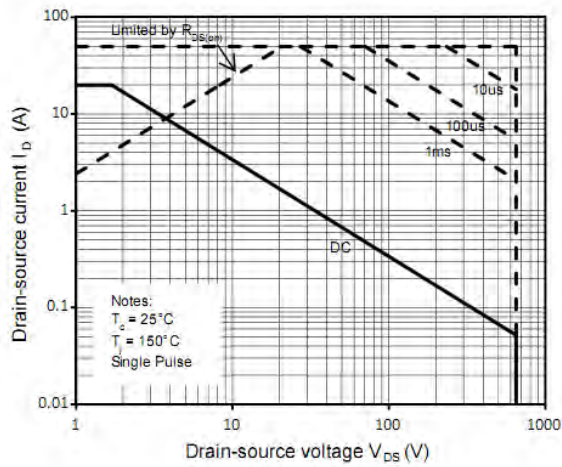


Figure 17. Safe Operating Area

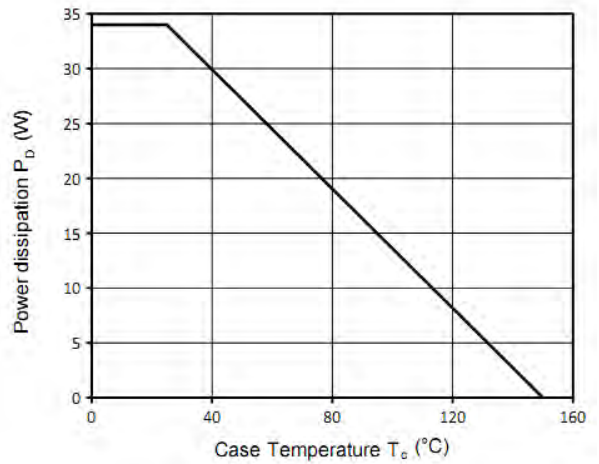


Figure 18. Power Derating

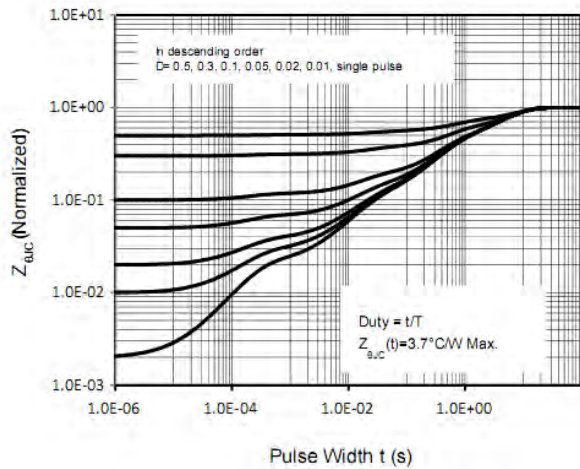


Figure 19. Transient Thermal Response Curve

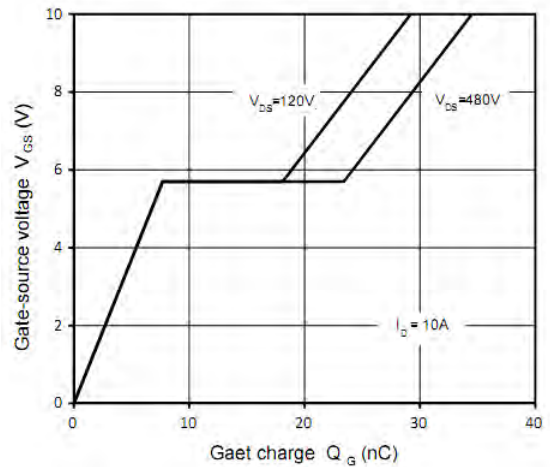


Figure 20. Gate Charge Characteristics

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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