

PRODUCT CHARACTERISTICS

N-Channel	P-Channel
$BV_{DSS} = 30V$	$BV_{DSS} = -30V$
$R_{DS(on)} (Typ@V_{GS}=10V) < 17m\Omega$	$R_{DS(on)} (Typ@V_{GS} = -10V) < 32m\Omega$
$R_{DS(on)} (Typ@V_{GS}=4.5V) < 22m\Omega$	$R_{DS(on)} (Typ@V_{GS}=-4.5V) < 45.5m\Omega$
$I_D = 6A$	$I_D = -6A$

APPLICATIONS

- * Power management in computing
- * Load switching, quick/wireless charging
- * Motor driving

FEATURES

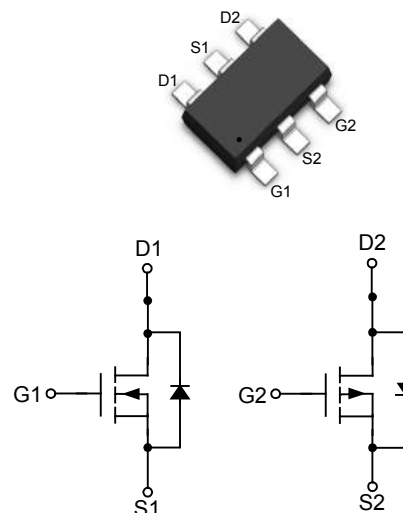
- * Ultra low $R_{DS(on)}$
- * Low gate charge
- * Pb-free lead plating

ORDER INFORMATION

Order codes		Package	Packing
Halogen- Free	Halogen		
N/A	MOT3650A6	SOT-23A-6L	3000 pieces/Reel

ABSOLUTE MAXIMUM RATINGS ($T_J=25^{\circ}C$ Unless Otherwise Noted)

Parameter		Symbol	Symbol		Unit
			N-channel	P-channel	
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	± 20	± 20	V
Continuous Drain Current	$T_A=25^{\circ}C$	I_D	6	-6	A
	$T_A=70^{\circ}C$	I_D	5	-5	A
Pulsed Drain Current		I_{DM}	24	-24	A
Maximum Power Dissipation		P_D	2	2	W
Thermal Resistance, Junction-to-Ambient		$R_{\theta JA}$	62.5	62.5	$^{\circ}C/W$
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 To 150	-55 To 150	$^{\circ}C$



N+P MOSFET

■ N-ELECTRICAL CHARACTERISTICS (T_c=25°C unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	30	33	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	1.6	3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =6A	-	17	25	mΩ
		V _{GS} =4.5V, I _D =6A	-	22	30	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =6A	15	-	-	S
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, F=1.0MHz	-	575	-	PF
Output Capacitance	C _{oss}		-	75	-	PF
Reverse Transfer Capacitance	C _{rss}		-	66.5	-	PF
Switching characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =15V, R _L =2.5Ω V _{GS} =10V, R _{GEN} =3Ω	-	4.5	-	nS
Turn-on Rise Time	t _r		-	2.5	-	nS
Turn-Off Delay Time	t _{d(off)}		-	14.5	-	nS
Turn-Off Fall Time	t _f		-	3.5	-	nS
Total Gate Charge	Q _g	V _{DS} =15V, I _D =6A, V _{GS} =10V	-	14.8	-	nC
Gate-Source Charge	Q _{gs}		-	2.6	-	nC
Gate-Drain Charge	Q _{gd}		-	2.9	-	nC
Drain-source diode characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =6A	-	0.8	1.2	V

■ P-ELECTRICAL CHARACTERISTICS ($T_c=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-30	-33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V$	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.3	-1.65	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-6A$	-	32	39	m Ω
		$V_{GS}=-4.5V, I_D=-6A$	-	45.5	51	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-6A$	10	-	-	S
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V,$ $F=1.0MHz$	-	575	-	PF
Output Capacitance	C_{oss}		-	75	-	PF
Reverse Transfer Capacitance	C_{rss}		-	66	-	PF
Switching characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, R_L=2.5\Omega$ $V_{GS}=-10V, R_{GEN}=6\Omega$	-	7.5	-	nS
Turn-on Rise Time	t_r		-	5.5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	19	-	nS
Turn-Off Fall Time	t_f		-	7	-	nS
Total Gate Charge	Q_g	$V_{DS}=-15V, I_D=-6A$ $V_{GS}=-10V$	-	11.1	-	nC
Gate-Source Charge	Q_{gs}		-	2.0	-	nC
Gate-Drain Charge	Q_{gd}		-	2.6	-	nC
Drain-source diode characteristics						
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=-6A$	-	-	-1.2	V

■ N-CHANNEL TYPICAL CHARACTERISTICS

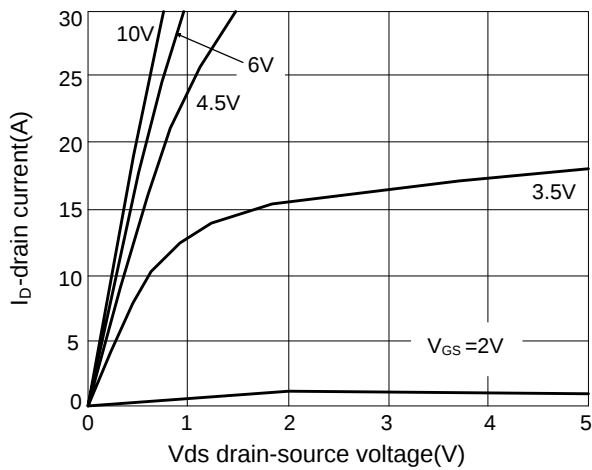


Figure 1: Output characteristics

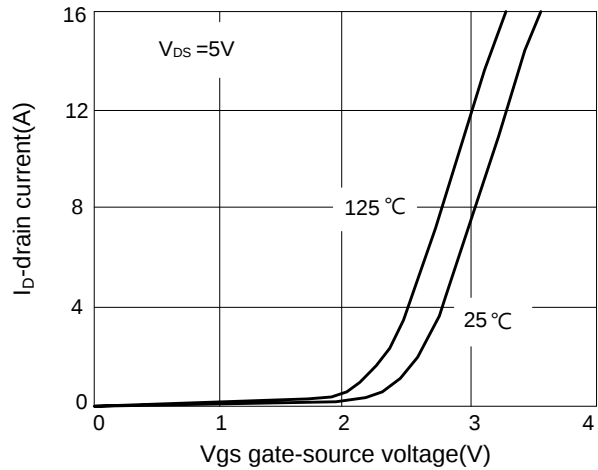


Figure 2: Transfer characteristics

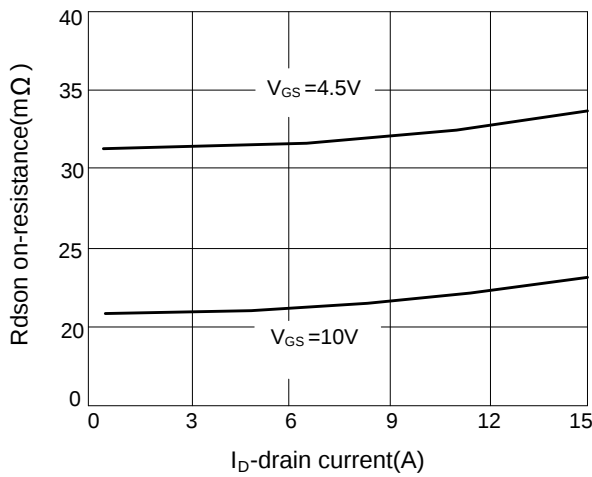


Figure 3: $R_{DS(on)}$ -drain current

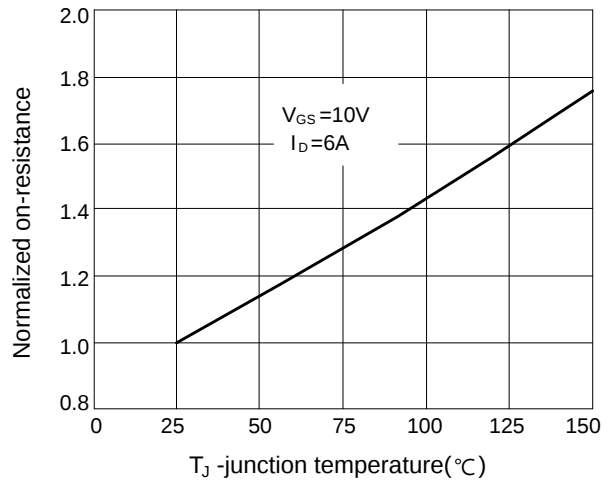


Figure 4: $R_{DS(on)}$ -junction temperature

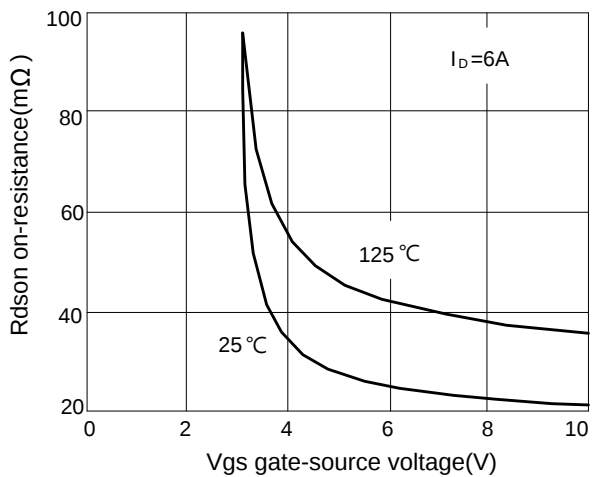


Figure 5: $R_{DS(on)}$ vs v_{gs}

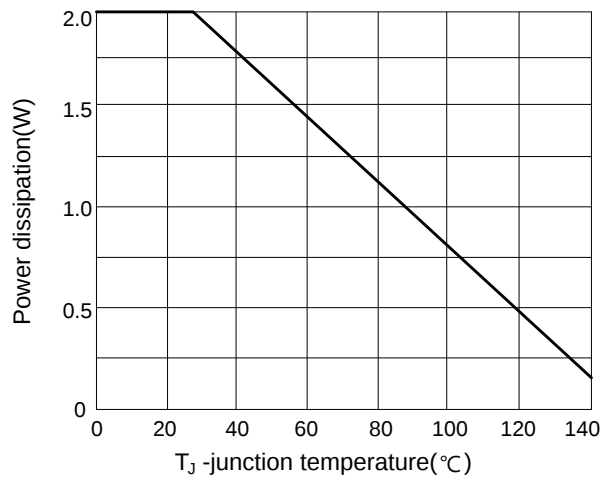
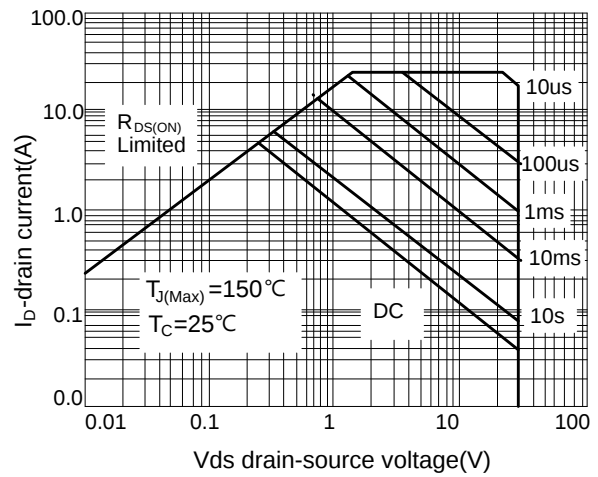
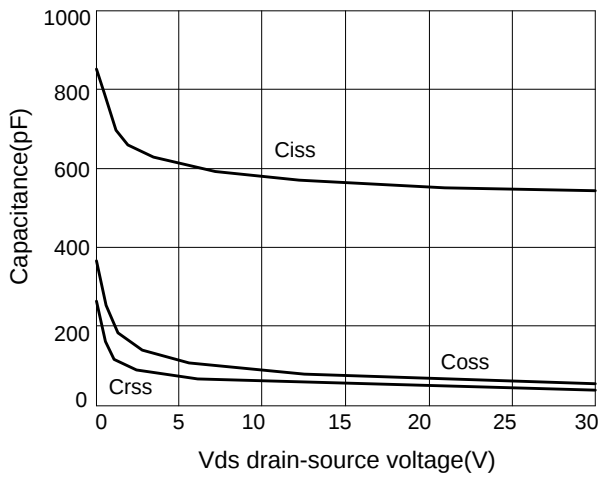
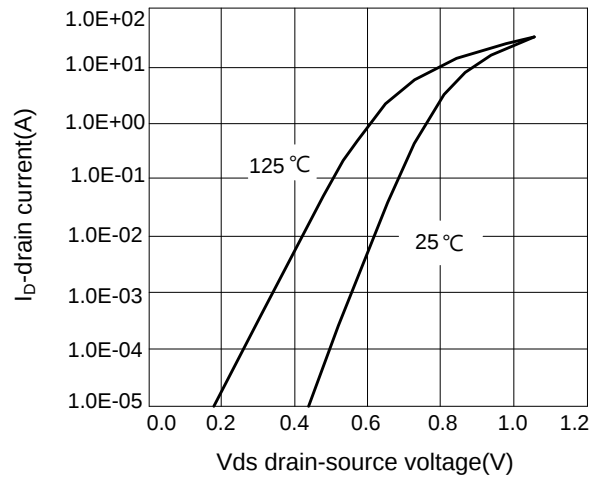
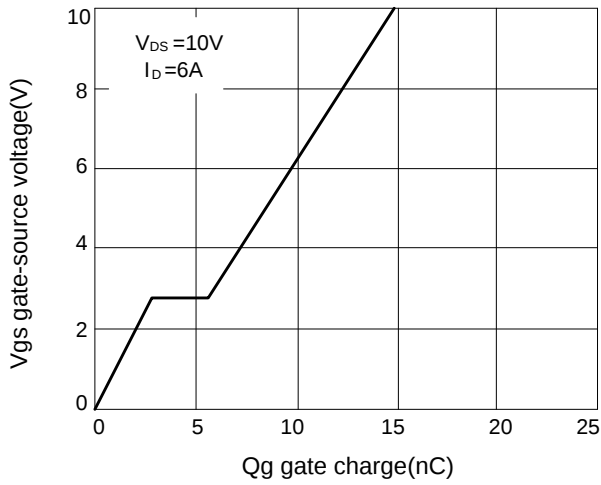


Figure 6: Power de-rating

■ N-CHANNEL TYPICAL CHARACTERISTICS(Cont.)



■ P-CHANNEL TYPICAL CHARACTERISTICS

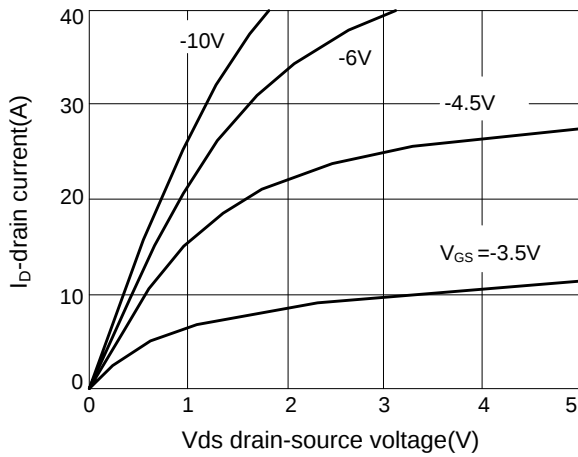


Figure 1: Output characteristics

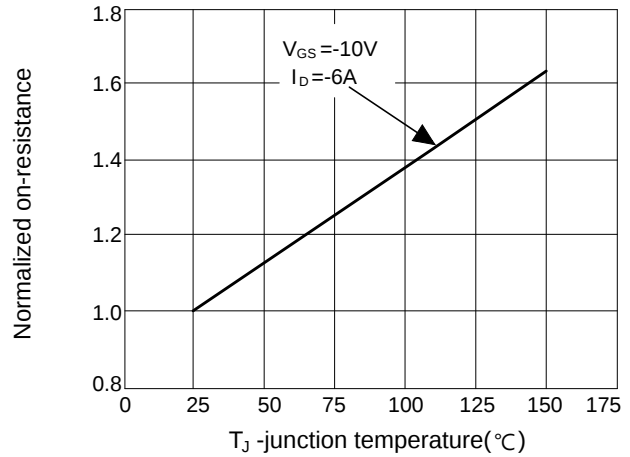


Figure 2: $R_{DS(on)}$ -junction temperature

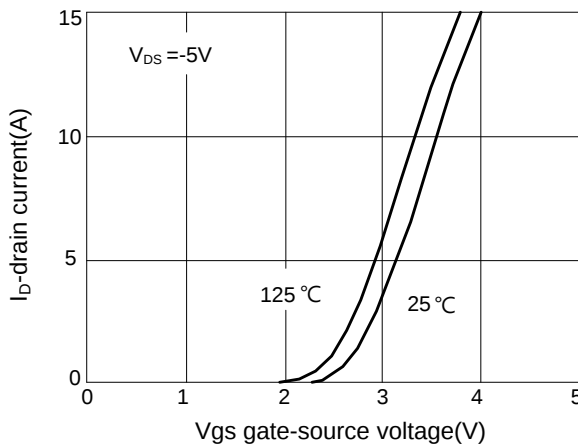


Figure 3: Transfer characteristics

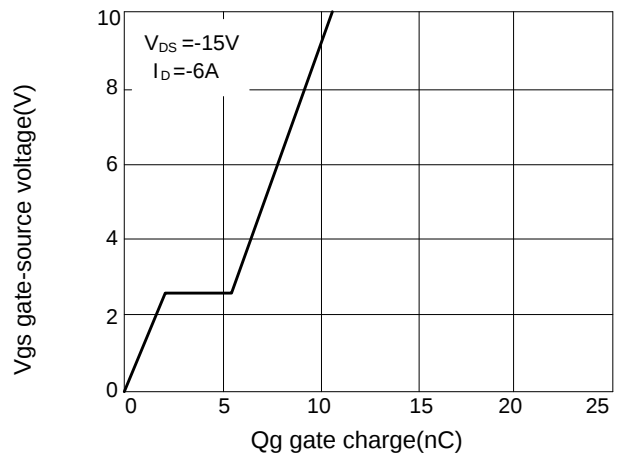


Figure 4: Gate charge

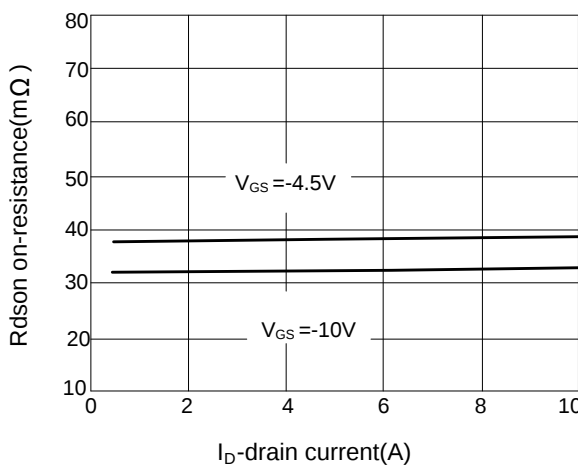


Figure 5: $R_{DS(on)}$ vs v_{gs}

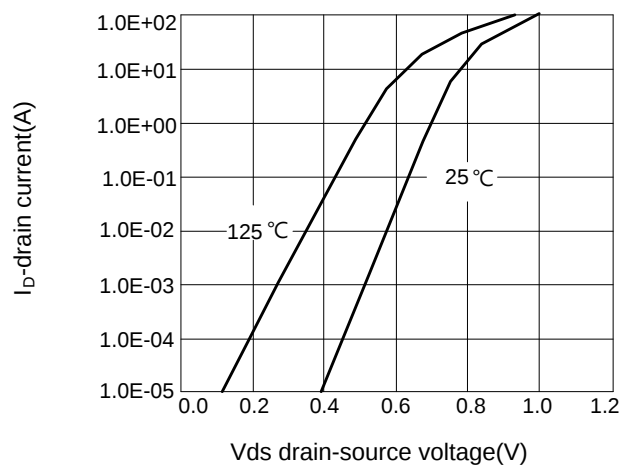


Figure 6: Source-drain diode forward

■ P-CHANNEL TYPICAL CHARACTERISTICS(Cont.)

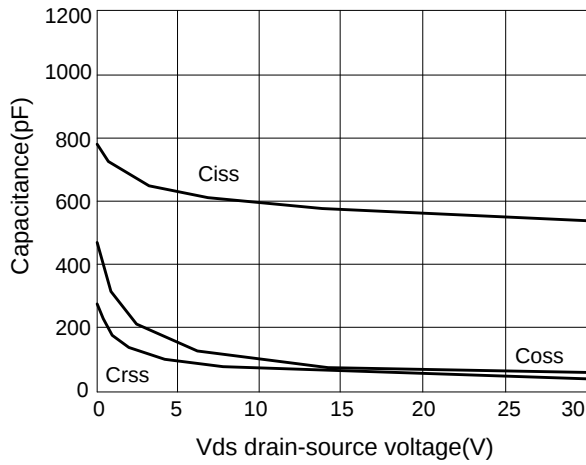


Figure 7: Capacitance vs vds

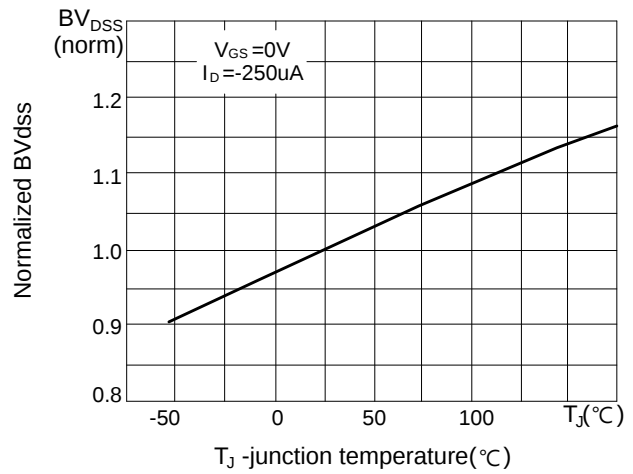


Figure 8: Bvdss vs junction temperature

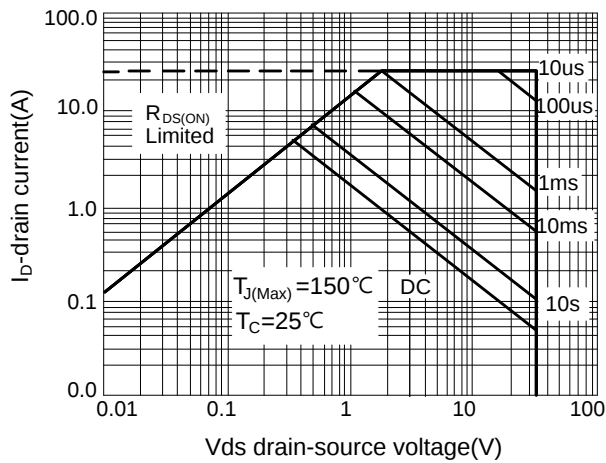


Figure 9: Safe operation area

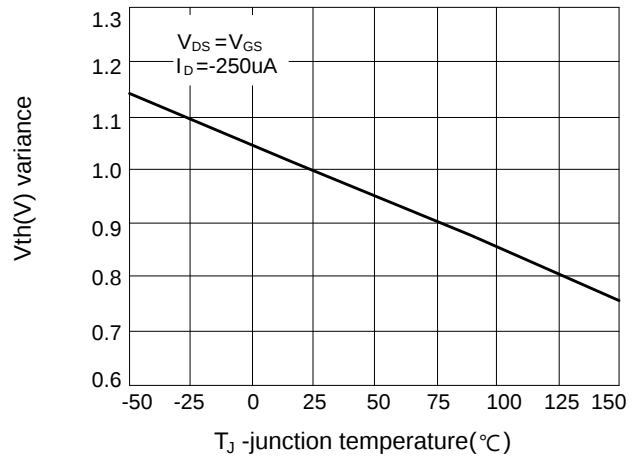


Figure 10: Vgs(th) vs junction temperature

■ SOT-23A-6L Package Mechanical Data

