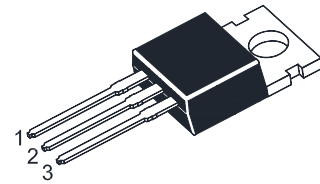
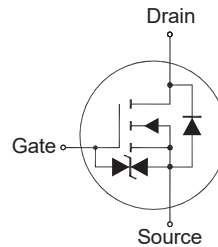


N-Channel Enhancement Mode MOSFET

Features

- Halogen and Antimony Free(HAF), RoHS compliant
- Built-in G-S Protection Diode
- Typical ESD Protection HBM Class 2



1.Gate 2.Drain 3.Source
TO-220FB Plastic Package

Classification	Voltage Range(V)
0A	< 125
0B	125 to < 250
1A	250 to < 500
1B	500 to < 1000
1C	1000 to < 2000
2	2000 to < 4000
3A	4000 to < 8000
3B	≥ 8000

Key Parameters

Parameter	Value	Unit
BV _{DSS}	100	V
R _{DS(ON)} Max	50 @ V _{GS} = 10 V	mΩ
	85 @ V _{GS} = 4.5 V	
V _{GS(th)} typ	1.9	V
Q _g typ	9 @ V _{GS} = 10 V	nC

Absolute Maximum Ratings(at T_a = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	100	V
Gate-Source Voltage	V _{GS}	± 20	V
Drain Current	I _D	16	A
		10	
Peak Drain Current, Pulsed ¹⁾	I _{DM}	45	A
Avalanche Current	I _{AS}	4.2	A
Single Pulse Avalanche Energy ²⁾	E _{AS}	4.4	mJ
Power Dissipation	P _D	26	W
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to + 150	°C

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Case	R _{θJC}	4.8	°C/W
Thermal Resistance from Junction to Ambient	R _{θJA}	55	°C/W

¹⁾ Pulse Test: Pulse Width ≤ 100 μs, Duty Cycle ≤ 2%, Repetitive rating, pulse width limited by junction temperature T_{J(MAX)} = 150°C.

²⁾ Limited by T_{J(MAX)}, starting T_J = 25 °C, L = 0.5 mH, R_g = 25 Ω, I_{AS} = 4.2 A, V_{GS} = 10 V.

Characteristics at $T_a = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $I_D = 250\ \mu\text{A}$	BV_{DSS}	100	-	-	V
Drain-Source Leakage Current at $V_{DS} = 100\ \text{V}$	I_{DSS}	-	-	1	μA
Gate Leakage Current at $V_{GS} = \pm 20\ \text{V}$	I_{GSS}	-	-	± 10	μA
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	$V_{GS(th)}$	1.2	-	2.5	V
Drain-Source On-State Resistance at $V_{GS} = 10\ \text{V}$, $I_D = 10\ \text{A}$ at $V_{GS} = 4.5\ \text{V}$, $I_D = 8\ \text{A}$	$R_{DS(on)}$	- -	- -	50 85	m Ω
DYNAMIC PARAMETERS					
Forward Transconductance at $V_{DS} = 5\ \text{V}$, $I_D = 8\ \text{A}$	g_{fs}	-	9.1	-	S
Gate Resistance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	R_g	-	0.7	-	Ω
Input Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 50\ \text{V}$, $f = 1\ \text{MHz}$	C_{iss}	-	317	-	pF
Output Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 50\ \text{V}$, $f = 1\ \text{MHz}$	C_{oss}	-	61	-	pF
Reverse Transfer Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 50\ \text{V}$, $f = 1\ \text{MHz}$	C_{rss}	-	7	-	pF
Gate charge total at $V_{DS} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $I_D = 10\ \text{A}$ at $V_{DS} = 50\ \text{V}$, $V_{GS} = 4.5\ \text{V}$, $I_D = 10\ \text{A}$	Q_g	- -	9 4.7	- -	nC
Gate to Source Charge at $V_{DS} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $I_D = 10\ \text{A}$	Q_{gs}	-	1.7	-	nC
Gate to Drain Charge at $V_{DS} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $I_D = 10\ \text{A}$	Q_{gd}	-	3	-	nC
Turn-On Delay Time at $V_{DS} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $I_D = 10\ \text{A}$, $R_g = 3.3\ \Omega$	$t_{d(on)}$	-	8	-	ns
Turn-On Rise Time at $V_{DS} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $I_D = 10\ \text{A}$, $R_g = 3.3\ \Omega$	t_r	-	19	-	ns
Turn-Off Delay Time at $V_{DS} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $I_D = 10\ \text{A}$, $R_g = 3.3\ \Omega$	$t_{d(off)}$	-	8	-	ns
Turn-Off Fall Time at $V_{DS} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $I_D = 10\ \text{A}$, $R_g = 3.3\ \Omega$	t_f	-	2	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $I_S = 1\ \text{A}$, $V_{GS} = 0\ \text{V}$	V_{SD}	-	-	1.3	V
Body-Diode Continuous Current	I_S	-	-	16	A
Body-Diode Continuous Current, Pulsed	I_{SM}	-	-	45	A
Body Diode Reverse Recovery Time at $I_S = 10\ \text{A}$, $di/dt = 100\ \text{A}/\mu\text{s}$	t_{rr}	-	33.5	-	ns
Body Diode Reverse Recovery Charge at $I_S = 10\ \text{A}$, $di/dt = 100\ \text{A}/\mu\text{s}$	Q_{rr}	-	26.6	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

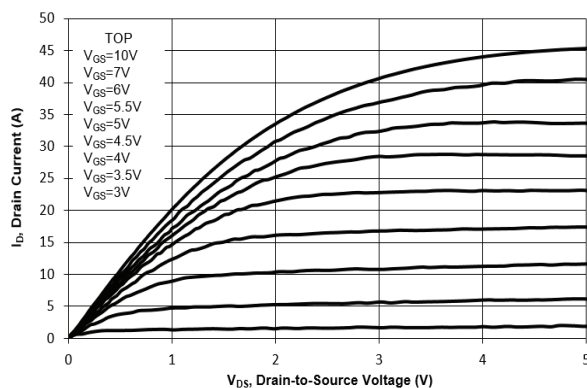


Fig. 2 Typical Transfer Characteristics

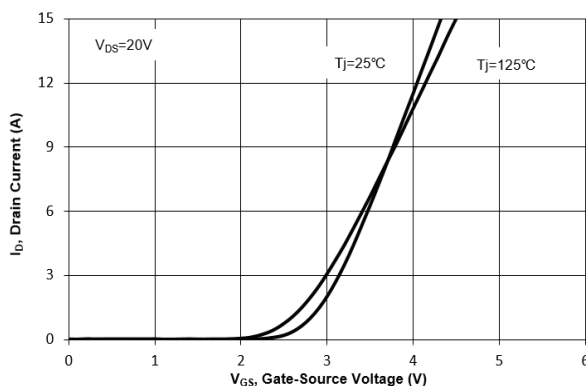


Fig. 3 on-Resistance vs. Drain Current

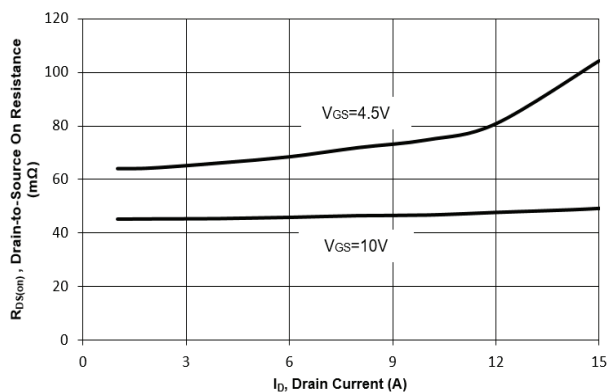


Fig. 4 on-Resistance vs. Gate to Source Voltage

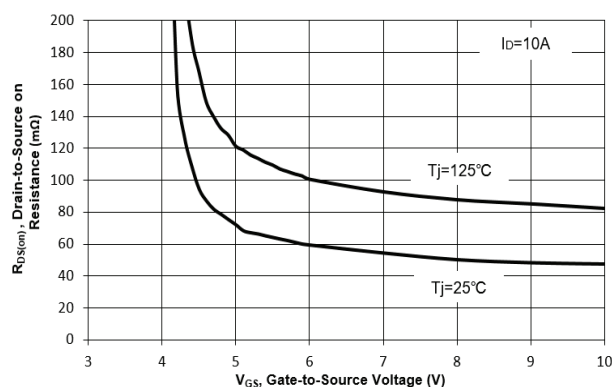


Fig. 5 on-Resistance vs. T_J

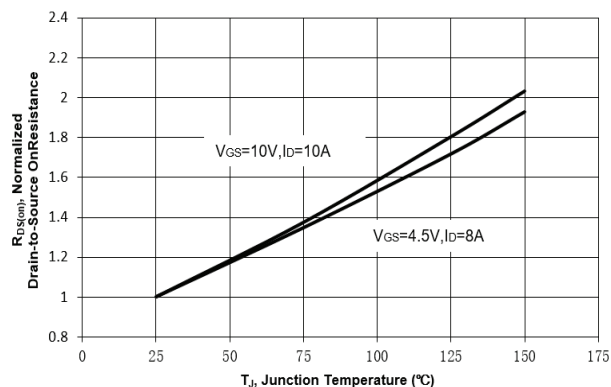
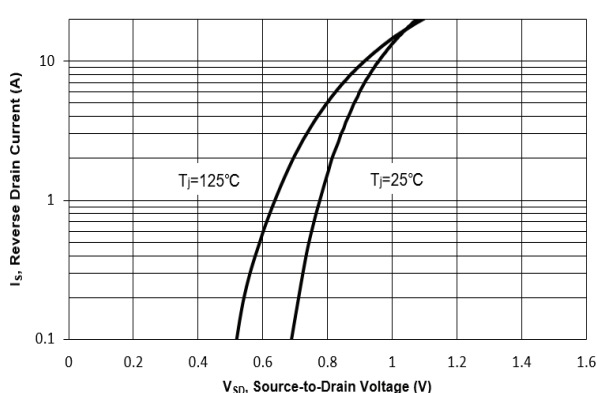


Fig. 6 Typical Body-Diode Forward Characteristics



Electrical Characteristics Curves

Fig. 13 Normalized Maximum Transient Thermal Impedance($Z_{\theta JC}$)

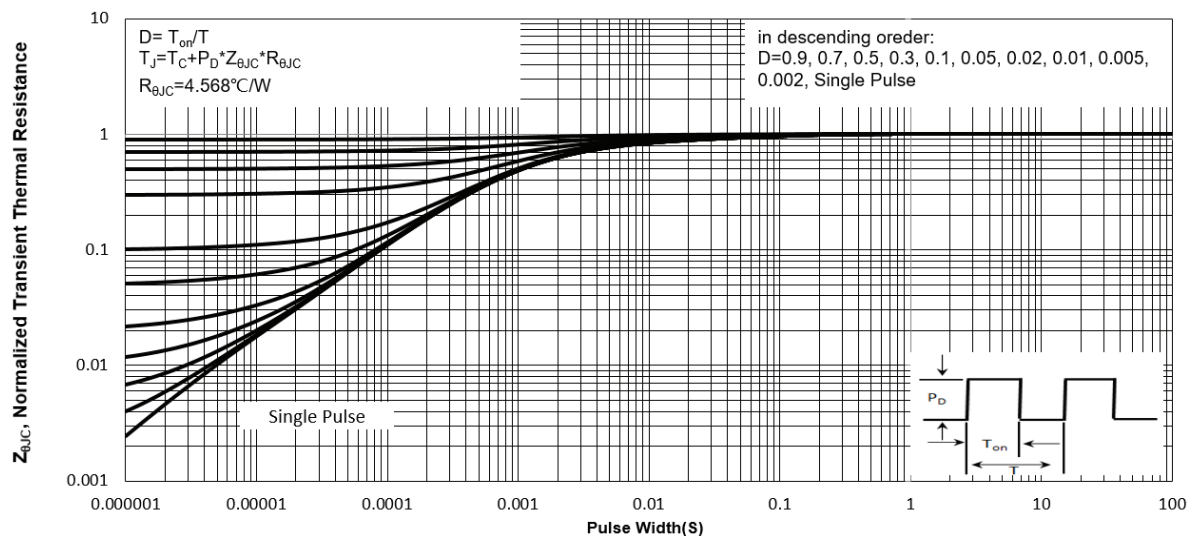
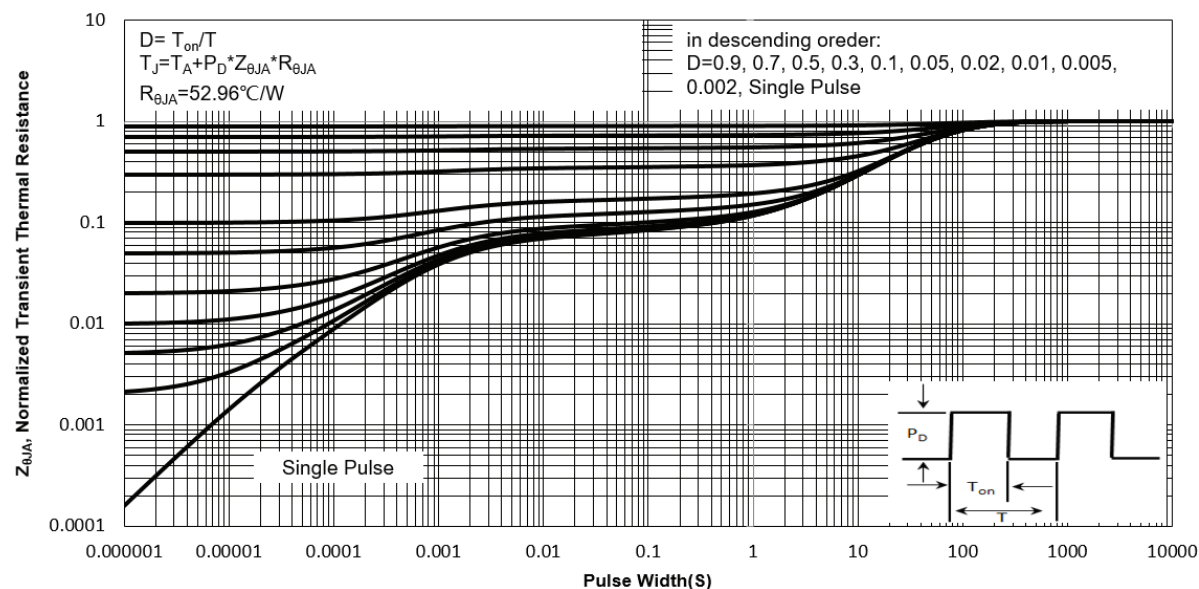


Fig. 14 Normalized Maximum Transient Thermal Impedance($Z_{\theta JA}$)



Test Circuits

Fig.1-1 Switching times test circuit

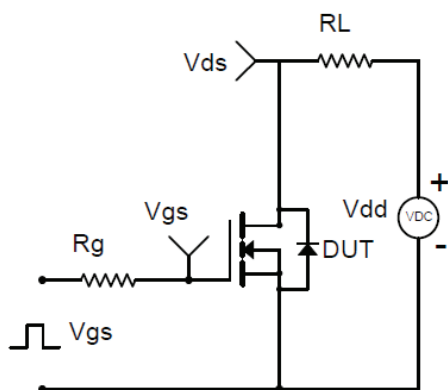


Fig.1-2 Switching Waveform

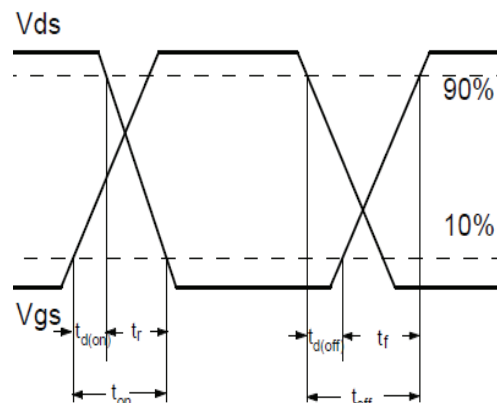


Fig.2-1 Gate charge test circuit

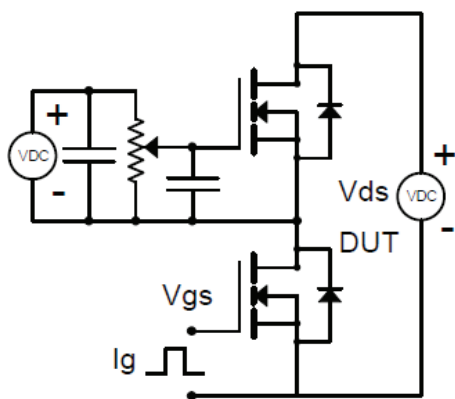


Fig.2-2 Gate charge waveform

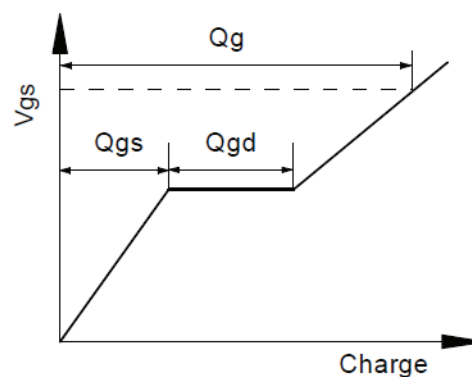


Fig.3-1 Avalanche test circuit

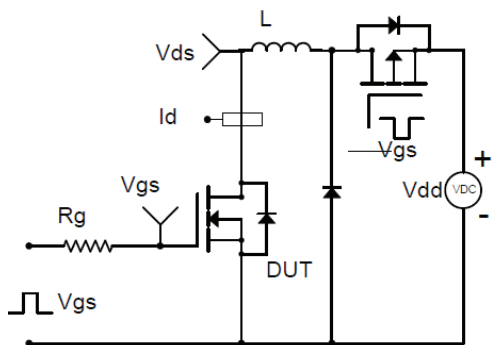
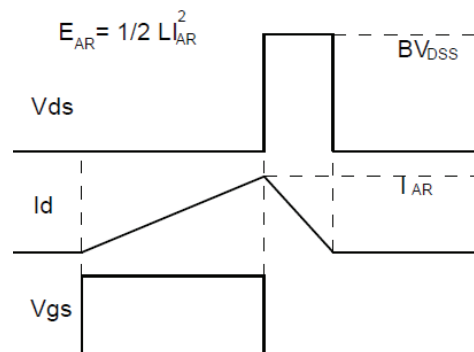
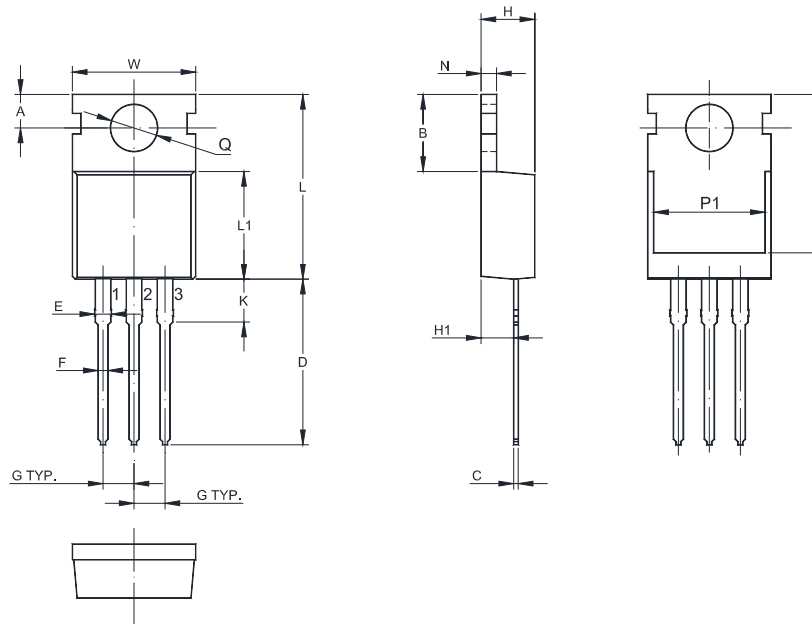


Fig.3-2 Avalanche waveform



Package Outline Dimensions (Units: mm)

TO-220FB



UNIT	A	B	C	D	E	F	G	W	H	H1	K	L	L1	N
mm	2.9	6.8	0.7	15	1.5	0.9	2.54	10.2	4.7	2.5	3.1	16.8	9.4	1.4
	2.7	6.4	0.3	11	1.1	0.7	TYP	9.8	4.3	2.2	2.7	14.8	9.0	1.2

UNIT	P	P1	Q
mm	13.3	8.2	3.7
	12.7	7.6	3.5

Packing information

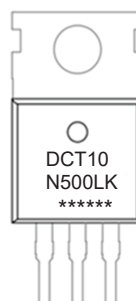
Package	Carton Quantity	Box Quantity	Base Quantity	Delivery Mode
TO-220FB	5 K / Carton	1 K / Box	50 pcs / Tube	Tube

Marking information

" DCT10N500LK " = Part No.

" ***** " = Date Code Marking

Font type: Arial



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Fig. 7 Typical Junction Capacitance

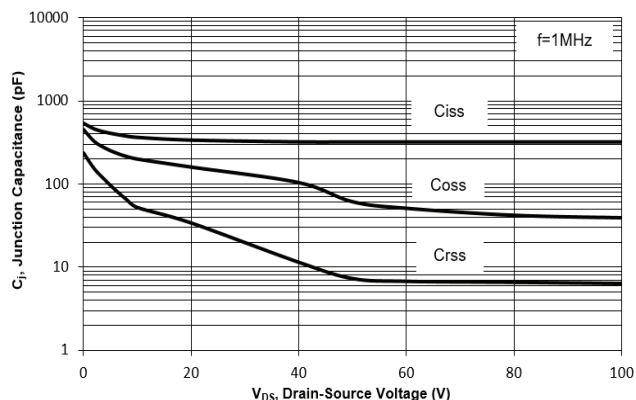


Fig. 8 Drain-Source Leakage Current vs. T_J

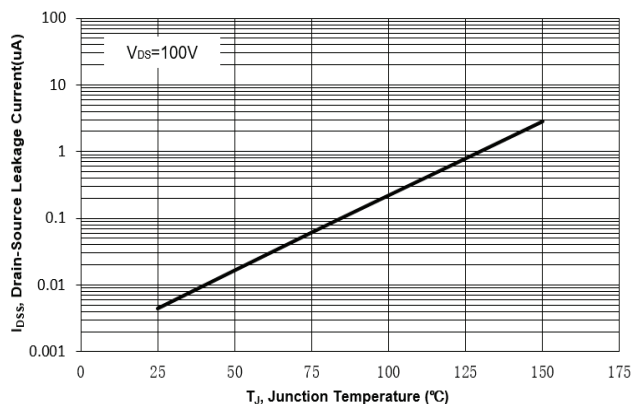


Fig. 9 V_{(BR)DSS} vs. Junction Temperature

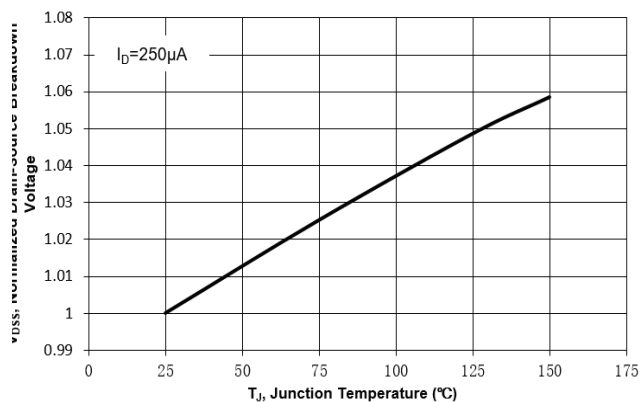


Fig. 10 Gate Threshold Variation vs. T_J

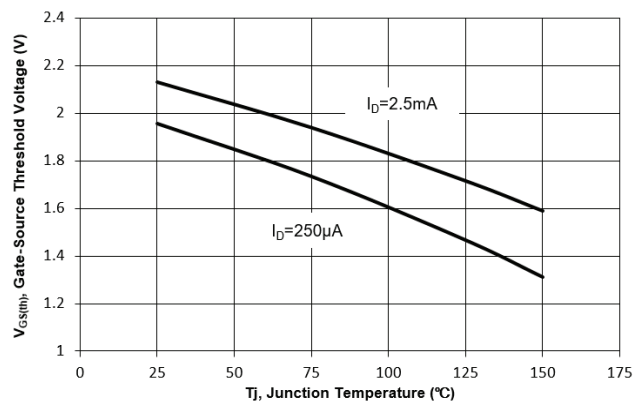


Fig. 11 Gate Charge

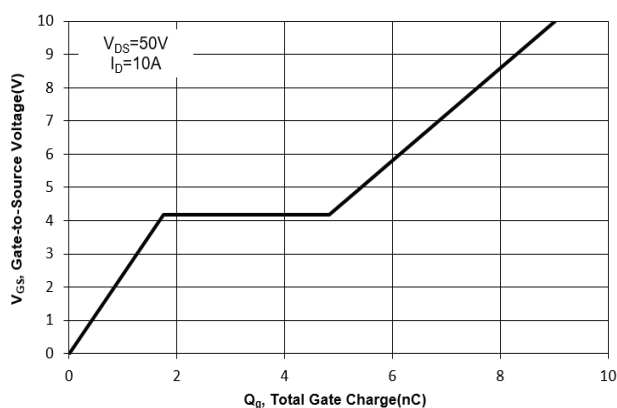


Fig. 12 Safe Operation Area

