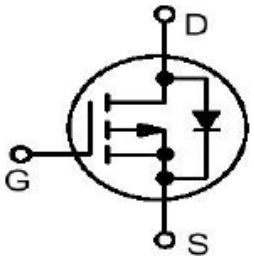
P-Channel Enhancement Mode MOSFET

TBL3407-6L

Features

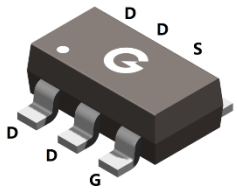
- $R_{DS(ON)} \leq 52m\Omega$@ V_{GS} = -10V
- $R_{DS(ON)} \leq 87m\Omega$@ V_{GS} = -4.5V
- High-speed switching
- Drive circuits can be simple
- Parallel use is easy
- HBM: JESD22-A114-B: 0
- Halogen free
- Qualified to AEC-Q101 standards for high reliability

HF



Typical Applications

- Power Management in Note Book
- Switching Application
- Battery Powered System
- Load switch



SOT-23-6L

Mechanical Data

- Case: SOT-23-6L
- Molding Compound, UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Plated Leads, Solderable Per MIL-STD-202, Method 208

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
TBL3407-6L	SOT-23-6L	3000 pcs / Tape & Reel	3407

Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	-30	V
Gate -Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	T_A = 25°C	I_D	-4.3	A
	T_A = 70°C		-3.5	A
Pulsed Drain Current (t_p = 10μs, T_A = 25°C)		I_{DM}	-20	A
Single Pulse Avalanche Energy *3		E_{AS}	12	mJ
Power Dissipation	T_A = 25°C	P_D	1.4	W
	T_C = 25°C		3	W
Operating Junction Temperature Range		T_J	-55 ~ +150	°C
Storage Temperature Range		T_{STG}	-55 ~ +150	°C

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case *1	$R_{\theta JC}$	-	30	40	°C/W
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	-	70	90	°C/W

Electrical Characteristics (@ T_A = 25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = -250μA	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -24V, V_{GS} = 0V	-	-	-1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
On Characteristics						
$R_{DS(ON)}$	Drain-Source On-resistance *2	V_{GS} = -10V,I_D = -4.1A	-	40	52	mΩ
		V_{GS} = -4.5V,I_D = -3A	-	59	87	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-1	-1.5	-2.1	V
R_G	Gate Resistance	V_{GS} = 0V, f = 1MHz	-	12	-	Ω
Dynamic Characteristics						
g_{FS}	Forward Transconductance	V_{DS} = -5V, I_D = -4A	-	7	-	S
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = -15V f = 1.0MHz	-	793	-	pF
C_{OSS}	Output Capacitance		-	78	-	
C_{RSS}	Reverse Transfer Capacitance		-	61	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time *4	V_{DD} =-15V, V_{GS} = -10V R_G = 2.5Ω, R_L = 15Ω I_D = -1A	-	5	-	ns
t_r	Turn-on Rise Time *4		-	6	-	
$t_{d(OFF)}$	Turn-Off Delay Time *4		-	28	-	
t_f	Turn-Off Fall Time *4		-	7	-	
Q_G	Total Gate-Charge	V_{DD} = -20V V_{GS} = -4.5V I_D = -3A	-	8	-	nC
Q_{GS}	Gate to Source Charge		-	2.6	-	
Q_{GD}	Gate to Drain (Miller) Charge		-	2.6	-	
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *2	I_{SD} = -1A, V_{GS} = 0V, T_J = 25°C	-	-0.8	-1.0	V
trr	Reverse Recovery Time	I_{SD} = -3A, V_{GS} = 0V d_I/d_t = 100A/μs	-	125	-	ns
Qrr	Reverse Recovery Charge		-	110	-	nC

Notes:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper
2. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
3. The E_{AS} data shows Max. rating. The test condition is V_{DD} = -15V, V_{GS} = -10V, L = 0.1mH
4. Guaranteed by design, not subject to production

Ratings and Characteristic Curves (@ T_A = 25°C unless otherwise specified)

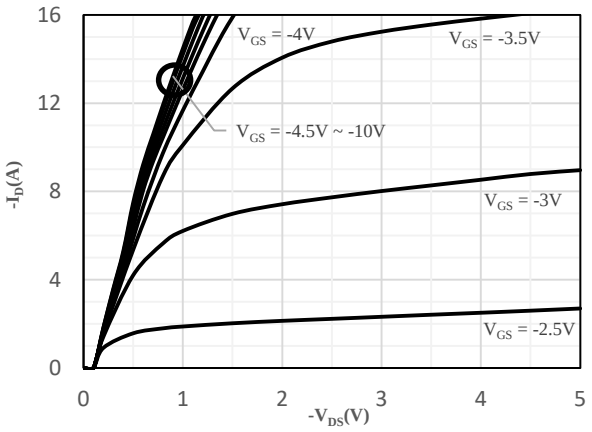


Fig 1 Typical Output Characteristics

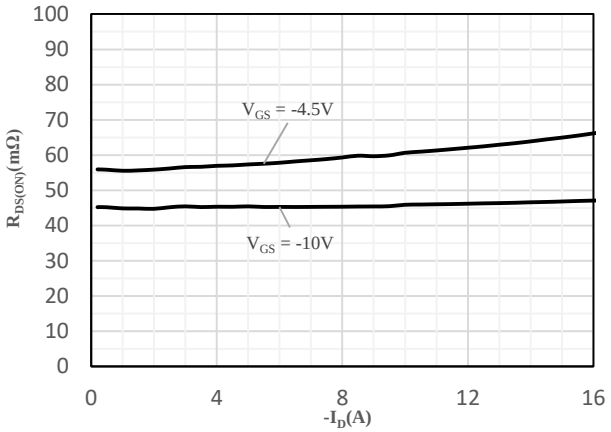


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

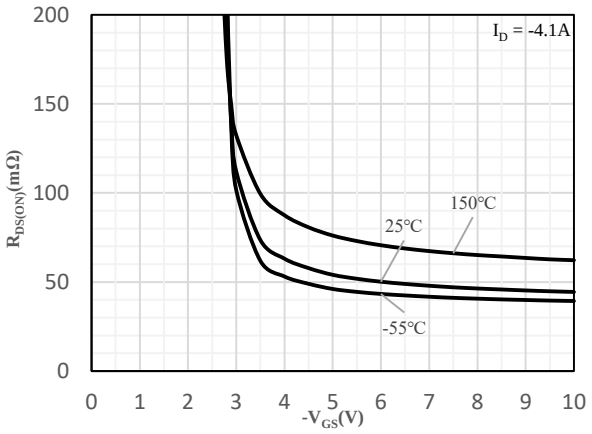


Fig 3 On-Resistance vs. Gate-Source Voltage

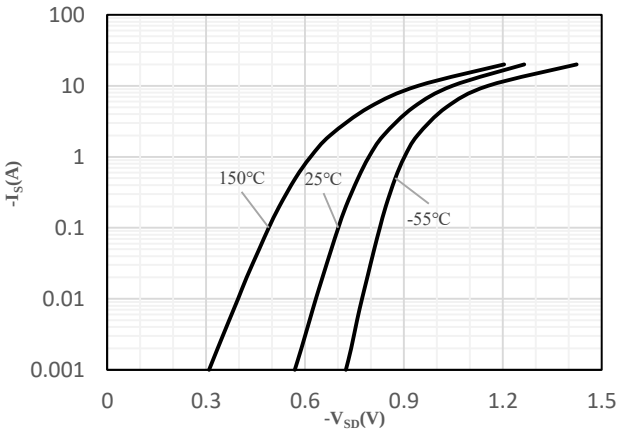


Fig 4 Body-Diode Characteristics

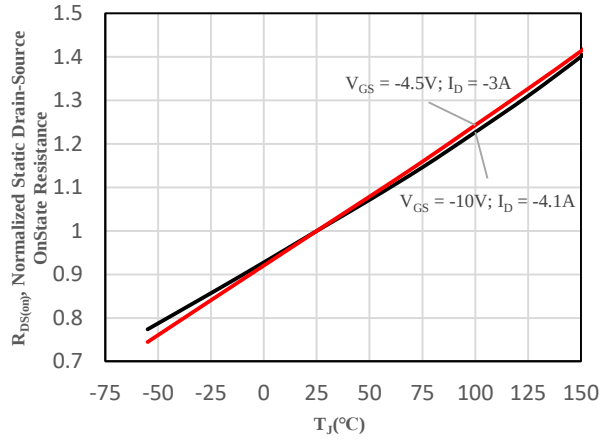


Fig 5 Normalized On-Resistance vs. Junction Temperature

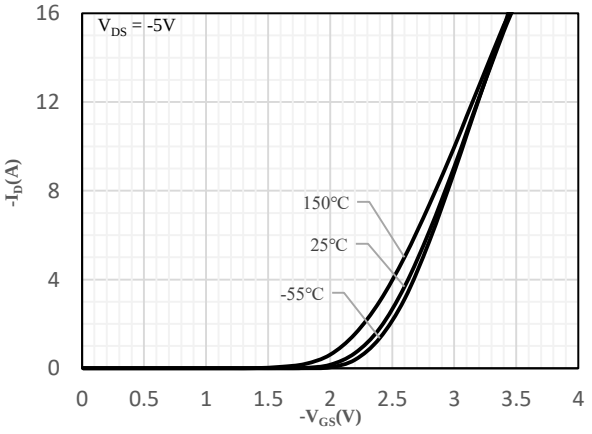


Fig 6 Transfer Characteristics

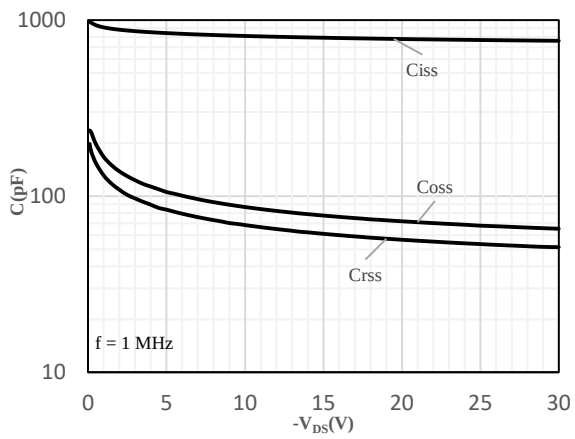


Fig 7 Capacitance Characteristics

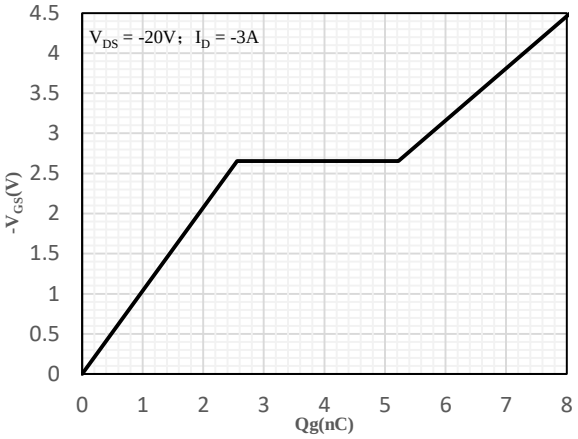


Fig 8 Gate-Charge Characteristics

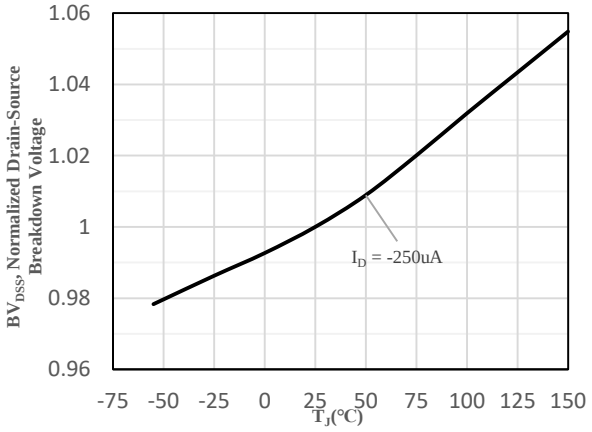


Fig 9 Normalized Breakdown Voltage vs. Junction Temperature

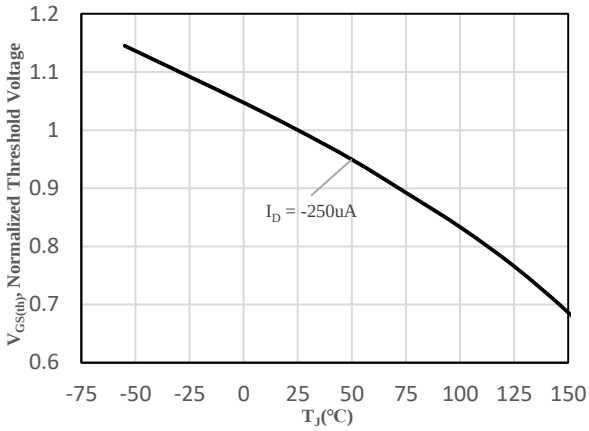


Fig 10 Normalized $V_{GS(th)}$ vs. Junction Temperature

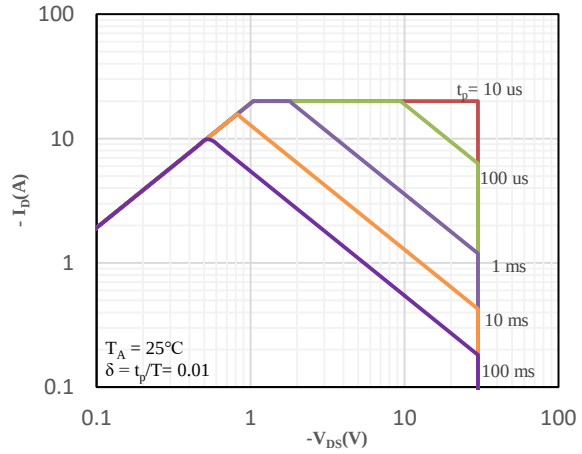


Fig 11 Safe Operation Area

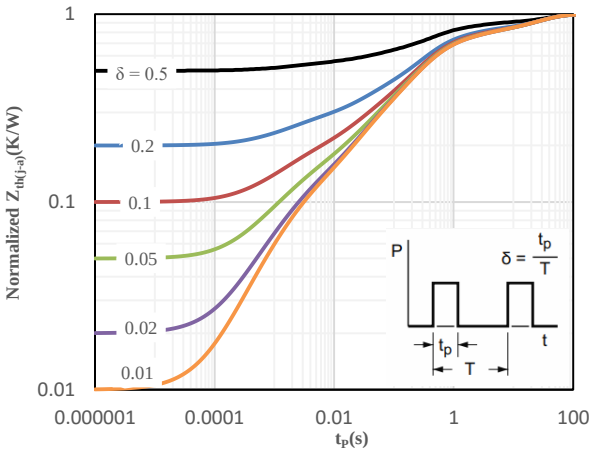
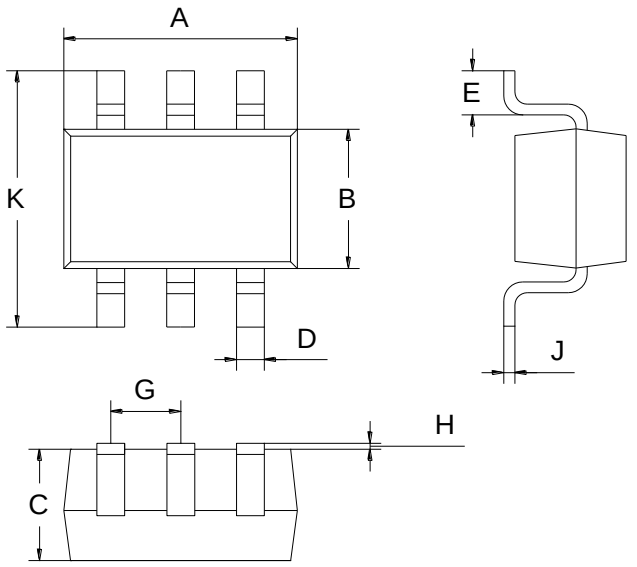


Fig 12 Normalized Maximum transient thermal impedance

Package Outline Dimensions (Unit: mm)



SOT-23-6L		
Dimension	**Min.**	**Max.**
A	2.80	3.00
B	1.50	1.70
C	1.00	1.20
D	0.35	0.45
E	0.35	0.55
G	0.90	1.00
H	0.02	0.10
J	0.10	0.20
K	2.60	3.00

Mounting Pad Layout (Unit: mm)

SOT-23-6L

