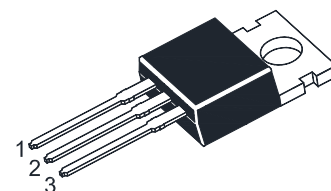
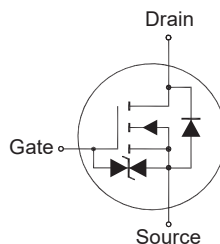


N-Channel Enhancement Mode MOSFET

Features

- Low $R_{DS(ON)}$
- 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}	65	V
$R_{DS(ON)}$ Max	6.1 @ $V_{GS} = 10\text{ V}$	mΩ
	10.5 @ $V_{GS} = 4.5\text{ V}$	
$V_{GS(th)}$ typ	1.7	V
Q_g typ	31 @ $V_{GS} = 10\text{ V}$	nC

Application

- Motor/Body Load Control
- High Frequency Switching and Synchronous Rectification

Absolute Maximum Ratings (at $T_a = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	65	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	90	A
		56.7	
Peak Drain Current, Pulsed ¹⁾	I_{DM}	360	A
Avalanche Current	I_{AS}	9.1	A
Single Pulse Avalanche Energy ²⁾	E_{AS}	4.1	mJ
Total Power Dissipation	P_{tot}	83.3	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	$R_{\theta JC}$	1.5	°C/W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	50	°C/W

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

²⁾ Limited by $T_{J(MAX)}$, starting $T_J = 25^\circ\text{C}$, $L = 0.1\text{ mH}$, $R_g = 25\ \Omega$, $I_{AS} = 9.1\text{ A}$, $V_{GS} = 10\text{ V}$.

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

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $I_D = 1\text{ mA}$	BV_{DSS}	65	-	-	V
Drain-Source Leakage Current at $V_{DS} = 65\text{ V}$	I_{DSS}	-	-	1	μA
Gate Leakage Current at $V_{GS} = \pm 20\text{ V}$	I_{GSS}	-	-	± 10	μA
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	$V_{GS(th)}$	1.2	-	2.5	V
Drain-Source On-State Resistance at $V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$ at $V_{GS} = 4.5\text{ V}$, $I_D = 10\text{ A}$	$R_{DS(on)}$	- -	5.3 -	6.1 10.5	$\text{m}\Omega$
DYNAMIC PARAMETERS					
Forward Transconductance at $V_{DS} = 5\text{ V}$, $I_D = 20\text{ A}$	g_{fs}	-	37	-	S
Gate resistance at $V_{GS} = 0\text{ V}$, $V_{DS} = 0\text{ V}$, $f = 1\text{ MHz}$	R_g	-	1	-	Ω
Input Capacitance at $V_{GS} = 0\text{ V}$, $V_{DS} = 30\text{ V}$, $f = 1\text{ MHz}$	C_{iss}	-	1691	-	pF
Output Capacitance at $V_{GS} = 0\text{ V}$, $V_{DS} = 30\text{ V}$, $f = 1\text{ MHz}$	C_{oss}	-	604	-	pF
Reverse Transfer Capacitance at $V_{GS} = 0\text{ V}$, $V_{DS} = 30\text{ V}$, $f = 1\text{ MHz}$	C_{rss}	-	37	-	pF
Gate charge total at $V_{DS} = 30\text{ V}$, $I_D = 20\text{ A}$, $V_{GS} = 10\text{ V}$ at $V_{DS} = 30\text{ V}$, $I_D = 20\text{ A}$, $V_{GS} = 4.5\text{ V}$	Q_g	- -	31 16	- -	nC
Gate to Source Charge at $V_{DS} = 30\text{ V}$, $I_D = 20\text{ A}$, $V_{GS} = 10\text{ V}$	Q_{gs}	-	6	-	nC
Gate to Drain Charge at $V_{DS} = 30\text{ V}$, $I_D = 20\text{ A}$, $V_{GS} = 10\text{ V}$	Q_{gd}	-	7.5	-	nC
Turn-On Delay Time at $V_{DS} = 30\text{ V}$, $I_D = 20\text{ A}$, $V_{GS} = 10\text{ V}$, $R_g = 3.3\text{ }\Omega$	$t_{d(on)}$	-	14	-	ns
Turn-On Rise Time at $V_{DS} = 30\text{ V}$, $I_D = 20\text{ A}$, $V_{GS} = 10\text{ V}$, $R_g = 3.3\text{ }\Omega$	t_r	-	25	-	ns
Turn-Off Delay Time at $V_{DS} = 30\text{ V}$, $I_D = 20\text{ A}$, $V_{GS} = 10\text{ V}$, $R_g = 3.3\text{ }\Omega$	$t_{d(off)}$	-	13	-	ns
Turn-Off Fall Time at $V_{DS} = 30\text{ V}$, $I_D = 20\text{ A}$, $V_{GS} = 10\text{ V}$, $R_g = 3.3\text{ }\Omega$	t_f	-	2.7	-	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	-	-	90	A
Body-Diode Continuous Current, Pulsed	I_{SM}	-	-	360	A
Body Diode Reverse Recovery Time at $I_S = 20\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$	t_{rr}	-	19	-	ns
Body Diode Reverse Recovery Charge at $I_S = 20\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$	Q_{rr}	-	8	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

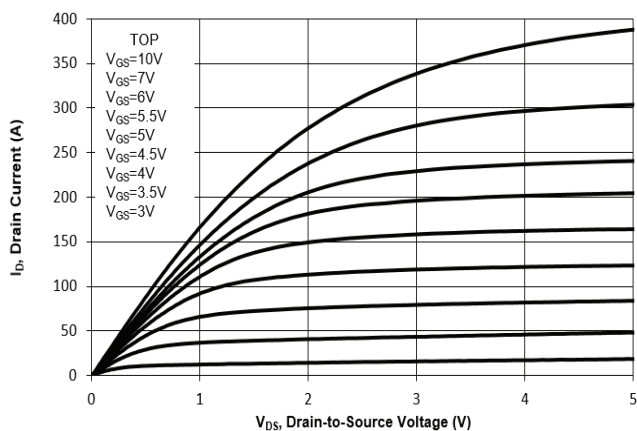


Fig. 2 Typical Transfer Characteristics

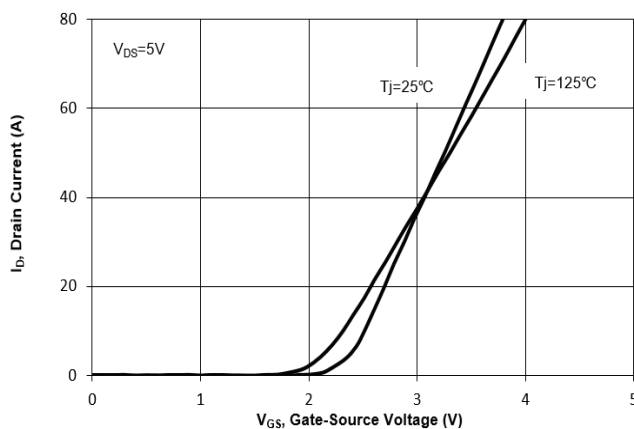


Fig. 3 On-Resistance vs. Drain Current

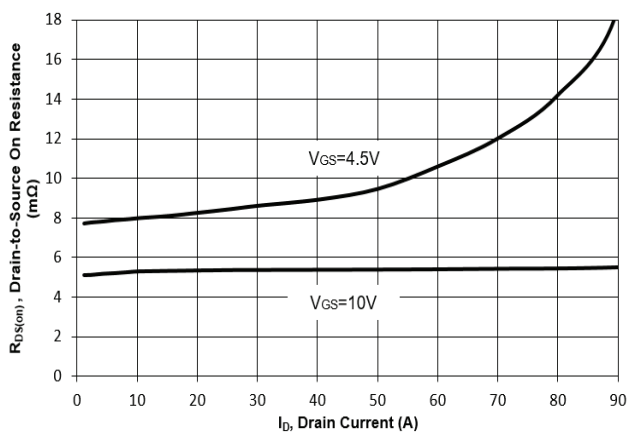


Fig. 4 On-Resistance vs. Gate to Source Voltage

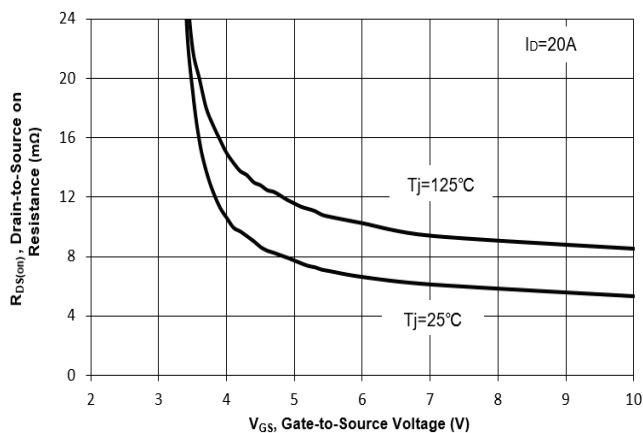


Fig. 5 On-Resistance vs. T_J

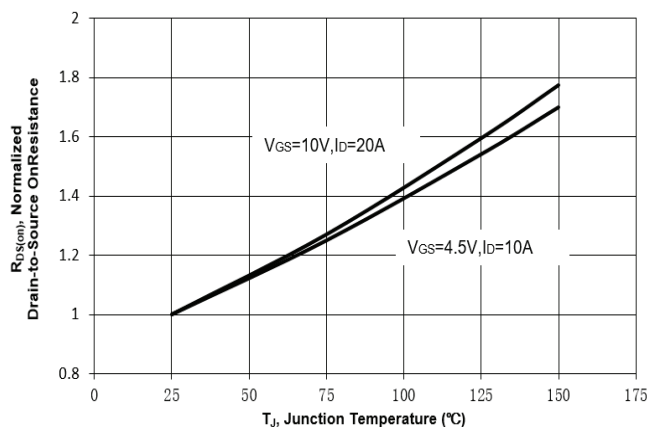
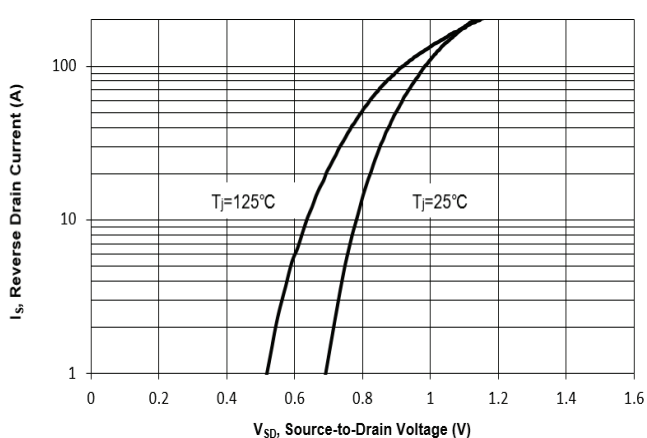


Fig. 6 Typical Body-Diode Forward Characteristics



Electrical Characteristics Curves

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

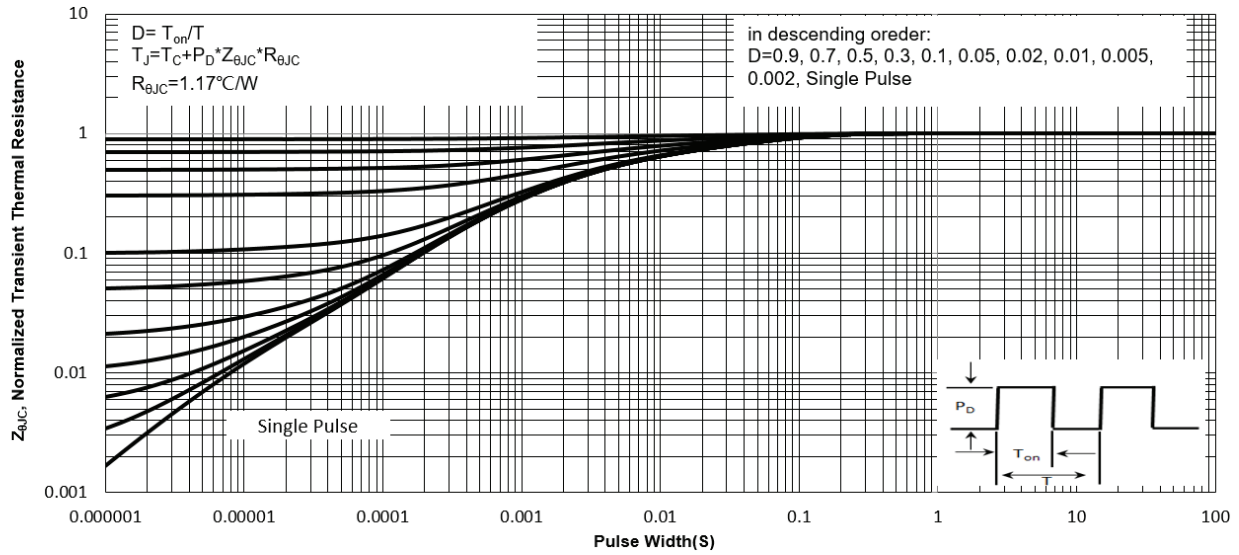
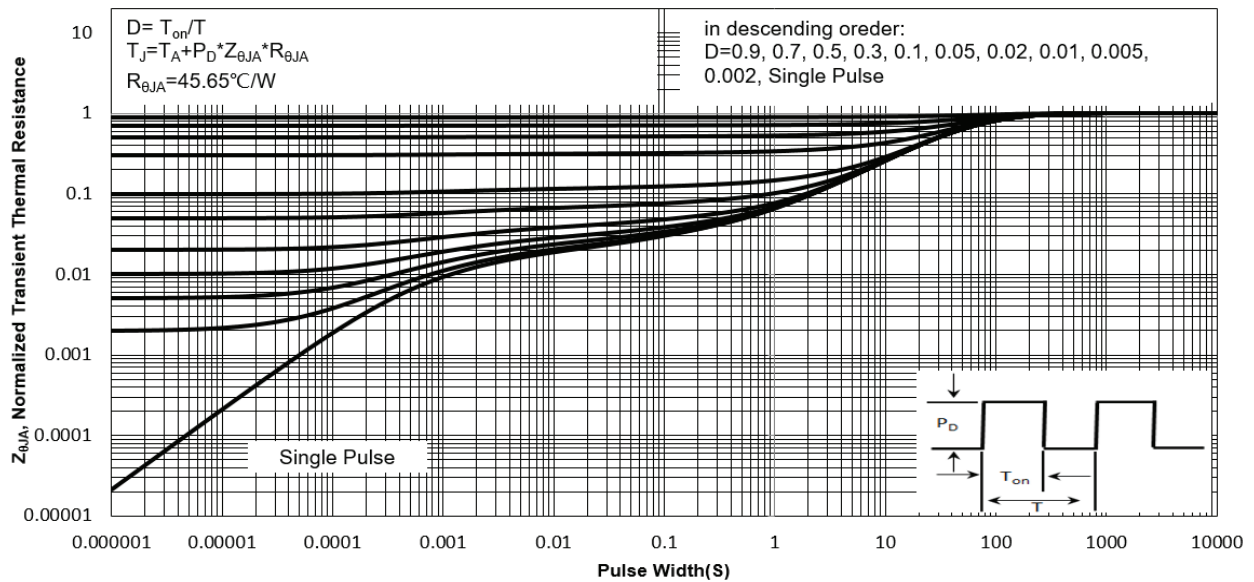
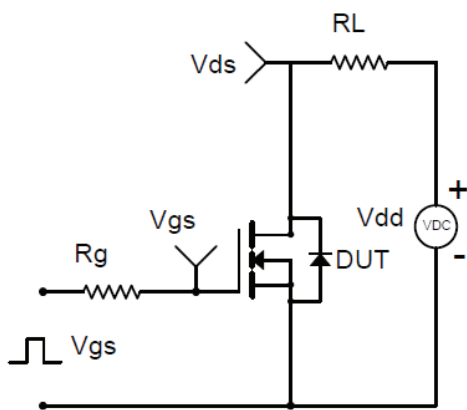
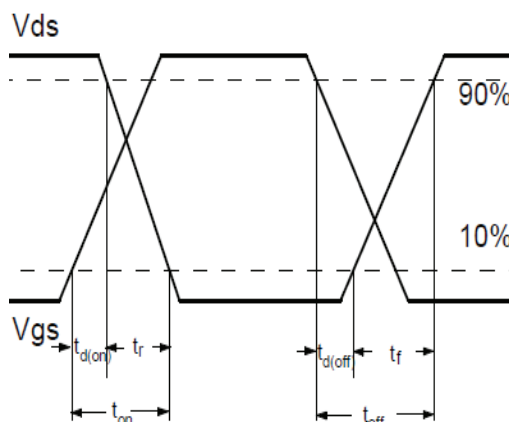
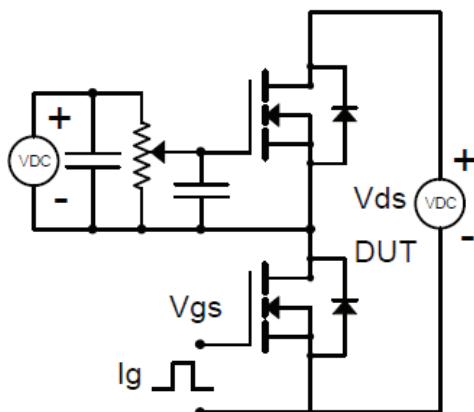
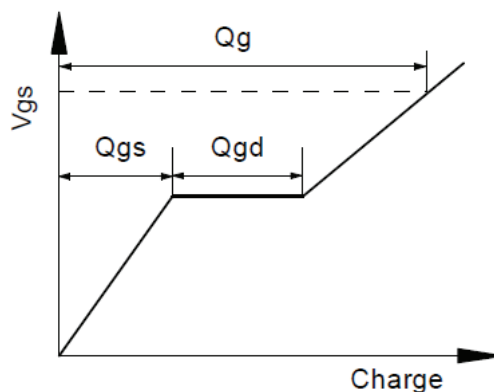
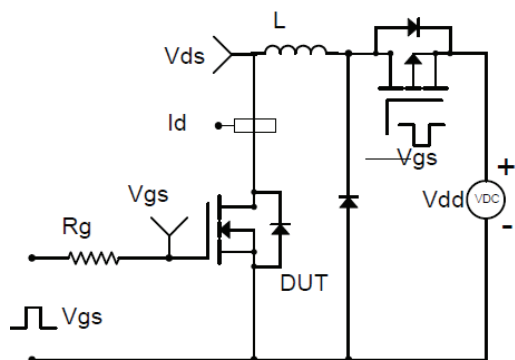
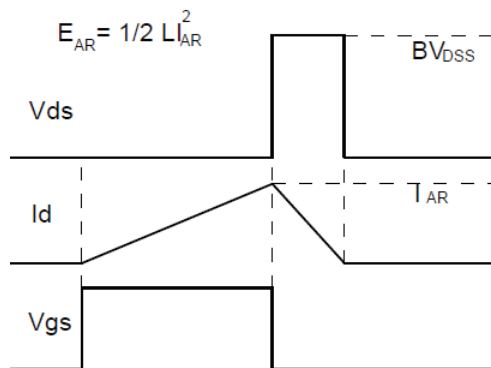


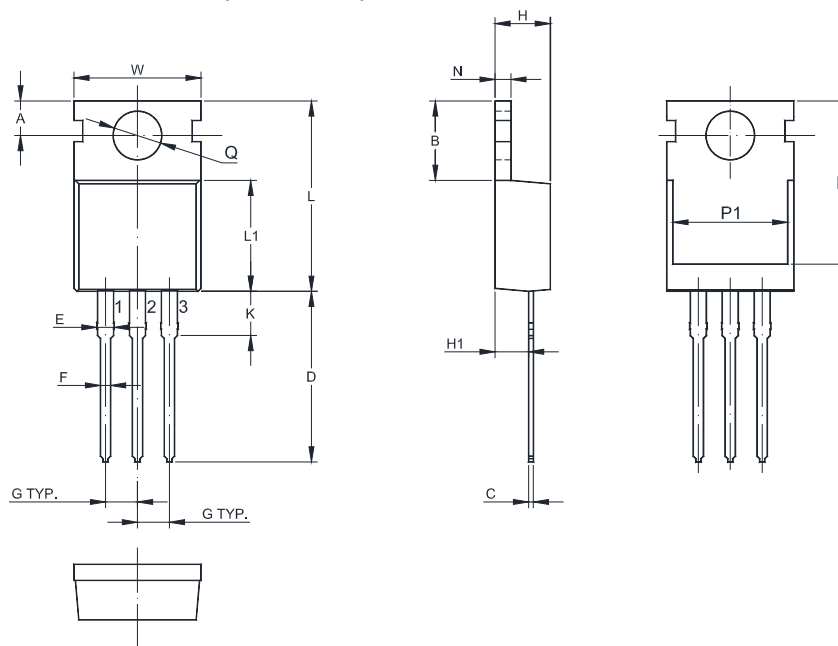
Fig.14 Normalized Maximum Transient Thermal Impedance($z_{\theta JA}$)



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

" DCTE6N055LK " = Part No.

" ***** " = Date Code Marking

Font type: Arial



Disclaimer: Our company reserve the right to make modifications, enhancements, improvements, corrections or other changes to improve product design, functions and reliability, anytime without notice. Semtech Electronics Limited makes no warranties, representations or warranties regarding the suitability of its products for any particular purpose, and does not accept any liability arising from the application or use of any product or circuit such as: Apply to medical, military, aircraft, space or life support equipment and expressly waive any and all liability, including but not limited to special, consequential or collateral damage.

Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

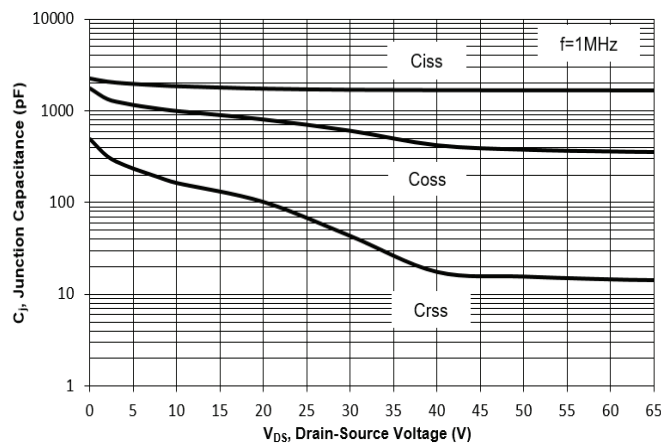


Fig. 8 Drain-Source Leakage Current vs. T_J

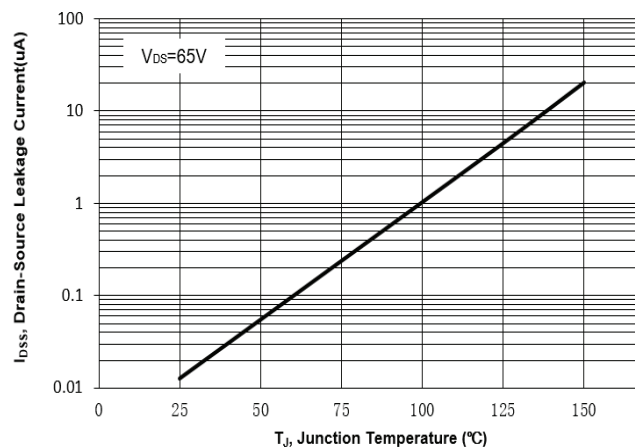


Fig. 9 V_{(BR)DSS} vs. Junction Temperature

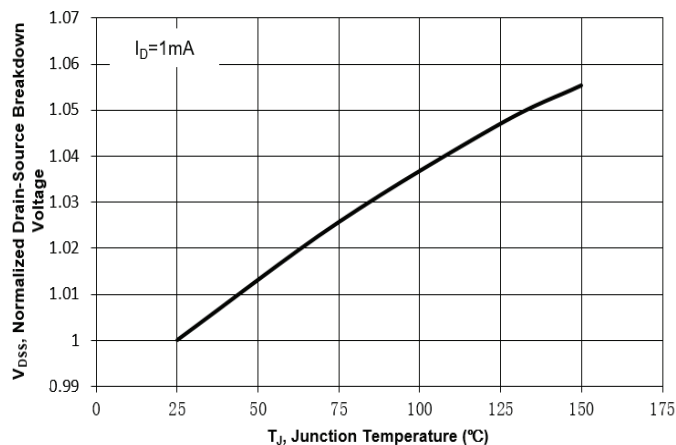


Fig. 10 Gate Threshold Variation vs. T_J

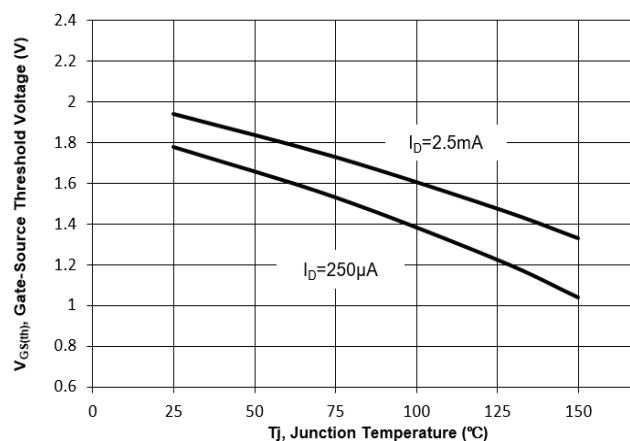


Fig. 11 Gate Charge

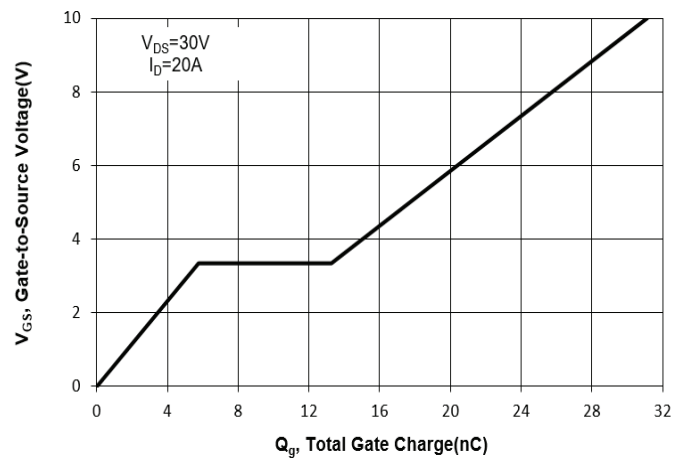


Fig. 12 Safe Operation Area

